



Perceptions of Playing-related Discomfort/Pain Among Tertiary String Students: A Longitudinal Study

Author

Waters, Megan Kate

Published

2018-09

Thesis Type

Thesis (PhD Doctorate)

School

Queensland Conservatorium

DOI

[10.25904/1912/3064](https://doi.org/10.25904/1912/3064)

Downloaded from

<http://hdl.handle.net/10072/381164>

Griffith Research Online

<https://research-repository.griffith.edu.au>

**Perceptions of Playing-related Discomfort/Pain Among Tertiary String Students:
A Longitudinal Study**

Ms. Megan Waters

BMus (Hons I)

Queensland Conservatorium
Arts, Education and Law School
Griffith University

Submitted in fulfilment of the requirements of the degree of Doctor of Philosophy

September, 2018

Abstract

Over the past 35 years a growing body of research has shown that many musicians suffer from playing-related discomfort/pain and injury throughout their lifetime. The vast majority of studies have collected cross-sectional quantitative data with the aim of establishing the incidence of injury in a specific population whether that be professional orchestral musicians, tertiary string students, adolescents, or children. Whilst beneficial, this type of research has been unable to provide much detail as to the unique experiences of these individuals, and how these change over an extended period of time.

The purpose of this PhD thesis is to gain a better understanding of the perceived impact of personal circumstances, past and present learning environments, and musical culture on the development of playing-related pain and injury among tertiary string students. The study used a multi-phased mixed methods methodology utilising elements of both quantitative and qualitative research. Over a period of 5 years a total of 40 Bachelor of Music string students at an Australian tertiary institution (all the violin, viola, cello, and double bass majors who entered the Bachelor of Music program in 2007 and 2008) participated in twice-yearly questionnaire/interviews. These contained standard and established pain measurement tools namely Fry's Overuse Injury Scale and the McGill Pain Questionnaire. Additional questions were added to both gather demographic data and also to allow the researcher to explore individual circumstances that may have impacted their playing and playing-related injury circumstances over the 5 year period. Data was also collected from three focus groups.

There were only 5 instances in 181 questionnaire/interviews where a student reported they had not experienced any playing-related discomfort/pain since the

previous round of data collection. Considering the participation rate remained extremely high at 96%, these results are striking. The perceived severity of student experiences varied greatly with some students suffering from only occasional mild discomfort whilst playing. Unfortunately, there were others who were experiencing severe pain and injury that impacted on their ability to not only play the instrument but also their ability to undertake some everyday activities.

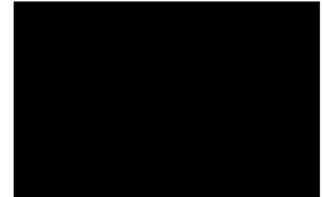
The thesis itself consists of 10 chapters and extensive appendices. Chapters 1-3 introduce the research questions, give a detailed review of the literature, and outline the methodology and preliminary data analysis. Chapters 4 to 8, the main discussion chapters, then go on to explore the 5 main areas of perceived influence on playing-related discomfort/pain and the emerging themes. Chapter 4 looks at the influence of past and present learning environments, with a particular emphasis on the Major Study course at the institution. Chapter 5 focuses on the perceived impact of the Orchestra course at the institution and examines factors such as rehearsal structure/scheduling, breaks, atmosphere, repertoire, stretching, ergonomics of the rehearsal spaces, and the Opera component of the course. Chapter 6 considers the relationship between their experiences of playing-related discomfort/pain and the number of hours per day spent playing their instrument and factors within practice such as consistency and content (warm-ups, practice breaks, and repertoire). Chapter 7 examines technique, posture, instrument set-up, and tension. Chapter 8 unpacks the multitude of other influencing factors, which ranged from exercise and diet, outside work, computer use, writing, and day-to-day activities to pre-existing medical conditions, psychological health, and personality.

The data was analysed using a mixed-method approach using a variety of qualitative and quantitative methodologies best suited to the research question. Through this process summaries of the individual cases for each of the 40 participants were also generated. (These extensive documents are contained in the Appendix B.) The summaries document the individual journeys of each student and the perceived interaction within and between the 5 main areas of contributing factors to discomfort/pain. The summaries also reinforce the extent to which students had a variety of perceptions of the overlapping, interactive, and highly subjective contributing factors. From these summaries, six specific cases (two violin majors, two viola majors, and two cello majors) were selected for further in-depth analysis in Chapter 9 of the thesis. The final chapter of the thesis, Chapter 10, reviews and discusses the 5 main areas of influence and the relevant themes in relation to the broader literature. It concludes with a general discussion of limitations to the research, recommendations for the institution and other tertiary institutions, and recommendations for further research.

Statement of Originality

This work has not been previously submitted for a degree or diploma in any university.

To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.



Megan Waters

Acknowledgements

I would like to express my sincere gratitude to my supervisors Dr Stephen Emmerson and Dr Scott Harrison for their ongoing support during my PhD candidature. Stephen, your faith in my ability to carry out and complete this research and the physical assistance you gave me on a day-to-day basis kept me going when I really did want to give up. Scott, your knowledge of ethical procedures and University guidelines were also invaluable.

Along with my supervisors, I wish to sincerely thank Michele Walsh and all the other staff at the institution where the research took place for their support, encouragement, and practical help over the five-year period of data collection. General thanks must also go to Dr Bronwen Ackermann, Dr Lisa Laasko, Dr Catherine Grant, Courtney Williams, my mum and dad, friends, Roscoe and my certified assistance dog Dottie.

Finally, I would like to thank the 40 string students at the institution who participated in this research project. I consider myself very lucky to have heard their individual stories and am honoured with the trust they placed in me. I sincerely hope that I have represented their words and experiences accurately.

Ethical Clearance

This research has been conducted in accordance with the National Statement on Ethical Conduct in Human Research, and was reviewed and approved by Griffith University Human Research Ethics Committee. All research was conducted in accordance with the approved protocol.

List of Publications and Presentations during Candidature

- Waters, M. K. (2011, October). *Playing-related discomfort/pain among tertiary string students: A longitudinal study*. Paper presented at the annual conference of The Australian Society for Performing Arts Healthcare, Sydney.
- Waters, M. K. (2012, December). *Playing-related discomfort/pain among tertiary string students: Two case studies*. Paper presented at the annual conference of The Australian Society for Performing Arts Healthcare, Sydney.
- Waters, M. K. (2013, November). *Playing-related discomfort/pain among tertiary string students: Three more case studies*. Paper presented at the annual conference of The Australian Society for Performing Arts Healthcare, Brisbane.
- Waters, M., Emmerson, S., & Harrison, S. (2014). Perceptions of playing-related discomfort pain among tertiary string students: a brief overview. *Stringendo*, 36(1), 26-27.

Table of Contents

Chapter 1: Introduction and Research Questions	1
Chapter 2: Literature Review	6
Incidence of Playing-Related Pain/Injury	32
Risk Factors for PRMDs	6
Age	6
Gender	7
Joint laxity (Hypermobility).....	7
Posture and technique.....	8
Instrument specific	10
Practice.....	12
Psychological factors.....	14
Outside stressors.....	20
Preconceived ideas, attitudes and the learning environment.....	22
Chapter 3: Methodology.....	26
Introduction	26
Stage one: Preparation.....	32
Stage two: Data collection and analysis	46
Data collection.....	46
Conclusion.....	78
Chapter 4: The Learning Environment.....	79
Introduction	79
Learning Environments within the Institution.....	80
The Major Study course	80
Individual teachers	81
Sessional teachers.....	95
Viola students.....	98
Music Education majors.....	100
The Orchestra course.....	102
Other Orchestral Environments.....	105
Influence of the First Teacher	105
Learning in a Group Situation	108
Conclusion.....	110
Chapter 5: Orchestra	112
Introduction	112
The Orchestra Course.....	113
Rehearsal Structure and Scheduling.....	114
Breaks within Rehearsals	117

The Psychosocial Work Environment.....	119
Repertoire.....	123
Stretching.....	125
Environmental Conditions.....	130
Opera.....	134
Other Orchestral Situations.....	140
Conclusion.....	145
Chapter 6: Practice.....	148
Introduction.....	148
Total Playing Time.....	149
Individual Practice.....	159
Consistency.....	165
Content of Practice.....	170
Warm-ups.....	170
Practice breaks.....	175
Repertoire.....	180
Other factors.....	183
Conclusion.....	185
Chapter 7: Technique.....	187
Introduction.....	187
General Overview.....	188
Posture.....	195
Instrument Set-Up.....	199
Tension.....	204
Conclusion.....	208
Chapter 8: Other Influencing Factors.....	210
Introduction.....	210
Exercise and Diet.....	211
Sports Injuries.....	219
Outside Work.....	222
Day-to-Day Activities.....	227
Sleeping.....	227
Carrying and lifting items.....	229
Travelling.....	232
House work.....	232
Computer Use and Writing.....	234
Pre-existing Medical Conditions.....	237
Psychological Health.....	240

Generalised anxiety and stress	241
Concern about experiences of playing-related discomfort/pain	244
Depression	246
Personality	250
Conclusion	254
Chapter 9: Case Studies	257
Introduction	257
Mary	258
Introduction/rationale	258
Orientation week	261
Semester 2	262
Semester 3	262
Semester 4	262
Semester 5	262
Semester 6	263
Discussion	263
Tom	271
Introduction/rationale	271
Orientation week	273
Semester 2	273
Semester 3	274
Semester 4	274
Semester 5	275
Semester 6	275
Discussion	275
Robert	282
Introduction/rationale	282
Orientation week	287
Semester 2	287
Semester 3	287
Semester 4	287
Semester 5	288
Semester 6	288
Semester 7	288
Semester 8	289
Discussion	290
Anna	296
Introduction/rationale	296

Orientation week	299
Semester 2	300
Semester 3	300
Semester 4	300
Semester 5	301
Semester 6	301
Semester 7	301
Semester 8	302
Discussion	302
Steve	308
Introduction/rationale	308
Orientation week	312
Semester 2	312
Semester 3	312
Semester 4	313
Semester 5	313
Semester 6	313
Semester 7	314
Semester 8	314
Discussion	315
Caitlin	320
Introduction/rationale	320
Orientation Week	324
Semester 2	324
Semester 3	324
Semester 4	324
Semester 5	325
Semester 6	325
Semester 7	325
Semester 8	326
Discussion	326
Conclusion.....	332
Chapter 10: Conclusion.....	335
Introduction and Research Questions.....	335
Major contributing factors.....	337
The learning environment	337
Orchestra	340
Practice.....	342

Technique.....	345
Other influencing factors.....	346
Conclusion.....	350
Reference List	353
Appendix A: Changes at the Institution since this Research Took Place.....	389
Appendix B: Student Summaries	392
Student 1: Susie.....	392
Student 2: John.....	416
Student 3: Tim.....	422
Student 4: Jill.....	436
Student 5: Caitlin.....	444
Student 6: Cassie	466
Student 7: Tom.....	482
Student 8: Wendy.....	498
Student 9: Jena	514
Student 10: Molly.....	515
Student 11: Mary.....	517
Student 12: Sam	530
Student 13: Erin.....	542
Student 14: Julie.....	554
Student 15: Brad.....	560
Student 16: Mark.....	570
Student 17: Chris.....	589
Student 18: Melanie	601
Student 19: Anna.....	604
Student 20: Rachel	628
Student 21: David.....	641
Student 22: Eve	653
Student 23: Frank	654
Student 24: Gary	656
Student 25: Steve.....	665
Student 26: Melissa.....	682
Student 27: Melinda	696
Student 28: Natalie.....	708
Student 29: Liam.....	717
Student 30: Tina	721
Student 31: Leah	730
Student 32: Donna.....	737

Student 33: Sally	750
Student 34: Robyn.....	765
Student 35: Robert.....	772
Student 36: Becky	798
Student 37: Claire.....	799
Student 38: Jack	800
Student 39: Felicity	817
Student 40: Jane	826
Appendix C: Consent Forms	827
Sample Consent Form: Focus Group	827
Sample Consent Form: Interview.....	829
Sample Consent Form: Ongoing Pain Questionnaire/interview (Revised).....	831
Sample Consent Form: Ongoing Pain Questionnaire.....	833
Sample Consent Form: Initial Questionnaire	835
Appendix D: Orientation Week Handout, <i>The Musician's Twelve-Point Fitness-to-Play Programme</i>	838
Appendix E: Initial Questionnaire by Instrument	839
Cello.....	839
Double Bass	852
Viola.....	866
Violin.....	878
Appendix F: Correspondence Templates	890
Sample Email: Ongoing Pain Questionnaire (2007).....	890
Sample Email: Ongoing Pain Questionnaire/interview (2011).....	891
Template of Initial Letter for Major Study Teachers (2006).....	892
Template of Letter for Major Study Teachers RE Ongoing Pain Questionnaire	894
Follow-Up Letter: Withdrawals	895
Appendix G: Poster Templates	896
Appendix H: Ongoing Pain Questionnaires and Interviews	898
Ongoing Pain Questionnaire (2007).....	898
Ongoing Pain Questionnaire (2008).....	901
Ongoing Pain Questionnaire (2009-2011)	905
Ongoing Pain Questionnaire/interview: Common Questions	909
Ongoing Pain Questionnaire/interview: Finishing Students	910
Appendix I: Feedback Form.....	911
Appendix J: Focus Group Quotations	912
Focus Group 1 (25/08/2009)	912
Selected extracts relating to Orchestra	912

Selected extracts relating to Practice.....	917
Selected extracts relating to Technique.....	921
Selected extracts relating to Other Influencing Factors	923
Focus Group 2 (20/10/2009)	924
Selected extracts relating to Orchestra	924
Selected extracts relating to Practice.....	926
Selected extracts relating to Technique.....	929
Selected extracts relating to “good posture”	931
Selected extracts relating to Other Influencing Factors	931
Focus Group 3 (30/03/2010)	935
Selected extracts relating to Orchestra	935
Selected extracts relating to Practice.....	935
Selected extracts relating to Technique.....	937

List of Tables

Table 1. Initial Questionnaire: An Outline.....	38
Table 2. Comparison of Rank (R) and Scale (S) scores: Group 1, McGill Pain Questionnaire..	44
Table 3. Group 1: Instrument by Gender	47
Table 4. Group 2: Instrument by Gender	47
Table 5. Instrument Make-up of Groups 1 and 2 Males and Females Combined.....	47
Table 6. Number of Participants per Semester.....	52
Table 7. Student Participation in Focus Groups.....	61
Table 8. Legend of Terms used in Microsoft Excel	64
Table 9. Fry's Overuse Injury Scale: Number of Students Selecting Each Grade	66
Table 10. McGill Pain Questionnaire: Present Pain Intensity	67
Table 11. Legend of Terms used in Questionnaire/interview Transcripts.	70
Table 12. Example Table Summary for Student 26 (Pseudonym Melissa), a Female Violinist. 74	
Table 13. Thematic Structure	77
Table 14. Reported Maximum Playing Time Per Day	151
Table 15. Average Daily Practice Reported.....	160
Table 16. Students Doing a Warm-Up at Some Stage of Program	170
Table 17. Students Doing a Warm-Up Regularly for the Duration of Their Program.....	171
Table 18. Reported Pain Experience for Student 11: Mary	261
Table 19. Reported Pain Experience for Student 7: Tom.....	273
Table 20. Reported Pain Experience for Student 35: Robert	286
Table 21. Reported Pain Experience for Student 19: Anna	299
Table 22. Reported Pain Experience for Student 25: Steve	311
Table 23. Reported Pain Experience for Student 5: Caitlin	323

List of Figures

Figure 1. The McGill Pain Questionnaire, Subclasses 1-20.....	43
Figure 2. The McGill Pain Questionnaire: Present Pain Intensity (PPI)	44
Figure 3: Sample Questions from an Ongoing Pain Questionnaire/interview	53
Figure 4: Common Questions for Ongoing Pain Questionnaire/interviews.....	55
Figure 5: Modified Ongoing Pain Questionnaire/interview	56
Figure 6. Extra Questions for Finishing Students	59
Figure 7. Focus Group 1 Discussion Points	62
Figure 8. Creswell's Process for Qualitative Research	68

List of Appendix Tables

Table B1. Reported Pain Experience for Student 1: Susie.....	395
Table B2. Reported Pain Experience for Student 2: John.....	417
Table B3. Reported Pain Experience for Student 3: Tim.....	424
Table B4. Reported Pain Experience for Student 4: Jill.....	438
Table B5. Reported Pain Experience for Student 5: Caitlin.....	446
Table B6. Reported Pain Experience for Student 6: Cassie.....	468
Table B7. Reported Pain Experience for Student 7: Tom.....	484
Table B8. Reported Pain Experience for Student 8: Wendy.....	500
Table B9. Reported Pain Experience for Student 9: Jena.....	514
Table B10. Reported Pain Experience for Student 10: Molly.....	516
Table B11. Reported Pain Experience for Student 11: Mary.....	519
Table B12. Reported Pain Experience for Student 12: Sam.....	532
Table B13. Reported Pain Experience for Student 13: Erin.....	544
Table B14. Reported Pain Experience for Student 14: Julie.....	555
Table B15. Reported Pain Experience for Student 15: Brad.....	561
Table B16. Reported Pain Experience for Student 16: Mark.....	572
Table B17. Reported Pain Experience for Student 17: Chris.....	591
Table B18. Reported Pain Experience for Student 18: Melanie.....	602
Table B19. Reported Pain Experience for Student 19: Anna.....	606
Table B20. Reported Pain Experience for Student 20: Rachel.....	630
Table B21. Reported Pain Experience for Student 21: David.....	642
Table B22. Reported Pain Experience for Student 22: Eve.....	653
Table B23. Reported Pain Experience for Student 23: Frank.....	655
Table B24. Reported Pain Experience for Student 24: Gary.....	658
Table B25. Reported Pain Experience for Student 25: Steve.....	667
Table B26. Reported Pain Experience for Student 26: Melissa.....	684
Table B27. Reported Pain Experience for Student 27: Melinda.....	698
Table B28. Reported Pain Experience for Student 28: Natalie.....	709
Table B29. Reported Pain Experience for Student 29: Liam.....	717
Table B30. Reported Pain Experience for Student 30: Tina.....	722
Table B31. Reported Pain Experience for Student 31: Leah.....	731
Table B32. Reported Pain Experience for Student 32: Donna.....	739
Table B33. Reported Pain Experience for Student 33: Sally.....	751
Table B34. Reported Pain Experience for Student 34: Robyn.....	766
Table B35. Reported Pain Experience for Student 35: Robert.....	774
Table B36. Reported Pain Experience for Student 36: Becky.....	798
Table B37. Reported Pain Experience for Student 37: Claire.....	799
Table B38. Reported Pain Experience for Student 38: Jack.....	801
Table B39. Reported Pain Experience for Student 39: Felicity.....	818
Table B40. Reported Pain Experience for Student 40: Jane.....	826

Chapter 1: Introduction and Research Questions

Historical reviews from authors such as Dawson (2013), Fry (1986b, 1991), and Harman (2010) show that musicians' maladies were first recognised as far back as the 18th century. Yet they only came to be widely acknowledged in the early 1980's when virtuosi pianists Leon Fleisher and Gary Graffman sought treatment for and openly talked about their experiences. As a result of their candour other musicians began to come forward seeking treatment for various injuries and the field of performing arts medicine was born.

In the years since, numerous organisations dedicated to the investigation and prevention of musicians playing-related injuries have been formed. Most notable internationally is The Performing Arts Medicine Association (PAMA); with sister journal, *Medical Problems of Performing Artists* (MPPA). Other organisations worldwide include The Australian Society for Performing Arts Healthcare (ASPAH), The British Performing Arts Medicine Association, and The Dutch Performing Arts Medicine Association.

The figures showing the incidence of pain and injury among musicians can be confronting. A systematic review of the literature undertaken by Silva, Filipa, and Afreixo (2015) found the prevalence of pain afflicting playing varied, affecting 25.8% to 84.4% of musicians (p. 8). Additional studies have found the level of playing-related discomfort/pain among professionals and university students to be as high as 89% (Zetterberg, Backlund, Karlsson, Werner, & Olssen, 1998, p. 161), and 92% of school students (Britsch, 2005, p. 41). Alarming, the figures may be even higher when considering string players alone. Among others, Guptill, Zaza, and Paul (2000) found

the incidence of pain to be as high as 100% in upper string players and 77.8% in lower string players (p. 87).

The body of growing research has identified a number of risk factors for playing-related health problems. In her review of the early literature Zaza (1992) listed the intrinsic factors from multiple studies as being age, gender, hypermobility, genetic predisposition, size, strength, flexibility, muscle tone, physical conditioning, underlying disease management, and malalignment. Extrinsic factors were found to be non-musical activities, stress and tension, incorrect rehabilitation of prior injury, and numerous factors related to technique, instrument (group, size, and hold), teacher, repertoire, practice habits, playing time, ergonomics and technique, and posture (p. 118).

More recently, Horvath (2010) listed the potential factors contributing to overuse as being body size and build, conditioning, muscle imbalances, fatigue, joint laxity, stress levels, misuse (poor technique habits or posture), abrupt changes or increases of schedule, length of practice, instrument type or weight, style of playing, lifestyle choices, and equipment set-up (p. 26). Brandfonbrener (2010) noted similar factors, adding in talent and bad luck (p. 29) and went on to further categorise them according to age, joint laxity, specific instruments, performing and environmental risks, and lifestyle issues and health (pp. 29-48).

It is thought that the interaction of several of these factors is what ultimately leads to a playing-related injury (Brandfonbrener, 2010 p. 25; Horvath, 2010, p. 23). Most of these can theoretically be minimised with the teaching of preventive practices and good playing habits. Given this, it seems reasonable to expect that increased awareness over the previous 35 years should have led to a decrease in the incidence of injury in targeted musician populations. Unfortunately, this does not seem to be the

case. Recent studies continue to show high incidence of pain and injury among musician populations of up to 90% (Ackermann, Driscoll, & Kenny, 2012, pp. 182-183; Brandfonbrener, 2009, p. 30; Ioannou & Altenmüller, 2015, p.135; Lamontagne & Belanger, 2015, p. 4; Sousa, Machado, Greten, & Coimbra, 2016, p. 8; Stanek, Komes, & Murdoch, 2017, p. 20; Steinmetz, Scheffer, Esmer, Delank, & Peroz, 2015, p. 965; Vinci, Smith, & Ranelli, 2015, p.143; Wood, 2014, p. 37).

There are many possible reasons as to why this might be. The majority of those researching the issues belong to organisations which have been formed by, and are largely made up of, health professionals rather than musicians and teachers. Much of the available research has been quantitative and impersonal, published in journals not readily accessed by musician populations. In any case, most musicians have placed little value in knowledge attained through systematic research (Kennel, 2002, p. 253). Unlike other disciplines, musical culture has seen some forms of knowledge remain largely unchallenged as time passes (Davidson, 1997, p. 212; Hargreaves, North, & Tarrant, 2002, p. 613; Wilson, 1994, p. 24).

However the real issue most likely lies in the complexity of the problem. It may be relatively straightforward for a medical practitioner or researcher to isolate certain behaviours that may be contributing to injury in an individual. However understanding where and why these behaviours originated is another matter. To take a step in this direction involves deep reflection and examination not only of individuals' personal circumstances but also the entire musical culture in which these individuals exist.

At the time that this research project was designed there was limited qualitative and mixed methods research that closely examined the perceived impact of personal circumstances, past and present learning environments, and musical culture on the

development of playing-related pain and injury. There was also a lack of research tracking the perceived experiences of playing-related discomfort/pain of individual musicians over time. This research project has approached the issue of musician injury from these formerly unexplored angles.

The project collected data over a period of five years, involving two intakes of Bachelor of Music string students at a music conservatory in Australia. 40 case studies in total were closely monitored through questionnaires, semi-formal interviews, and focus groups. The project aimed to address the following research questions:

1. How, if at all, do string students perceive the nature and causes of their own playing-related discomfort/pain as changing as they progress through a Bachelor of Music program?
2. What are students' perceptions as to the individual circumstances (both past and present) that may be contributing to the development of their playing-related discomfort/pain?
3. What behaviours do string students perceive to be influencing their playing-related discomfort/pain? And
4. What factors within the current learning environment at the institution do string students perceive to be influencing their playing-related discomfort/pain?

The overriding purpose of these questions is not to diagnose or quantify experiences of pain, as this has already been done extensively in other contexts. Rather, addressing these questions will give insight into the unique experiences of each individual, and how these change over an extended period of time. They will also allow participants to give their perceptions of the specific learning environments at the

institution and potentially allow it to identify and modify positive and/or negative factors in their curriculum that students perceive as impacting in some way on playing-related pain and injury.

Chapter 2: Literature Review

Risk Factors for PRMDs

This section considers a selection of the main risk factors that have been identified as contributors to musicians' injuries. As already noted, a wide range of factors have been identified but more recent literature emphasises that playing-related pain and injury often results from the interaction of multiple, overlapping risk factors (Brandfonbrener, 2010, p. 25; Horvath, 2010, p. 23; Rickert, Barrett, & Ackermann, 2013, p. 227). Some of the relevant contributing factors are considered briefly below, beginning with three of them that are beyond the control of the individual.

Age

Generally speaking, the consensus is that injury is most common among tertiary students and young professionals. Hochberg and Newmark (1987) found that over two thirds of the 108 musicians presenting at a clinic with the chief complaint of playing-induced pain were conservatory students or young professionals (p. 93). Ioannou and Altenmüller (2015) also noted the onset of PRMDs among 186 tertiary music students coincided with their entrance to conservatoire study (p. 135). However in a study of 377 professional orchestral musicians Kenny and Ackermann (2015) found that those aged 41 to 50 reported higher frequency and severity of PRMDs (p. 53); and in a study including 106 Brazilian violinists Kochem and Silva (2017) found that older musicians were more likely to report pain in the past 7 days (p. 27). It is also worth keeping in mind that there may be fewer older people reporting their injuries because they have already left the profession (Fishbein et al., 1988, p. 5; Wood, 2014, p. 39).

Gender

Many researchers have also found women to be at a greater risk of developing a playing-related injury. Among others, Barton et al. (2008, p. 75); Britsch (2005, p. 40); Cayea and Manchester (1998, p. 19); Farewell and Zaza (1997, p. 292); Fry, Ross, and Rutherford (1988, p. 133); Kaneko et al. (2005, p. 168); Kenny and Ackermann (2015, p. 53); Kochem and Silva (2017, p. 27); Leaver et al. (2011, p. 549); Middlestadt and Fishbein (1989, p. 45); Paarup, Baelum, Holm, Manniche, and Wheddokopp (2011, p. 223); Ranelli et al. (2011, p. 123); Steinmetz et al. (2015, p. 965); and Viljamaa et al. (2017, p. 195) found the incidence of injury in females to be significantly higher than in men. Certain other studies, including those by Brandfonbrener (2009, p. 32); Guptill et al. (2000, p. 89); Hiner, Brandt, Katz, French, and Beczkiewicz (1987, p. 69); Ioannou, Hafer, Lee, and Altenmüller (2018, p. 32); and Pratt, Jessop, and Neimann (1992, p. 18) have found that both genders are at equal risk.

Focal dystonia may be an exception. As described by Fry (1991, p. 46), it usually develops after many years of intense practice, and is most commonly encountered among men in their thirties (Brandfonbrener & Robson, 2004, p. 255; Frucht, 2004, p. 227). Lederman and Schuele (2004) found that 86% of the 21 string musicians presenting with focal dystonia at a clinic were men, despite women generally outnumbering men 2.5:1 (p. 46). Macfarlane and Rietveld (2009) also found the majority of the 253 new patients presenting at a performing arts clinic were male (p. 185).

Joint laxity (Hypermobility)

Some researchers believe that musicians with joint laxity, defined by Wynn Parry (2004) as “increased range of movement beyond the accepted norm” (p. 44), may

be more likely to suffer PRMDs. Brandfonbrener has repeatedly found higher levels of joint laxity among injured musicians and has published extensively on the topic (Brandfonbrener, 2000, p. 73; 2006, p. 750; Burkholder & Brandfonbrener, 2004, p. 116). Other researchers confirming a link between joint laxity and PRMDs include Farewell and Zaza (1997), who found it to be an asset in general among 281 professional and university student musicians (p. 297); Larsson et al. (1993), who found it to be an asset in joints that are frequently moved such as hands and wrists in a population of 660 working musicians (p. 1079); and Vinci et al. (2015), who found a significant association between hypermobility and PRMDs in a study involving 76 adolescent musicians (p. 149). However Miller, Peck, and Watson (2002) found no connection between hypermobility and injury in a study involving 92 tertiary music students (p. 169).

Posture and technique

Many researchers have noted that posture and body mechanics, which are intrinsically linked to playing technique, may contribute to the development of PRMDs (Brandfonbrener, 2010, p. 33; Ioannou & Altenmüller, 2015, pp. 139-140; Schafer-Crane, 2006, pp. 827, 830; Steinmetz, Seidel, & Mucche, 2010, p. 603; Wynn Parry, 2004, p. 48). Tubiana, Chamagne, and Brockman (1989) suggest that posture should be automatic, allowing the musician to focus on fine muscle movements (p. 73). In order to find the correct posture, however, one must know how the body works, both on its own and in conjunction with the instrument.

Harrison and Paull (1997) note that, traditionally, musicians have been taught little about anatomy (p. 6). As a result they may be unaware that their posture can be affected when muscles become shortened (and thus tight) whilst practising due to the

limited range of motion used (Ackermann, 2010, p. 251; Wynn Parry, 2004, p. 49). They may also be unaware that taking a break during practice and breathing deeply can restore the muscle to its proper length (Liebermann, 1991, p. 48; Wilson, 2005, p. 65). Knowledge and activation of these simple principles could aid many musicians in their fight against playing-related pain.

In recent years the American *Health Promotion in Schools of Music* project (Chesky, Dawson, & Manchester, 2006; <http://www.unt.edu/hpsm>) has seen the introduction of courses in tertiary music institutions worldwide aiming to educate student musicians about such principles. In a German study Voltmer, Spahn, and Zander (2010) found that student participation in a preventative program during the first two semesters of university music training had a positive effect on student performance and attitudes towards health (p. 54). However they also found there to be little effect on students who already had physical symptoms. They later reported additional longitudinal data confirming these findings (Spahn, Nusseck, & Zander, 2014, pp. 11-12; Spahn et al., 2017, p. 222).

Lopez and Martinez (2013) investigated the effect of a preventative course in health and prevention of PRMDs among 149 advanced musicians at a Spanish conservatory. Encouragingly, they found that students in the experimental group increased their body awareness by 91%, and the rate of injury in this group fell by 78%, as opposed to no change in the control group (p. 100). In an American study of 26 freshman music majors Barton and Feinberg (2008) found that participation in a preventative course resulted in increased knowledge of the content covered (p. 47). In a study involving 23 Icelandic music students Árnason, Briem, and Árnason (2018) similarly found that participation improved subjective body awareness and attitude

towards prevention strategies (p. 131). However in a sample of 46 participants from 7 conservatories in the UK, where there is a less cohesive approach across institutions, Atkins (2009) found they perceived inadequate support for their health and wellbeing (p. 219).

When considering issues of posture, it is also necessary to consider the impact of other aspects of the playing environment. Ackermann et al. (2012) found that professional orchestral musicians perceived stressful situations such as performance as requiring more physical exertion than practice (pp. 182-183) and Wood (2014) found that students were more likely to correct their posture during practise than performance (pp. 40-41). Such findings are once again suggestive of the complexity and overlapping nature of the risk factors for playing-related injury.

Instrument specific

Since Owen (1985, pp. 137-138) many studies have found higher rates of PRMDs among string players (in particular violinists) and pianists than other instrumentalists. In a study involving 117 musicians Guptill et al. (2000) found that 100% of upper string players and 77.8% of lower string players experienced problems (p. 87); in the American ICSOM National Survey of 2212 professional orchestral musicians string players were found to be more likely to have a severe medical problem (Middlestadt & Fishbein, 1989, p. 43); and in a study of 246 Brigham Young University students Pratt et al. (1992) found that string majors reported the highest figures for injuries of the back, shoulder, wrist, neck, arm, and fingers (p. 14).

In a more recent study involving 253 new patients at a performing arts clinic Macfarlane and Rietveld (2009) found that violinists, keyboardists, and guitar players were more likely to present for treatment (p. 185). Nawrocka, Mynarski, Powerska-

Didkowska, Grabara, and Garbaciak (2014) also found that string instrumentalists were most likely to experience musculoskeletal pain in their study involving 225 instrumentalists at a Polish music school (p. 65); and in a sample of 101 Scottish professional orchestral musicians Berque et al. (2016) found that upper string players reported more PRMP in the right and left upper limbs and neck (p. 81). However Ackermann et al. (2012, p. 183), Brandfonbrener (2009, p. 30), and Kreutz et al. (2008, p. 3) found no significant differences in PRMDs among instrumental groups.

Some researchers have also found differences in the location of injuries experienced by musicians according to which instrument they play. The results from a study of 32 violinists by Ackermann and Adams (2003) suggested that players with shorter right arms were at an increased risk of injury (p. 65). In a study involving 377 professional orchestral musicians Ackermann et al. (2012) found that upper string players predominately experienced pain in the back and both upper limbs whilst lower string players experienced it in the back and right shoulder (p 183). Burkholder and Brandfonbrener (2004) found that, among the 314 music students seen at a specialty clinic, violinists had significantly more injuries in the left forearm and hand compared to other string players (p. 117); and in a study of 408 German professional orchestral musicians Steinmetz et al. (2015) found that upper string players were more likely to experience permanent pain in the neck, both shoulders, and left wrist (p. 969).

There may however be ways to limit the risks for string players. Many children start their learning on instruments that they can “grow into”. Dommerholt and Norris (1997) claim that children who start playing on an instrument that is too large assume that strained postures are normal and a requirement of playing the instrument (p. 190). Havlick and Upton (1996) agree, stating that “smaller children with larger instruments

develop increased hypermobility, related problems, and myofascial complaints of the larger assisting muscles, particularly those of the upper arm and shoulder” (p. 59).

Brandfonbrener (2010, pp. 34-35) and Horvath (2010, p. 91) also note that playing on an instrument that is too large may increase the likelihood of injuries.

Other factors of instrument set-up, such as bridge height, string length, and the depth, width, and weight of the instrument may also leave musicians vulnerable to injury (Brandfonbrener, 2010, p. 33). However there are a number of ways of modifying instruments so they are more suitable to the individual such as recessing the top portion of a viola, altering carrying cases with wheels or backpack additions, changing the height of the bridge, or simply finding a new chin or shoulder rest. Examples of authors noting the benefits of such modifications include Ackermann (2010, p. 263); Horvath (2001, p. 104; 2010, pp. 158-164); Markison (1990, p. 534); Warrington (2003, p. 293); and Wynn Parry (2004, pp. 52-53). It is noteworthy that the choice of shoulder and chin rest are often not determined by what fits best, but rather the teacher’s and musician’s own prejudices (Brandfonbrener, 2010, p. 34).

Finally, it is important to consider the impact of particular demands of instruments on the musician’s body. For example, muscles may develop asymmetrically due to the particular demands of instruments (Ackermann and Adams, 2003, p. 65). In string players the muscles on the right side are often more developed than those on the left (Brandfonbrener, 2003, p. 234). The end result is muscle imbalance which can lead to musculoskeletal disorder (Wilke, Priebus, Biallas, & Frobose, 2011, p. 25).

Practice

Over the past 30 years researchers have consistently reported on a link between the development of PRMDs and practice habits. Fry (1987) found a close to 100%

correlation between the onset of overuse symptoms and an increase of time versus intensity of practice in his early study of 1249 Australian music students. He went on to write that such increases may be related to upcoming auditions and recitals, the demands of specific repertoire, or a change of teacher (p. 38). The results of studies by Ackermann and Adams (2004, p. 673); Ackermann et al. (2012, p. 183); Britsch (2005, p. 40); Fry et al. (1988, p. 133); Hiner et al. (1987, p. 69); Kochem and Silva (2017, p. 30); Ling et al. (2018, p. 82); Miller et al. (2002, p. 169); Porter et al. (2018, p. 47); Pratt et al. (1992, p. 7); Ranelli, Smith, and Straker (2015, p. 390); Robitaille, Tousignant-Laflamme, and Guay (2018, p. 6); and Zetterberg et al. (1998, p. 164) also confirm a link between increased hours of practice and the development of PRMDs.

Other researchers have also confirmed the potential impact of practising specific repertoire on PRMDs. Hagglund (1996) found that 30% of 151 tertiary music students from the New England Conservatory perceived that practising technically demanding pieces and/or difficult repertoire contributed to music-related injuries (p. 102). In their study involving 22 Irish traditional musicians Wilson et al. (2014) found that participants perceived intensity, speed, and technical demands of the music increased the likelihood of PRMDs (p. 685). In a study of 214 tertiary-trained jazz pianists Wood (2014) similarly found that students perceived a link between PRMDs and repertoire, although no meaningful statistics emerged to support this (p. 40).

Another key consideration is the practice warm-up and its content. Hoppmann (2010) says that “muscles, tendons, and other supporting structures function more efficiently and are less likely to be injured if they are first warmed up and put through the range of motion required for the activity to be undertaken” (p. 210). Hickey (2005) suggests that an effective way to warm-up would involve stretching the muscles gently

in the direction opposite to the instrument's playing position, before moving on to slow scales and exercises (p. 10). However Ackermann (2010) writes that as yet there is no conclusive evidence that stretching for musicians is beneficial as a preventative for injury. She goes on to caution that stretching should focus on specific muscles required to play the instrument and restoring range of motion, and should not be done immediately prior to playing (p. 260).

Finally, the frequency and content of breaks within the practice period need to be considered. Klickstein (2003) is one of many recommending that breaks should occupy at least ten minutes of every hour spent practising regardless of total practice time (p. 52). However, as with warm-ups, content is key. Ideally musicians would stay away from hand-intensive tasks like typing during practice breaks. Taking a break and undertaking some light form of physical activity (such as walk/yoga/stretch) will help to restore shortened muscles to their proper length (Wilson, 2005, p. 65; Wynn Parry, 2004, p. 49).

Psychological factors

Stress

A link between PRMDs and increased stress has been shown in numerous studies of professional orchestral musicians. In a comprehensive study of over 2000 ICSOM musicians Middlestadt and Fishbein (1988) found that the prevalence of musculoskeletal problems was highest among those experiencing greater stress, and lowest amongst those experiencing less stress (p. 689). In a study involving 377 Australian orchestral musicians Ackermann et al. (2012) reported that stress was perceived by 69.6% of those experiencing pain/injury as affecting its development (p. 186). A study of 241 Brazilian professional orchestral musicians also showed that 32%

claimed to experience greater pain when under emotional stress (Kaneko et al., 2005, p. 169).

Although to date there is not as much research of younger populations, some similar results have been found. In a study involving 227 student musicians Zetterberg et al. (1998) found that 21% of injured male and 47% of injured females considered stress to be a cause of their injury (p. 162). In their studies of tertiary music students, Lamontagne and Belanger (2015) found that anxiety was linked to increased pain (p. 6); Spahn et al. (2014) showed a correlation between elements of physical and psychological health (p. 14); and Wristen and Fountain (2013) found that pain, depression, and anxiety were related (p. 157). In a study of 357 school-aged musicians Russell and Benedetto (2014) also found that participants who felt stressed about playing the instrument were more likely to report musculoskeletal discomfort (p. 270).

In recent years there has been additional research relating to the psychosocial work environment in professional orchestras. In a study involving 342 Danish orchestral musicians Holst, Paarup, and Baleum (2012) found that they experienced more psychosocial work stress than non-musicians (p. 639). Rickert et al. (2013) similarly found that Australian orchestral musicians perceived that workplace stress contributed to injury (p. 219), and that it was aggravated by a lack of control due to cultural issues. However in their smaller study of classical orchestral musicians Kaufman-Cohen and Ratzon (2011) found that psychosocial work stressors did not predict PRMDs (p. 93) and Leaver et al. (2011) found only weak associations between psychosocial work stressors and musculoskeletal pain in their study of 243 British orchestral musicians (p. 549). Differences in the amount of control musicians have in the workplace in different cultures (e.g. UK versus Australia) may account for some of these discrepancies.

A recent study by Perkins, Reid, Araújo, Clark, and Williamon (2017) involving 20 UK musicians also showed that both physical and psychological health were of concern to students within the conservatoire learning environment. In this particular research a number of lifestyle and environmental enablers and barriers to optimal health were identified within such institutions. Examples of enablers included promoting psychological well-being, awareness of health, and health lifestyle choices. Examples of barriers included physical playing problems such as PRMD, low levels of health awareness, and practice and learning challenges, as well as many factors linked to mental health including anxiety related to performing and negative feedback (p. 5 of 15).

Music Performance Anxiety

A specific form of psychological stress referred to as Music Performance Anxiety (MPA) has been extensively investigated and proven to be a prevalent medical problem in musician populations (Kenny, 2011, pp. 86 – 91). Some of the variables that have been examined in relation to MPA specifically include gender, experience, coping mechanisms, personality dimensions, social support, dietary and sleeping habits, confidence, positive thinking, self-esteem, efficacy, and perfectionism (Stephenson & Quarrier, 2005, p. 119).

As with PRMDs, the rate of reported MPA in musician populations can vary widely. In a recent study of 112 professional orchestral musicians in Portugal the self-reported incidence of MPA was 13.2% (Sousa et al., 2016, p. 8). These figures are similar to those reported in the much larger ICSOM study (Fishbein et al., 1988), where 16% of respondents claimed to suffer from “stage fright” (p. 6), and those of Wesner,

Noyes, and Davis (1990), who found the incidence of performance anxiety among 302 students and faculty at a tertiary music school to be 16.5% (p. 177).

However a study involving 204 professional orchestral musicians in Canada by Bartel and Thompson (1995) found that the incidence of what was termed “performance-related stress” was 96% (p. 72); and in a study of 220 professional Turkish orchestral musicians Topoğlu et al. (2018) found that 81.8 experienced MPA before and during performances (p. 120). Similarly, in a study of 97 young musicians Britsch (2005) found that 75% of experienced some form of performance anxiety (p. 42); and Cox and Kenardy (1993) found that all of the 32 tertiary instrumental music students in their study experienced anxiety in the performance setting (p. 55). A number of other researchers have also found the incidence of performance anxiety in various musician populations to be between 30% and 60% including Fehm and Schmidt (2006, p. 98); Marchant-Haycox and Wilson (1992, p. 1061); Shoup (1995, p. 102); Steptoe and Fidler (1987, p. 244); Thomas and Nettlebeck (2014, p. 628); and van Kemenade, van Son, and van Heesch (1995, pp. 557-558).

As with PRMDs, the discrepancies can be partially explained by the lack of a commonly accepted definition for MPA. Historically, the literature shows that researchers have used a number of definitions and terms including MPA, performance anxiety, stage fright, and stress related to performance (Kenny, 2011, pp. 48-49; Sasso, 2010, p. 328). The different populations being studied; and the inherent unreliability of self-report measures in assessing psychological well-being may also have played a role in the variance in reported incidence of MPA (Cousineau & Shedler, 2006, p. 427; Kenny & Ackermann, 2015, p. 55).

Some of the available research is suggestive of a link between MPA and PRMD. However the number of studies that have actually attempted to assess this complex relationship remains relatively small (Kenny & Ackermann, 2015, p. 45). Studies reporting limited or no independent association between MPA and PRMDs include Farewell and Zaza (1997, p. 295) and Leaver et al. (2011, p. 549). On the other hand studies by Davies and Mangion (2002, 161) and Kaneko et al. (2005, p. 171) showed a statistically significant relationship between anxiety and pain.

Recently, Kenny and Ackermann (2015) found strong relationships between PRMDs, depression, and MPA (p. 43). In this landmark study of 377 Australian professional orchestral musicians they utilised common definitions and measuring tools¹ for both disorders in what will hopefully be a precedent for future research. Nonetheless the investigations into a possible link between psychological stressors such as MPA and PRMDs are in the early stages. Although beyond the scope of this research project they therefore remain an ongoing area of interest for further research and development.

Physical fitness

Although there are relatively few supporting statistics available (Brandfonbrener, 2010, p. 46), historically researchers have thought that being physically fit may be a preventive measure for PRMDs (Ackermann, 2010, p. 257;

¹ In order to address the lack of diagnostic criteria for MPA, in 2010 Kenny proposed the following comprehensive definition: “Music performance anxiety is the experience of marked and persistent anxious apprehension related to musical performance that has arisen through specific anxiety-conditioning experiences. It is manifested through combinations of affective, cognitive, somatic, and behavioral symptoms and may occur in a range of performance settings, but is usually more severe in settings involving high ego investment and evaluative threat. It may be focal (i.e. focused only on music performance), or occur comorbidly with other anxiety disorders, in particular social phobia. It affects musicians across the lifespan and is at least partially independent of years of training, practice, and level of musical accomplishment. It may or may not impair the quality of the musical performance” (Kenny, 2010, p. 433). A number of imperial measuring devices for MPA have also been developed including the Kenny Music Performance Anxiety Inventory (revised), or K-MPAI (Kenny, 2009, pp. 39-40) and the Music Performance Anxiety Inventory for Adolescents, or MPAI-A (Osborne & Kenny, 2005, p. 748). For a comprehensive list of MPA measures refer to Osborne and Kenny (2005, p. 747).

Baadjou et al., 2015, p. 232; Chan, Driscoll, & Ackermann, 2014, p. 181; Dommerholt & Norris, 1997, p. 192; Norris, 1993, p. 2; Schafer-Crane, 2006, p. 830). Tight, weak, or inadequately conditioned muscles may be more susceptible to overuse than those that are strong and flexible (Norris, 1993, p. 2). The ultimate goal of exercise for musicians should therefore be improving balance, core strength, stretching, flexibility, and aerobic fitness (Foxman & Burgel, 2006, p. 314).

The small number of researchers who have tried to assess the link between physical exercise and PRMDs have reported inconsistent findings. In a study of 90 university instrumentalists Roach et al. (1994) found that those with joint pain did 17.3 hours of physical activity per week compared with 26 hours in those without (pp. 128-129). Similarly, Wood (2014) found that students who participated in regular aerobic exercise reported a lower rate of injury (p. 40). However in their studies of tertiary music students Baadjou et al. (2015) found that physical activity was not significantly associated with musculoskeletal complaints (p. 235) and Brandfonbrener (2009) found no significant relationship between exercise and pain (pp. 34-35).

It may also be that certain types of physical exercise are more beneficial than others to musicians in preventing PRMDs. In a study of 18 undergraduate music majors, Ackermann, Adams, and Marshall (2002) found that endurance training was more effective than strength training in reducing the perceived exertion of playing (p. 33). More recently, Brandfonbrener (2010) recommended musicians undertake low resistance, high frequency exercise (p. 46); Chan et al. (2014) found that a tailored exercise program was beneficial in reducing the frequency and severity of PRMDs in Australian orchestral musicians (p. 181); and Wilke et al. (2011) recommended that training programs for string musicians focus on strength, endurance, and flexibility (p.

26). It is also important that injured musicians are not given further strengthening exercises for muscles which are already overloaded (Ackermann, 2010, p. 258).

Of course being more physical active may also increase the likelihood of suffering some kind of injury unrelated to music making. Hand surgeon Dawson has published extensively on the potential impact of sports participation on hand and upper extremity injury in musician populations (Dawson, 1995, 1996, 2001, 2007). In a study that collected data over 15 years, he found that the most common causes of injury in musicians were sports or a direct fall. Strikingly, nearly two thirds of the sports trauma were caused by ball sports (Dawson, 2007, p. 106). Hand surgeon Wynn Parry (2003) similarly found the largest number of musicians presenting at a clinic were there because of a non-playing-related prior injury (pp. 317-318). However those being referred for hand surgery are more likely to have significant complaints than those suffering from the lower grade upper limb and hand injuries common to overuse injury.

Outside stressors

A number of outside stressors also have the potential to impact on the development and experience of PRMDs in musician populations. Among those mentioned in the literature are computer use, heavy lifting, and travel strains (Ackermann, 2010, p. 248); common household activities such as gardening and craft work (Hoppman, 2010, p. 209; Norris, 1993, pp. 4-5); and pre-existing illnesses/injuries (Horvath, 2010, p. 23). Musician patients may present for treatment with upper extremity injuries caused by household accidents (e.g. knives, broken glass, doors closing on fingers, power tools), motor vehicle accidents, falls or direct blows, and non-musical workplace accidents (Dawson, 2007, p. 106; Foxman & Burgel, 2006, p. 312).

Many part-time work or secondary occupations also involve hand intensive activities (e.g. typing, writing, and waiting on tables) that may contribute to PRMDs.

The figures showing the perceived impact of PRMDs on daily activities (and vice versa) are striking. Due to musculoskeletal symptoms, Paarup et al. (2011) found that 55% of Danish orchestral musicians reported difficulty with daily activities at home, 53% had difficulty with leisure time activities, and 49% experienced difficulty sleeping (p. 231). Similarly, Kaufman-Cohen and Ratzon (2011) found significant correlations between participation in household chores, hobbies, tobacco usage, and PRMDs in a sample of 59 classical musicians (p. 92); Wood (2014) found that carrying heavy items, lifestyle, computer use, and hazards from secondary occupations impacted on perceptions of PRMDs in jazz pianists (p. 42); Ranelli et al. (2014) found that 65% of the 731 child and adolescent instrumentalists in their study reported soreness related to non-musical activity (p. 102); and Vinci et al. (2015) found that non-music-related musculoskeletal soreness in adolescent string musicians was associated with PRMDs (p. 149).

Such are the extent of any perceived links that in some instances the actual origin of a musician's pain (be it playing-related or other activities) may be unclear. Ackermann et al. (2012) reported that 11% of orchestral musicians identified their current pain issue as being non-work-related, and a further 11% were unsure (p. 186). Similarly, Dawson (2007) reported that 32.6% of musicians presenting for treatment at a performing arts clinic were there because of an injury that originated with a fall or blow (p. 105); and Macfarlane and Rietveld (2009) found that 12% of patients presenting at a Dutch performing arts clinic were found to be seeking treatment because of trauma to the affected area (p. 185).

Finally, it is important that musicians take care of their physical health and appropriately manage any underlying illness such as diabetes or arthritis (Horvath, 2010, p. 23). Good nutrition, hydration, and avoidance of caffeine, nicotine, and other stimulants should form the foundation of any treatment program (Schafer-Crane, 2006, p. 830). Historically, there may have been a high incidence of substance abuse ranging from alcohol to cocaine in musician populations (Brandfonbrener, 2010, p. 46). The incidence of AIDS and HIV in performing arts communities may also be higher than in the general population (Gallivan & Sataloff, 2010, p. 311).

Preconceived ideas, attitudes and the learning environment

Preconceived ideas, attitudes, and the learning environment may also have an enormous and overriding influence on the risk factors for PRMDs discussed in this literature review. Many of the identified risk factors for playing related pain and injury relate to habits and attitudes that may form in one-on-one teaching environments. These environments foster relationships which are complex, variable, and can continue outside of the lesson situation. This is particularly the case in higher educational situations where the boundaries between teaching, professional and social contexts may be unclear (Gaunt, 2011, p. 159).

In some contexts it has been shown that students have a variety of experiences with their music studio teachers in higher education (Burwell, 2017; Carey & Grant, 2015; Gaunt, 2009; Schmidt, 1989a, 1989b). Similarly, injured music students (who primarily seek advice from their instrumental tutors) also report a variety of experiences (Guptill, 2011; Ioannou & Altenmüller, 2015; Persson, 1996; Williamon & Thompson, 2006; Wood, 2014). Injured musicians are more likely to seek help from health professionals that have been recommended by teachers and colleagues. Unfortunately,

they may also feel these teachers and health professionals lack the appropriate knowledge to assist them (Guptill, 2011).

Among the available literature on playing-related injuries, the most commonly discussed preconceived idea is that it is acceptable to play through pain (“no pain, no gain”). It is striking that research has consistently found that it is common for musicians of all ages to keep playing through pain, in some instances until they cannot play at all (Britsch, 2005, pp. 41-42; Fry, 1986a, p. 53; Hagglund, 1996, p. 104; Ioannou & Altenmüller, 2015, p. 140; Lockwood, 1988, p. 131; Park, Guptill, & Sumsion, 2007, p. 89; Rickert, Barrett, & Ackermann, 2014a, p. 94; Shoup, 1995, p. 104; Wood, 2014, p. 39).

Consideration of the musician’s viewpoint helps to explain this apparent contradiction. Firstly, success as a musician requires not only talent but also dedication and sustained hard work. Perseverance is required (and encouraged) to advance: musicians may be schooled to continue practising when conditions are not optimal, or feedback is negative (Hallam, 1998, p. 116). Musicians who see injury as a form of weakness, failure, and poor musicianship may play and perform through considerable pain (Brandfonbrener, 2006, p. 748; Rickert et al., 2014a, p. 94).

Secondly, musicians invest much of themselves in their music: they can find it very difficult to separate their personal identity from their identity as a musician (Guptill, 2011, p. 88; McCready & Reid, 2007, p. 140; Park et al., 2007, p. 91; Spahn, Strukely, & Lehmann, 2004, p. 26). Any setback (such as pain) can be perceived as a direct attack on the musician themselves, and considered to be a necessary consequence of playing. In these circumstances it may be interpreted as a weakness to be tolerated and

overcome with more practising (Andersen, Roessler, & Eichberg, 2013, p. 124; Kemp & Mills, 2002, p.8).

Thirdly, (and perhaps most pertinently), such ideas may be inadvertently encouraged in the learning environment. In a study of 1249 Australian tertiary music students, Fry (1987) found that over half of those who were injured had been told at some stage that there was nothing wrong with them. A quarter of the students had also been told that their injury was a result of incorrect technique. Understandably, many of these students practised harder and thus worsened their injuries (p. 38).

A number of recent studies have found that some music students and/or teachers are willing to learn more about how to prevent PRMDs (Ioannou & Altenmüller, 2015, p. 135; Lopez & Martinez, 2013, p. 104; Wood, 2014, pp. 42-43). This is encouraging in light of the frequent recommendations in the available literature that music instructors/institutions educate their students on preventative practices (Barton & Feinberg, 2008, pp. 52-53; Brandfonbrener, 2010, p. 28; Brown, 1997, p. 17; Hildebrandt & Nubling, 2004, p. 68; Horvath, 2010, pp. 87-88; Ioannou and Altenmüller, 2015, p. 141-142; Lister-Sink, 2005, p. 20; Lockwood, 1988, p. 129; Lopez & Martinez, 2013, p. 104; Palac, 2012, pp. 14-15; Quarrier, 1995, p. 106; Rickert, Barrett, & Ackermann, 2015, p. 426; Spahn, Richter, & Zschocke, 2002, p. 22; Williamon & Thompson, 2006, p. 427; Wood, 2014, p. 44; Zaza, 1993, p. 120). Yet despite this growing awareness misconceptions as to the causes, treatment, and prevention of playing-related injuries are still evident. As a result a cycle of unhealthy playing behaviours may be thriving.

Conclusion

The foregoing discussion shows that the development of PRMDs is a complex process involving the interaction of multiple contributing factors. The findings from Brandfonbrener's 2009 study of freshman music students suggest that risk factors are only relevant when applied in multiples, and that no generalisations between cases are possible except the presence of pain (p. 35). The findings of her study reinforce the point that, although any musician can suffer an injury, no two cases are exactly the same. It is therefore extremely important to develop a more comprehensive understanding of the individual experience and the perceived impact of unique learning environments on PRMDs.

Chapter 3: Methodology

Introduction

The previous chapter has discussed a broad range of literature available on musicians' PRMDs. At the time that this research project was designed, much of the available research was quantitative and impersonal, and published in journals not readily accessed by musician populations. These studies established beyond doubt that pain and injury can be an issue for any musician, regardless of their age or stage of career. They identified a number of possible risk factors, along with two main points:

1. Many PRMDs are theoretically preventable; and
2. PRMDs occur because of the complex interaction of many different risk factors.

Given this, it seems important to also consider the impact of musical culture and the individual musician's unique learning environments on the development of PRMDs. At the time that this research project was designed, there was limited research exploring personal stories of PRMD, and/or perceived links to musical culture and education.

Given the type of most research (quantitative) and the fields of the researchers themselves (non-musical) this may be understandable. Quantitative researchers collect numbers: when adhering strictly to their paradigm they must "eliminate their biases, remain emotionally detached and uninvolved with the objects of study, and test or empirically justify their stated hypothesis" (Johnson & Onwuegbuzie, 2004, p. 14). Research results are generalized to the population as a whole.

The qualitative paradigm, on the other hand, emphasizes meaning, context, understanding, and process. Qualitative researchers "study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings

people bring to them” (Denzin & Lincoln, 2011, p. 3). They can use narrative content and discourse as well as statistics, tables, graphs, and numbers. They can also draw upon the approaches, methods, and techniques of ethnography (case studies and focus group discussions), interviews, cultural studies, and survey research (Denzin & Lincoln, 2000, p. 6.) Qualitative researchers may use any methods and tools that are available to them, in order to gain individual perspectives on whatever is being studied (Denzin & Lincoln, 2011, p. 4).

Traditionally, the quantitative and qualitative paradigms have remained separate. However a third paradigm has also emerged. Mixed methods research is described as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study” (Johnson & Onwuegbuzie, 2004, p. 17). In mixed methods research, the quantitative and qualitative elements are integrated to answer the research questions. In theory, any weaknesses within should be offset by strengths in others.

According to Creswell (2014) the philosophical base for mixed methods research is the pragmatic worldview. Some of the main characteristics of pragmatism include:

- Not being committed to any one system of philosophy and reality;
- Having the freedom to choose the methods, techniques, and procedures that best meet needs and purposes;
- Utilising many approaches for collecting and analysing data; and
- Acknowledging that research always occurs in social, historical, political, and other contexts (p. 11).

For the mixed methods researcher, pragmatism therefore opens the door to multiple methods, different worldviews, different assumptions, and different forms of data collection and analysis (Creswell, 2014, p. 11).

Some of the possible designs for mixed methods research include convergent parallel mixed methods, explanatory sequential mixed methods, exploratory sequential mixed methods, transformative mixed methods, embedded mixed methods, and multi-phased mixed methods (Creswell, 2014, pp. 15-16). Within multi-phased mixed methods,

Researchers conduct several mixed methods projects, sometimes including mixed methods convergent or sequential approaches, sometimes including only quantitative or qualitative studies in a longitudinal study with a focus on a common objective for the multiple projects. This form of research is popular in the valuation or program implementation fields in which multiple phases of the project stretch over time. These projects may go back and forth between quantitative, qualitative, and mixed methods studies, but they build on each other to adjust a common program objective. (Creswell, 2014, p. 228)

My research was mostly qualitative. However, it did contain some elements of quantitative research and can therefore be classified as multi-phased mixed methods. The common program objective in my research project was to develop a more comprehensive understanding of the unique and complex personal circumstances that may lead to the development of playing-related discomfort/pain among tertiary music students at a tertiary institution. In order to best answer the research questions, the methodology was adapted over time according to the incoming data.

The approach adopted in this study

Data collection methods in this mixed methods research project were combined through both intra- and inter-method mixing. Johnson and Turner (2003) define these terms as follows:

- Intramethod mixing: “The concurrent or sequential use of a single method that includes both qualitative and quantitative components”.
- Intermethod mixing: “Concurrently or sequentially mixing two or more methods” (p. 298).

Some of the quantitative (QUAN) elements in this research included:

1. Testing and confirming existing theories about the causes of playing-related pain among string players;
2. Measuring each student’s pain and comparing the levels of pain both within the participant pool as a whole and individually over a four-year period using established and validated research tools (questionnaires containing closed-end questions); and
3. Coding and storing selected data in Microsoft Excel.

Some of the qualitative (QUAL) elements included:

1. Generating results and theories that were credible to both the musicians and musician researchers through a multi-faceted approach (open-ended questionnaires, semi-structured interviews, focus groups) in a naturalistic and dynamic environment;
2. Responding to any changes that took place during the study (e.g. contextual and individual) and adapting research methodology to take these into account;

3. Studying cases in depth;
4. Providing rich and complex data that highlighted each student's personal background as well as their experience and understanding of playing-related pain;
5. Identifying contextual and setting factors as they related to the occurrence of playing-related pain in the institution whilst taking heed of situational constraints; and
6. Acknowledging my own experiences and their impact on my research.

I initially underestimated the impact that my personal circumstances would have on my interpretation of the data and the research method. I first became interested in the area of musician injuries when completing my Bachelor of Music program at the institution. My honours research at this institution (Waters, 2005) explored the issue of playing-related discomfort/pain by considering the attitudes and priorities of violin teachers towards beginner violin students aged 7 to 10 in south-east Queensland. The main conclusions from this research were that teachers were aware that musician injuries existed, but perceived that the teaching of preventative strategies for playing-related discomfort/pain were relatively low on the list of priorities (p. 55).

The satisfaction I derived from conducting my Honours research influenced my decision to undertake take this PhD project. In addition, I perceived several advantages to me specifically researching playing-related pain within the institution. I had grown up experiencing not only musical culture in general but the specific culture that I was planning to study; I had experienced the physical and emotional demands of playing a stringed instrument; I was not much older than the fellow undergraduate students who formed the basis for this research; and I had just completed my undergraduate work at

the same institution in the Bachelor of Music program. As a part-time student, I also had six to eight years to complete my research. This put me in the unique position of being able to follow two intakes of Bachelor of Music string students over their entire program (a total of five years of data collection).

It was always my intention to complete this PhD within the specified timeframe. However, in 2008 my physical condition changed significantly with the onset of a muscle disease causing chronic pain. Over a period of 12 months this severe pain spread to affect my whole body. Over the following years I would consult many doctors, have several hospital admissions, modify my life and career outlook, and ultimately extend the due date of my thesis. My ability to walk became greatly restricted; I was physically unable to perform simple tasks such as typing, opening doors, and pushing buttons; and I required carers to help me perform everyday tasks both in and out of the home environment. Ironically, I was also no longer able to play my instrument due to chronic pain.

I experienced many physical challenges that may be seen as limitations to the research process. However there were also many benefits. I was able to relate and empathise with students in this research, some of whom also claimed to be coming to terms with their chronic pain and other illnesses. My inside knowledge of pain meant that I was able to ask specifically targeted questions, based on my own circumstances and what I had noticed. My experiences undoubtedly affected the line of questioning taken in individual interviews as well as my subsequent interpretation of data. As a result of my experiences, the focus of my research also became increasingly qualitative and personal. However I believe that my closeness to the research has ultimately led to further insight and understanding of participant experiences.

Incidence of Playing-Related Pain/Injury

Since the field of performing arts medicine was established in the 1980s, there have been numerous studies investigating the incidence of playing-related pain and injury among musician populations. The most comprehensive study of professional orchestral musicians conducted to date is the ICSOM National Survey. The findings from this American survey of over 2000 professional musicians found 82% of respondents admitted to some type of playing-related medical problem. 76% also classed this medical problem as severe (Fishbein, Middlestadt, Ottati, Straus, & Ellis, 1988, p. 5).

Although there have not been any further studies of this scale, the high incidence of discomfort/pain among professional musicians has been confirmed. A study of 377 musicians in eight Australian professional orchestras found that 84% had experienced pain or injury that affected their ability to play the instrument (Ackermann et al., 2012, p. 182). A similar investigation of 408 professional orchestral musicians in Germany found the past and present incidence of playing-related musculoskeletal pain to be 89.5% (Steinmetz et al., 2015, p. 965). A number of other studies have also found a similar incidence of playing-related pain and injury in professional classical musicians (Aki & Yakut, 2003, p. 329; Berque, Gray, & McFayden, 2016, p. 78; Fry, 1986a, p. 51; Kaneko, Lianza, & Dawson, 2005, p. 168; Kochem & Silva, 2017, p. 27; Leaver, Harris, & Palmer, 2011, p. 549; Topoğlu, Karagülle, Keskin, Abacıgil, & Okyay, 2018, p. 118; Viljamaa, Liira, Kaakkola, & Savlolainen, 2017, p. 195).

The incidence of pain and/or injury among tertiary-level/college music students has also been extensively researched. An early study by Fry in 1987 found the minimum incidence of musculoskeletal injury among 1429 Australian tertiary music students to be

9.3% (p. 35). However this result may have been influenced by his diagnostic method, as many other researchers have found their incidence rate of pain and/or injury to be comparable of that professional musicians. For example, Ioannou and Altenmüller (2015) found a lifetime prevalence of discomfort/pain among 180 Czech music students of 88.9%, with 12.6% affected every time they played (p. 135). In a study involving 330 university freshman music students Brandfonbrener (2009) found that 79% experienced playing-related pain (p. 30) and Steinmetz, Möller, Seidel, and Rigotti (2012) found the incidence of playing-related musculoskeletal disorder among 36 tertiary music students was 81% (p. 625). Other researchers confirming percentages of playing-related pain of up to 90% include Árnason, Árnason, and Briem (2014, p. 74); Baadjou, Verbunt, van Eijsden-Besseling, Huysmans, and Smeets (2015, p. 231); Barton et al. (2008, p. 75); Kok, Vliet Vlieland, Fiocco, Kaptein, and Nelissen (2013, p. 487); Kreutz, Ginsborg, and Williamon (2008, p. 3); Larsson, Baum, Mudholkar, and Kollia (1993, p. 73); Ling, Loo, and Hamedon (2018, p. 82); Lopez and Martinez (2013, p. 102); Porter, Wilson, Doherty, and Magee (2018, p. 47); Pratt, Jessop, and Niemann (1992, p. 13); Roach, Martinez, and Anderson (1994, p. 129); Spahn, Voltmer, Mornell, and Nussek (2017, p. 214); Stanek et al. (2017, p. 20); Wood (2014, p. 37); and Zetterberg et al. (1998, p. 161).

The body of research regarding the occurrence of injury among adolescents is not as large as for older populations. However the reported figures of pain and injury are still significant. Fry and Rowley (1989) found that 71% of 169 students at a British music school experienced pain (p. 999). In a study involving 425 American school band and orchestra students, Shoup (1995) found that 33.2% had experienced a musculoskeletal injury related to their playing (p. 102). In a sample of 97 school-aged

youth orchestra musicians Britsch (2005) found that 92% had experienced pain at some stage whilst playing their instrument (p. 41).

More recently, a study of 76 adolescent musicians in various West Australian Youth Orchestras by Vinci et al. (2015) found the rate of playing-related musculoskeletal symptoms in the month preceding data collection was 73.5% (p. 143). Another more comprehensive Australian study involving 731 children aged 7-17 by Ranelli, Straker, and Smith (2011) found an incidence of playing-related musculoskeletal symptoms of 67% over the lifetime (p. 123). Only one study involving 357 school-aged children has suggested low levels of musculoskeletal discomfort (Russell & Benedetto, 2014, p. 259).

The large range of incidence both between and within each population has been cause for much discussion and some confusion among researchers. Hagglund (1996) draws attention to the fact that studies can be limited because of a lack of interest on the behalf of the musicians themselves (p. 106). Manchester (1988) says that many studies are limited because there is a lack of knowledge or depth concerning the students involved and the musicians are not followed over time (p. 15). Zaza (1998) mentions the possible impact of methodological weaknesses such as low response rates and unclear definitions of injury (p. 1023).

Unfortunately, unclear and inconsistent definitions of injury are common throughout the literature (Wu, 2007, p. 50). Already in this literature review the words “medical problem”, “health problem”, “injury”, “pain”, “musculoskeletal injury”, “playing-related musculoskeletal disorder” henceforth referred to as “PRMD”, and “playing-related musculoskeletal symptoms (PRMS)” have been used. A landmark study by Zaza, Charles, and Muszynski (1998) asked musicians themselves to define

playing-related musculoskeletal disorders with the aim of providing a generic classification. The widely accepted definition of PRMDs emerged as being “pain and other symptoms which are chronic, are beyond their control, and which interfere with their ability to play the instrument at their usual level” (p. 2013). This particular study showed that musicians were clearly able to distinguish between normal everyday mild aches and pains and PRMDs. Many researchers now base their definition of PRMDs on this one including Ackermann et al. (2012, p. 182); Steinmetz et al. (2015, p. 966); and Wilson, Doherty, and McKeown (2014, p. 680).

Stage one: Preparation

Stage one of this research project took place between February 2006 and February 2007. The first step was to conduct a comprehensive literature review. To this end approximately 500 references were sourced through databases, library catalogues, and bibliographies. These references, including websites, journal articles, and books, came from fields as diverse as music, education, medicine, physiotherapy, sociology, and psychology. Each was read, coded according to relevance, and subsequently entered into an endnote library. Major points from each reference were also entered into a *Mind map* for easy reference.

A rough research plan was then formulated and an application for ethical approval submitted. Ethics approval was granted dependent on minor changes to the consent mechanisms (see Appendix C for relevant consent form templates).

At this point the focus moved on to the Initial Questionnaire. This questionnaire was designed to:

1. Collect as much background information as time/circumstance allowed.
This information would form an invaluable basis from which further development and exploration could take place.
2. Measure each student's perception of their own discomfort/pain as it was either at the time of questionnaire completion or on the most recent occurrence. Measurement would be done by the students themselves using established self-assessment tools. These tools would be contained in one section that would then be extracted to form an independent questionnaire. This new questionnaire would consequently be reissued to each student at regular intervals throughout their study allowing the researcher to track the participants' perceptions of discomfort/pain over time.

Designing the questionnaire was a difficult task taking the better part of 12 months. All the possible risk factors for injury as currently known were taken into account along with previous research and the recommendations of authors.

As established through the literature review, the development of playing-related discomfort/pain is a complex process involving many variables. Thus, in order to "cover all the bases" in regards to background information it was clear that the questionnaire would have to be fairly lengthy. Initially this was a cause for some concern for me as I thought the longer the questionnaire was the harder it would be to entice students to take part during their own time. However, after consulting with the Head of Strings at the institution we were able to work out a convenient and practical solution.

A portion of the first compulsory session for incoming String Instrument Majors (violin, viola, cello, and double bass players) in Orientation Week 2007 was put aside specifically for me to introduce my project. In these 30 minutes I was to speak about the

project and guide the students through the Initial Questionnaire section by section. The students would then hand them in before proceeding to their next scheduled session. After this Orientation session, students were also to be provided with a handout current in 2006 by the British Association for Performing Arts Medicine, *The Musician's Twelve-Point Fitness-to-Play Programme* (See Appendix D) in order to give them some basic information about musicians' health and injury prevention.

Several pilots of the Initial Questionnaire took place in late 2006 and early 2007. As a result two major modifications to the construction and issue were made. Firstly, many students wanted to give more information about their experiences. As a result, several questions were added or amended. Secondly, the students found it easier to fill out their questionnaires when I explained each question and guided them through. Consequently, I decided to talk the students through their questionnaires.

The amended Initial Questionnaire consisted of six sections, each containing a mixture of closed (QUAN), open (QUAL), and mixed (QUAN + QUAL) questions. A summary of the general areas covered in each section is in Table 1. Refer to Appendix E for full Initial Questionnaire by instrument.

The purpose of Section Four "Describing your discomfort/pain" was to measure each student's perception of their own discomfort/pain as it was either at the time of questionnaire completion or on the most recent occurrence. My intention was to reissue this section periodically as an independent quantitative questionnaire as the students progressed, providing a basis for comparison of pain levels. As such, the design and content of this particular section were considered especially important. The self-assessment tools decided upon included Fry's Overuse Injury Scale (Fry, 1986a, p. 51) and the McGill Pain Questionnaire or MPQ (Melzack, 1975, pp. 280- 281).

Table 1

Initial Questionnaire: An Outline

Section	Purpose	Type of Questions	Areas Covered
One: Student Background	To gather general background information	An equal number of QUAN, QUAL and mixed	General (age, weight, height etc.) Instrumental history (size, number of teachers, ensemble experience etc.) Physical activities and history of injury Strategies to prevent pain and where learned Job requirements (both musical and other) Musical ambitions
Two: Practice	To gather information about practice	Mostly QUAN and mixed	Length and frequency of practice Routines/warm-ups and logic behind them Breaks: frequency, length, content, and logic behind them Discussions with teachers regarding practice
Three: Discomfort/Pain	To get a summary of all their experiences with discomfort/pain	An equal number of QUAN, QUAL and mixed	Have they experienced it and in what parts of the body General description of pain properties Most severe experience: does it recur, when did it first arise, what did they think was the cause, how did they deal with it, have they since changed how they deal with it, does it affect their practising Have they discussed their experiences with anyone, if so who, what did they diagnose/recommend and was it helpful

(continued)

Initial Questionnaire: An Outline (Cont'd)

Section	Purpose	Type of Questions	Areas Covered
Four: Describing your discomfort/ pain	To measure pain as it is at the moment of survey completion, or on its most recent occurrence	Largely QUAN	Fry's Overuse Injury Scale, McGill Pain Questionnaire or MPQ
Five: Instrument Specific	To ask questions relevant to each specific instrument	Mostly mixed	Violin/violin: Use of shoulder rest; practising sitting down Cello/double bass: Carrying instrument (approximately how long and how often, do they experience any difficulties etc.); issues with sitting and inappropriate chairs
Six: Opinions	To gain an idea of student opinion to a number of statements related to playing-related injury	QUAN	N/A

Fry's Overuse Injury Scale was developed specifically as a tool for grading injury among musicians. Many have used this scale as originally devised or with minor changes to categorise injury (for examples of minor amendments see Aki & Yakut, 2003, p. 328; Harrison & Paull, 1997, p. 9; Hoppmann, 2010, p. 211; and Horvath, 2010, p. 28). A QUAN tool containing five grades, the complete version of Fry's Overuse Injury Scale appears as follows:

1. Pain in one site on playing. This must be consistent rather than occasional, and pain ceases when the musician stops playing.
2. Pain in multiple sites on playing. Physical signs of tissue tenderness minimal. May have transient weakness or loss of control. No interference with other uses of the hand.
3. Pain in multiple sites. Pain persists away from the instrument, some involvement in other uses of the hand that now cause pain. May have weakness, loss of control, loss of muscular response or dexterity.
4. As for Grade 3. All common uses of the hand cause pain – housework, driving, writing, turning faucets or doorknobs, hair grooming, dressing, washing or drying, but these uses are possible as long as the pain is tolerated.
5. As for Grade 4 with loss of capacity to use the hand because of disabling pain.²

For the purposes of this research an additional grade was added. Stiffness, commonly caused by excess muscle tension, may be an early warning sign of overuse injury (Horvath, 2010, pp. 11-12; Norris, 1993, p. 6; <https://physioworks.com.au/injuries-conditions-1/overuse-injuries>). It has been linked with disability, injury and/or pain in numerous evidence-based studies of musicians (Ackermann et al., 2012, p. 186; Barton et al., 2008, p. 74; Davies & Mangion, 2002, p. 158; Ling et al., 2018, p. 82; Porter et al., 2018, p. 47; Raeburn, Hipple, Delaney, & Chesky et al., 2003, p. 113; Raymond, Romeo, & Kumke, 2012, p. 21; Rickert, Barrett,

² From “Incidence of Overuse Syndrome in the Symphony Orchestra,” by H. J. H. Fry, 1986, *Medical Problems of Performing Artists*, 1(2), p. 51. Copyright 1986 by Science & Medicine, Inc. Reprinted with permission.

Halaki, Driscoll, and Ackermann, 2012, p. 70; Topoğlu et al. (2018, p. 121); Wilke et al., 2011, p. 25). Given the age and stage of the participants of this research project (young, at beginning of career) it seemed appropriate to add this as an additional grade. Some changes to the wording were also deemed appropriate.

The completed scale as used in this research project was as follows:

1. General stiffness of joints.
2. Discomfort/pain in one location on playing.
3. Discomfort/pain in several locations on playing.
4. Discomfort/pain in several locations on playing, persisting away from the instrument.
5. As for Grade 4 but now any use of the joint causes pain.
6. As for Grade 5 but now the affected joints cannot be used at all. Playing is no longer possible.

In order to get a more comprehensive understanding of each participant's pain around the time of questionnaire completion, a more in-depth tool was also needed. It was at this time that leading Australian expert on PRMDs Bronwen Ackermann recommended using the McGill Pain Questionnaire (MPQ) in addition to the modified version of Fry's Overuse Injury Scale.

The McGill Pain Questionnaire, (Melzack, 1975, pp. 280-281), was designed to provide quantitative (QUAN) measures of clinical pain that can be treated statistically (Melzack, 1975, p. 277). Since its inception in 1975 it has been used in over 500 studies of acute, chronic, and laboratory-produced pains. Its reliability and validity has been tested and proven many times, and it is able to detect differences in pain regardless of severity (Katz & Melzack, 2011, pp. 50-54; Melzack & Katz, 2013, pp. 305-307).

The MPQ consists of 102 words grouped into four classes and 20 sub-classes (see Figure 1). The classes are Sensory (groups 1-10), Affective (groups 11-15), Evaluative (group 16) and Miscellaneous (groups 17-20). Participants are asked to highlight the words that describe their pain as it is at time of questionnaire completion. A maximum of one word can be selected from each group. They must also mark the exact location of the pain on a diagram (Part One). Pain is scored through four different measures: the Pain Rating Index – Rank (PRI (R)), Pain Rating Index – Scale (PRI (S)), Number of Words Chosen (NWC), and Present Pain Intensity (PPI).

The Pain Rating Index (PRI) can be calculated using two different methods: Rank (R) and Scale (S) (see Table 2 for example). To calculate the Rank (R) score the words in each group are assigned a value. The first word is given a value of one, the second two, etc. The numbers in each of the groups making up each class are then added to give five different PRI (R) scores: PRI (R): T (Total), PRI (R): S (Sensory), PRI (R): A (Affective), PRI (R): E (Evaluative), and PRI (R): M (Miscellaneous).

To find and calculate the Scale (S) scores one must refer back to the original article by Melzack and Torgenson (1971, pp. 54-55). When the tool was designed, groups of physicians, university students, and patients were asked to rate each word on a scale of one (mild) to five (excruciating). When calculating the Scale (S) score one uses the mean values of each word as decided by the patients. The same as with the Rank (R) scores these can then be added to make up five different PRI (S) scores.

The Number of Words Chosen (NWC) is calculated by adding the total number of words chosen. The highest possible total is 20, the lowest 0.

The final measure, the Present Pain Intensity (PPI), is calculated by asking the patient to rate the pain as it is at that moment, according to Figure 2.

Figure 1. The McGill Pain Questionnaire, Subclasses 1-20

Sample copy. Do not use without permission.

1	2	3	4	5
Flickering	Jumping	Pricking	Sharp	Pinching
Quivering	Flashing	Boring	Cutting	Pressing
Pulsing	Shooting	Drilling	Lacerating	Gnawing
Throbbing		Stabbing		Cramping
Beating		Lancinating		Crushing
Pounding				
6	7	8	9	10
Tugging	Hot	Tingling	Dull	Tender
Pulling	Burning	Itchy	Sore	Taut
Wrenching	Scalding	Smarting	Hurting	Rasping
	Searing	Stinging	Aching	Splitting
			Heavy	
11	12	13	14	15
Tiring	Sickening	Fearful	Punishing	Wretched
Exhausting	Suffocating	Frightful	Gruelling	Blinding
		Terrifying	Cruel	
			Vicious	
			Killing	
16	17	18	19	20
Annoying	Spreading	Tight	Cool	Nagging
Troublesome	Radiating	Numb	Cold	Nauseating
Miserable	Penetrating	Drawing	Freezing	Agonizing
Intense	Piercing	Squeezing		Dreadful
Unbearable		Tearing		Torturing

Figure 1. The McGill Pain Questionnaire, subclasses 1-20. From “The McGill Pain Questionnaire: Major Properties and Scoring Methods,” by R. Melzack, 1975, *Pain*, 1, p. 281. Copyright 1975 by Ronald Melzack. Reprinted with permission. Contact information and permission to use: Mapi Research Trust, Lyon, France – Internet: <https://eprovide.mapi-trust.org/>

Table 2

Comparison of Rank (R) and Scale (S) scores: Group 1, McGill Pain Questionnaire

Group 1	Rank (R) score	Scale (S) score
Flickering	1	1.89
Quivering	2	2.5
Pulsing	3	2.56
Throbbing	4	2.68
Beating	5	2.7
Pounding	6	2.85

Figure 2. The McGill Pain Questionnaire: Present Pain Intensity (PPI)

Sample copy. Do not use without permission.

0	1	2	3	4	5
Not present	Mild	Discomforting	Distressing	Horrible	Excruciating

Figure 2. From “The McGill Pain Questionnaire: Major Properties and Scoring Methods,” by R. Melzack, 1975, *Pain*, 1, p. 281. Copyright 1975 by Ronald Melzack. Reprinted with permission. Contact information and permission to use: Mapi Research Trust, Lyon, France – Internet: <https://eprovide.mapi-trust.org/>

Prior to this study, there have been no methods for comparison between the intensity and properties of playing-related pain and other types of pain. One of the major reasons why I chose the MPQ was so I would have the option to do this, if the

research went in this direction. Comparisons of the different scores for a variety of ailments are given in sources including Katz and Melzack (2011, p. 49) and Melzack and Katz (2013, pp. 305, 307). In order to compare these scores with those of musicians I needed only to calculate the relevant PRI score.

The MPQ is commonly done in an interview format but can also be done as a written questionnaire. According to Klepac, Dowling, Rokke, Dodge, and Schafer (1981), interview format is associated with higher scores across all methods of scoring but there is no interaction between administration and intensity of pain (p. 243).

At the time that this research project was designed, the MPQ had only been used in two studies of musician injury. Kaneko et al. (2005) found that the most commonly used words among orchestral musicians were “heavy”, “tearing”, “searing”, “tugging”, and “spreading” (p. 172); and using a simplified version, Aki and Yakut (2003) determined that the most commonly used words used by professional and student string musicians were “tight”, “boring”, “tearing”, “sharp”, and “dull” (p. 329). One possible reason for this lack of use may be that the MPQ was originally designed to measure pain at the exact moment of questionnaire completion. For the purposes of this research project, the instructions were amended. If pain was not present, respondents were to recall and describe their most recent experience (writing down where and when this was).

Research has found that memory for pain using the MPQ is reasonably accurate (Beese & Morley, 1993, p. 183; Hunter, Philips, & Rachman, 1979, p. 35). However a few pertinent facts should be kept in mind. In a literature review on pain recall, Erskine, Morley, and Pearce (1990) found a general tendency for memory of acute pain (that is, of short duration but typically severe) to be more accurate than that of chronic pain

(persisting for a long time) (p. 255). Von Korff (2011) noted that, when recalling pain, there was a tendency towards “forward telescoping” (reporting events that occurred before the reference period as occurring during it) (p. 460). Eich, Graff-Radford, Jaeger, and Reeves (1985) found that when present pain intensity was high, patients recalled previous pain as being more severe than it actually was (p. 375). Finally, Melzack and Torgenson (1971) noted that experiences and recollections of pain were influenced by attention, past experience, and the meaning of the situation (p. 58).

Stage two: Data collection and analysis

Between the years of 2007 and 2011 several different methods of data collection were taking place concurrently: the Initial Questionnaires, Ongoing Pain Questionnaire/interviews, and Focus Groups. The direction of the research was greatly influenced by the ongoing analysis of data received, which highlighted the individuality and complexity of each student’s experiences.

Data collection

Initial Questionnaire (Semester One)

The data from the Initial Questionnaire was collected in February 2007 (Group 1, see Table 3 below) and February 2008 (Group 2, see Table 4). Group 1 included 11 cellists, (6 female, 5 male), 6 violinists, (4 female, 2 male), 5 violists, (4 female, 1 male), and 1 double bassist, (male). The intake of string students in that particular year was somewhat unusual for the institution in that a relatively large number of cellists were accepted. Group 2 included 11 violinists, (3 male, 8 female), 1 violist, (male), 4 cellists, (1 male, 3 female), and 1 double bassist, (female). Encouragingly, all of the 40 first-year string students who entered the Bachelor of Music program in these two years

participated in this stage of the research. The intake of both groups is combined below in Table 5.

Table 3

Group 1: Instrument by Gender

Gender	Major Study Instrument				Total String Players
	Violin	Viola	Cello	Double Bass	
Female	4	4	6	0	14
Male	2	1	5	1	9
Total	6	5	11	1	23

Table 4

Group 2: Instrument by Gender

Gender	Major Study Instrument				Total String Players
	Violin	Viola	Cello	Double Bass	
Female	8	0	3	1	12
Male	3	1	1	0	5
Total	11	1	4	1	17

Table 5

Instrument Make-Up of Groups 1 and 2 Males and Females Combined

Group	Major Study Instrument				Total String Players
	Violin	Viola	Cello	Double Bass	
Group 1 (2007)	6	5	11	1	23

Group 2 (2008)	11	1	4	1	17
Total	17	6	15	2	40

Fifteen of the total 23 string students in Group 1 were present at the initial Orientation Week session (Monday 19/2/2007). These students were guided through the Initial Questionnaire step-by-step. When going over the responses, however, clarification of minor points was required from eight students. Almost all these points related to the completion of the MPQ. Common mistakes included circling words from every group, selecting multiple words within one group, and describing their most severe experience of pain rather than their most recent. I approached affected students individually over the following days and all of these issues were resolved. I also later became aware that an additional student (David)³ had filled out an item incorrectly by describing his most recent experience of general playing whilst exercising. His data was therefore not included in the analysis for this item.

The remaining eight of the 23 students were followed up in the Major Study meeting in Orientation Week (Thursday 22/2/2007). At this time appointments with them were arranged individually according to their schedules. These appointments all took place in an interview room in the library at the institution. Four respondents (John, Tom, Mary, and Chris) filled the questionnaire out in a group on Friday 23/2/2007, and the remaining four (Tim, Sam, Erin, and Julie) met individually with me during the following week and a half. Given the mistakes made by the earlier group in regards to the McGill Pain Questionnaire, during these interviews special attention was given to

³ Throughout this thesis the names of participants have been replaced by pseudonyms to assure their anonymity.

the explanation and completion of this item. As a result no further clarification was required from any of these eight students with regards to these questions.

The next group of string students, Group 2, completed their Initial Questionnaires in February 2008. This time I was extremely fortunate in that all 17 enrolled students were at the initial Orientation Week session on 25 February, 2008. The result was that I was able to get a 100% participation rate in just one sitting. In addition, some modifications were made to the way in which I delivered some parts of the questionnaire. This was done in order to try and minimise the amount of errors made by students when completing certain sections. General modifications made included:

1. I explained how to fill out the more difficult questions as we progressed through the questionnaire; and
2. I instructed the students that, if they were progressing through the questionnaire ahead of the group, they were to skip Sections 3 and 4 completely and go on to 5 and 6, as the explanations for Sections 3 and 4 were essential.

The following additional instructions were also given for these specific question items.

1. With regards to S3Q1, any kind of discomfort/pain was relevant, no matter how mild.
2. In the MPQ:
 - S4Q2a-f: When describing your playing-related discomfort/pain at its least, you could select “not present”;
 - S4Q2a and S4Q3: “Are you feeling any playing-related discomfort/pain right now” were referring to the exact moment at time of questionnaire completion, not a general period;

- S4Q5: Students were to describe only the most recent experience, not the collective experiences;
- S4Q5: Students were to only circle words that described said experience, words did not need to be selected from every group; although
- S4Q5: Only one word within one group could be selected;
- S4Q6: Only one word or group of words could be selected; and
- S4Q11: Stopping your practice session early because of discomfort/pain counted as “altering your practice routine”.

3. In Section 6, it was not an option to circle the / between T / F. One or the other must be selected, or the question must be left blank.

As a result of these modifications to the delivery further clarification was not required from any of the 17 students on these points. The focus then turned to the construction of the Ongoing Pain Questionnaire/interviews.

Ongoing Pain Questionnaire/interviews

Data collection for the Ongoing Pain Questionnaire/interviews took place twice yearly from October 2007 to November 2010 (Group 1) and from October 2008 to November 2011 (Group 2). Over the five-year period the students in Group 1 participated in a total of 105 questionnaire/interviews and those in Group 2 participated in a total of 76 questionnaire/interviews. The number of questionnaire/interviews was dependent on how many semesters they remained enrolled in the Bachelor of Music program at the institution and the maximum questionnaire/interviews any one student participated in was seven.

All of the 181 questionnaire/interviews given by participants in this research were recorded in audio at the time. However on seven occasions there were subsequent technical problems with the recordings. As a result only parts of the interviews from Chris (SEM 2) and Leah (SEM 4) were retrievable and there were no recordings of interviews by Gary (SEM 8), Susie (SEM 7), Mary (SEM 2), and Rachel (SEM 4). Fortunately in each of these cases the technical error was realised shortly afterwards. Any answers were straight away recorded as best of my recollection and sent to the relevant student to confirm in order to minimise the impact of these technical mishaps.

The original plan, as agreed on with the Head of the Strings Department at the institution, was for me to do the bulk of the Ongoing Pain Questionnaire/interviews during the time set aside for compulsory string workshop each week (Tuesday afternoons, 2 - 3.30 pm). Any remaining students who were unable to attend these workshops would then be seen at a mutually convenient time. Unfortunately however, it was an ongoing issue at the time at the institution that some students were choosing not to regularly attend these workshops. The flow-on effect to this research was that it was more difficult than anticipated to collect the data, as the majority of students had to be followed up outside of workshop time.

Despite this, the participation rate of students over this five-year period did remain extremely high. No less than 86% of eligible students took part in any one round of data collection, with the average participation rate over the eight semesters 96% (see Table 6). However there were 11 string students who withdrew from the institution without completing their Bachelor of Music program over that time, and none of them continued in the research project past that point. As a result only 29 of the original 40 students continued to graduation: 14 violinists, 4 violists, and 11 cellists. (The students

who withdrew in their first semester of study were Jena, Molly, Eve, Claire, and Jane. The other six students – John, Melanie, Frank, Liam, Leah, and Becky – had all withdrawn from their programs by the conclusion of their fourth semester.)

Table 6

Number of Participants per Semester

Participants	Semester								Average
	1	2	3	4	5	6	7	8	
Number of participants	40	34	31	30	25	28	19	17	N/A
Percentage of total pool	100%	97%	97%	97%	86%	97%	95%	100%	96%

* Students were given the option to exit their program after completing either 240 credit points (6 semesters full-time) or 320 credit points (8 semesters full-time) of study.

Prior to each round of data collection, notices were put up around the institution reminding eligible students of the research project and the options if they wished to participate. These included attending the workshop, scheduling a meeting, and dropping by my workroom at the time. In order to capture their attention these notices were constructed with bright colours and used colloquial language to make the process less formal or forbidding. Students also received an email to their nominated address. (See Appendices F and G for correspondence and poster templates, minor changes were made in successive rounds of data collection.) Other informal strategies such as making myself visible around the institution were also utilised to keep the participation rate high. In addition I had to remain persistent as it was not unusual for individual students to miss three or four scheduled meetings in just one round of data collection (examples included Tom, Mary, Steve, and Robert).

The location where the Ongoing Pain Questionnaire/interviews took place varied over the five-year period. At the time workshops were mostly being held in the Recital Hall at the institution and a small enclosed room at the back of this venue was able to be used. The process was for me to announce at the beginning of the workshop (after confirming it was okay with the relevant convener for that day) that data collection was taking place, and eligible students to then come out one at a time. (If there was a visiting artist or special master class being held in the workshop time, data collection was postponed for that week.) Other interviews took place in the room I was working in at the time.

The first lot of Ongoing Pain Questionnaire/interviews were completed in October 2007 (Group 1). I had an initial general discussion with each student regarding any changes in their discomfort/pain, before moving on to a short list of questions that had been pre-prepared for that individual according to data gathered in the Initial Questionnaire. Figure 3 gives examples from the list prepared for Susie (Student 1).

Figure 3: Sample Questions from an Ongoing Pain Questionnaire/interview

Does discomfort/pain still affect your practising most days? Y / N

Is the pain in your elbows and wrists still constant? Y / N

Figure 3. Sample questions from an Ongoing Pain Questionnaire/interview, modified and used to interview Susie.

Students were then given a separate questionnaire to fill in, which contained set items asking them about the amount of practice they were undertaking, as well as the modified version of Fry's Overuse Injury Scale, and the McGill Pain Questionnaire. As already pointed out, the purpose of this was so that there would be a quantitative

mechanism by which to compare student experiences both individually and as a group over the period of years, if required. Given the mistakes made filling out these items during the Initial Questionnaire detailed instructions as to how to fill out these items were given.

The original intent was for all students to complete a basic Ongoing Pain Questionnaire, and selected students to participate in a one-off, comprehensive interview. However by 2009, I had noticed that students were offering a great deal of information verbally to clarify their yes/no answers with each round of data collection. In addition I found it was far more effective to ask all of the questions in a semi-structured interview format rather than have the participants focused on physically writing their answers. Subsequently, the list of base questions gradually expanded, removing the need for any further survey data collection. The direction of these semi-structured interviews were largely dependent upon the student's experiences, as well as the willingness to elaborate.

Figure 4 shows the base list of questions for each semi-structured interview from 2008 onwards. The sequence and specifics of the questions varied according to the individual's reported experiences. (The relevant templates for the Ongoing Pain Questionnaire and Ongoing Pain Questionnaire/interview are contained in Appendix H.)

Figure 4: Common questions for Ongoing Pain Questionnaire/interviews

1. Have you noticed any changes in the severity/intensity of your discomfort/pain since we last spoke?
2. Are you taking breaks during your practice?
3. Do you take breaks because you are already feeling discomfort/pain?
4. Do you do a warm-up and what does it entail?
5. Have you discussed your experiences with your teacher or anyone else and what did they say?
6. Do you have any new strategies for preventing/dealing with your playing-related discomfort/pain?
7. Are you concerned by your experiences of playing-related discomfort/pain?
8. Are you exercising?
9. Are you currently employed?
10. Is there anything else you would like to add?

Figure 4. Common questions for Ongoing Pain Questionnaire/interviews, taken from Semesters 2 – Semester 8.

Students generally did not see their list of individual questions throughout these Ongoing Pain Questionnaire/interviews as they were in front of me. In order to make sure I was getting the relevant information, over time I modified each questionnaire so that there were prompts reminding me what the particular student had said in our previous meetings. Figure 5 shows part of a later Ongoing Pain Questionnaire/interview for Susie, with questions specifically targeted to her.

Figure 5: Modified Ongoing Pain Questionnaire/interview

1. **Have you noticed any changes in the severity/intensity of your discomfort/pain since we last spoke? Y / N** (Last time it had decreased as you were only playing around once a week for a half-hour. You were feeling very depressed, sick, and tired and no longer enjoyed playing your instrument because it hurt so much. You were taking six months off from University studies, with the aim of doing your A. Mus. A. and L. Mus. A. on violin)
2. **How have your six months off been?** (Previously you were hoping that during the time off you would start to enjoy playing the violin again)
3. **Last time you were feeling quite depressed and anxious — you were also feeling quite angry about pain you were experiencing. Have you noticed any improvements in regards to this? Y / N**
4. **Have there been any changes to your 12 month health plan? Y / N** (Previously you had been taken off antidepressants and were seeing the doctor for review every month)
5. **Have there been any developments in regards to the lump in your wrist? Y / N** (Last time the orthopaedic surgeon said that they couldn't take it out until it was really big and sore, and in order for it to get that way you would have to practise a lot)
6. **Are you still experiencing discomfort/pain in your elbows, wrist, and shoulders, persisting for around 20 minutes after playing? Y / N** (Last time you also had elbow pain when cleaning)
7. **Are you still noticing that you have tension in your neck all the time? Y / N** (Previously you thought this was stress-related)
8. **Currently, which playing-related discomfort/pain would you classify as being the most severe?**

Figure 5. Ongoing Pain Questionnaire/interview, modified and used to interview Susie.

After each questionnaire/interview the recordings were listened to, and answers and/or quotations inserted into the electronic copies. The process of constructing the

next questionnaire was to use the previous questionnaire and modify the prompting notes to take into account any changes that had occurred.

In late 2008 some changes were made to the Ongoing Pain Questionnaire containing the Pain Measurement Tools. Question 1 was amended to also ask students what their maximum amount of playing time had been in one day, and an additional question was inserted asking students to indicate on a scale of 1 to 5 the level of their concern about their experiences of playing-related discomfort/pain. As students repeatedly wanted to circle more than one word within a group of words on the McGill Pain Questionnaire I decided to allow this as well. (As noted in the previous section, in a clinical setting patients are instructed to select only the most relevant word.)

When completing these items the students generally looked at a printed questionnaire and highlighted with a pen the relevant category or descriptive words. However there were some students who preferred to speak their answers. Unfortunately on one such occasion there was a subsequent problem with the recording. As a result of this there were no scores according to either Fry's Overuse Injury Scale or the McGill Pain Questionnaire recorded for Leah, SEM 3. There was also one occasion where an ongoing pain questionnaire was misplaced, and as a result of this the McGill Pain Questionnaire scores for Susie, SEM 4, were not retrievable. The data from these students was not used in the group analysis of the pain scores in those particular questionnaire/interviews as it was incomplete. However there were only two instances of this in all 181 questionnaire/interviews.

In late 2009 I was also caught unawares when a number of students in Group 1 (Jill, Tom, Mary, and Sam) elected to exit the Bachelor of Music program after completing six semesters of study. I had incorrectly assumed that all students would

remain enrolled for eight semesters. Once I realised this I set about constructing an additional list of questions that were targeted to finishing students. These are contained in Figure 6. I also made sure that all students were given the opportunity to provide feedback via a form (see Appendix I). This form was provided at the final questionnaire/interview where possible, and/or was also emailed to the participants once their participation in the project had ended.

Figure 6. Extra Questions for Finishing Students

1. **In general, what changes to your levels of playing-related discomfort/pain have you noticed as you have progressed through your program?**
 - Have your levels of discomfort/pain increased or decreased?
 - At what stage of your program would you say they were the most severe?
 - Had you experienced any discomfort/pain at all before you came to the institution?
2. **Before you came to the institution, had you ever thought about the whole issue of playing-related discomfort/pain (and who have you discussed it with since coming to the institution)?**
 - Had you ever discussed it with your peers/teachers, and have you now?
 - Do you think it would be beneficial if there was a course that all first-year students were to take regarding playing-related discomfort/pain etc.?
 - Has being a part of this study been helpful in any way?
3. **Since being at the institution, have your ideas as to the causes and current rates of playing-related discomfort/pain among string players changed?**
 - What do you see as being the causes of playing-related discomfort/pain?
 - Do you think many of your peers are affected? Why/why not?
4. **During your time at the institution, what are the biggest changes you have noticed in your playing, and what, if any affect have these changes had on your playing-related discomfort/pain?**
5. **What has been your most vivid experience of playing-related discomfort/pain?**
 - What body parts were involved?
 - When did this experience take place?
 - In your opinion, what was the cause of this experience?
 - What did you do when it happened?
6. **What new strategies, if any, have you learned (in regard to playing-related discomfort/pain) since coming to the institution (and who did you learn them from)?**
 - What are your opinions as to the importance of warm-ups, breaks during practice, exercise, general health, etc.?
7. **How, if at all, have your career aspirations changed during your time at the institution, and why?**
8. **In relation to orchestral rehearsals, have they had any impact on your levels of playing-related discomfort/pain, and why?**
 - Do you have any suggestions as to how the structure of the Orchestra course at the institution could be adapted?
9. **Do you have any suggestions as to how the structure of the Bachelor of Music program could be changed to better address any challenges you have faced?**

Figure 6. Extra questionnaire/interview questions for finishing students.

In 2009 some other aspects of my methodology were also adapted because my mobility became restricted. One of the flow-on effects was that I was physically unable to continue freely moving around the buildings at the institution. I also required assistance from the research participants with some tasks including operating the recording equipment, writing names and dates on questionnaires, and carrying whatever equipment was required to and from the workshop etc. Fortunately, by this time students had already been participating in data collection for at least one year. As a result, the initial connection and relationship had been formed and they were far more willing to accommodate my specific circumstances. I remain extremely grateful to the assistance of all 29 students who continued participating in this research project until they completed their Bachelor of Music program.

Focus groups

In 2009 and 2010 a total of three focus groups were also held as part of this research project. The purpose of these was to provide further insight into the issue of playing-related discomfort/pain among string students. Focus Group 1 took place in the conference room at the institution, and Focus Groups 2 and 3 were held in my work room at the time. All three took place on Tuesday afternoons, during compulsory string workshop, went for up to one hour, and were recorded as both sound and video files. Pertinent quotations selected from the transcripts of these three Focus Groups can be found in Appendix J.

Prior to each focus group, a number of students received emails inviting them to participate. Those students were also contacted through other means including face-to-

face, email, and telephone. I was hoping to have approximately six students attending each focus group but unfortunately on all three occasions some students who indicated that they were going to attend were unable to make it (including Caitlin, Anna, Melinda, Tina, and Jack). In the end, 10 of the 29 eligible students in this research project who completed their Bachelor of Music program also participated in a focus group (see Table 7).

Table 7

Student Participation in Focus Groups

Focus Group	Date	Participating Students
1	28/8/2009	Susie, Tim, Wendy, and Rachel
2	20/10/2009	Jill, Mark, David, and Sally
3	30/3/2010	Gary and Felicity

At the beginning of each focus group each student was given a consent form (see Appendix C) and advised that they could say as little or as much as they wished. They also received a sheet of paper with some potential points of discussion. These points of discussion (contained below in Figure 7) were based upon the original research questions as well as the perceived contributing factors and themes that were emerging through the ongoing data analysis. During each focus group I tried to draw on my own experiences so that I could not only participate in the discussion but also effectively direct the conversations. The data obtained through the focus groups proved useful in confirming what was emerging through the Ongoing Pain Questionnaire/interviews.

Figure 7. Focus Group 1 Discussion Points

- 1. What general opinions do string students have regarding the causes of playing-related discomfort/pain?**
 - How significant are the following factors?
 - Technique
 - Practice habits, including warm-ups and breaks
 - Total amount of playing time
 - Orchestral rehearsals
 - Academic/job requirements (impact of computer use)
 - Diet, exercise, and physical fitness
 - Outside stressors
 - At what stage do string students believe that playing-related discomfort/pain becomes a problem? When does it require intervention such as a change in practice habits or medical consultation?
- 2. Do string students find that the current learning environment is sympathetic to the causes and nature of playing-related discomfort/pain?**
 - Do students perceive the structure of the program as having any influence over the development of playing-related discomfort/pain?
 - Do students perceive there to be sufficient flexibility within the institution to accommodate them if they experience playing-related discomfort/pain?
 - Do students feel that they are able to talk openly and non-judgmentally about such issues with fellow students and teachers?
- 3. Do string students find that their opinions as to the causes of playing-related discomfort/pain are changing as they progress through their program and are they changing their playing habits accordingly?**

Figure 7. Some points for discussion, used during Focus Group 1.

Data analysis

Part 1

As already highlighted, one of the purposes in designing the Initial Questionnaire was that elements of it could be used to compare student's pain both within the group and compared to outside groups. To this end in the initial stages, the data program SPSS (Statistical Package for the Social Sciences) for Mac (13.0) was used. Given the complexity and length of the Initial Questionnaire, and the complexity and inconsistencies among the responses, entering the data for Group 1 proved to be an arduous task. It quickly became evident that this would not be the most productive way to understand the complexity of the data.

Advice from a specialist methodologist at this time was very beneficial. He confirmed that the nature of the data was better suited to qualitative analysis because of both the small number of participants and the uncontrollable number of variables that would not allow clear conclusions to be drawn. Moreover and as already noted my own physical situation changed at around this time resulting in my requiring voice recognition software and I was unable to continue using SPSS software on the Macintosh computer. I subsequently realised that it was more efficient to use Excel for selective basic quantitative data analysis of the group.

To this end, in 2009 I started a spreadsheet entitled "Pain scores" in Microsoft Excel. Each of the 40 students who entered the Bachelor of Music program in 2007 and 2008 had already been assigned a case number and this was listed across the top of the spreadsheet. Variables along the left-hand side by semester included Fry's Overuse Injury Scale, the McGill Pain Questionnaire (Rank and Scale scores for all word groupings as explained earlier in methodology section), the Present Pain Intensity,

intensity of pain at worst, and concern about experiences of discomfort/pain. Student responses to these particular questions already had an assigned numerical value, so there was no need for further coding of this particular data. However, to explain any instances where there was no data available, the key defined in Table 8 was used.

Table 8

Legend of Terms used in Microsoft Excel

Abbreviation	Definition
N/A	Question not asked
CR	Can't recall experience
DM	Data missing
UTP	Unable to play instrument
F	Finished Bachelor of Music program
NP	Not playing instrument
L	Left the institution
DNP	Did not participate in data collection

As was also found to be the case in Britsch (2005, p. 42), it was not uncommon for students in my research to indicate that their pain according to Fry's Overuse Injury Scale was more than one grade. (For example, in SEM 3, 4, 6, and 7, Susie said her pain was alternating between Grades 3 and 4.) In order to take account of this, I entered the data for this item in two ways, firstly by inserting the highest grade selected (in this case, 4), and then by entering the average of all grades selected (in this case, 3.5). It was also not uncommon for students to indicate more than one word in a single group in Question 5 of the McGill Pain Questionnaire. In such cases I entered the highest ranked

score in the group. All the pain scores that were entered into the spreadsheets were checked on multiple occasions over a period of years to ensure accuracy.

Preliminary analysis of the quantitative data was striking. From the outset it was clear that the incidence of playing-related discomfort/pain perceived by incoming tertiary music students in this research project was extremely high. In the Initial Questionnaire 39 of the 40 students (98%) indicated in Section 3 that they had experienced playing-related discomfort/pain prior to their studies at the institution. 29 of the students (73%) indicated that this discomfort/pain recurred and 19 (48%) claimed that it was ongoing at the time. These figures are in line with those recorded by Brandfonbrener (2009), who found that 79% of freshman university music students reported a history of playing-related pain (p. 30). However they are substantially higher than those reported by Spahn et al. (2017), who found only 29% of music students reported having a playing-related health problem at the beginning of their university training (p. 225).

These high figures were replicated time and time again over the five-year period. Table 9 shows the number of students in the research selecting each grade on Fry's Overuse Injury Scale throughout their Bachelor of Music program. There were only five instances (Tim, SEM 6 and SEM 8; Julie, SEM 3; Brad, SEM 7; and David, SEM 3) in all these Ongoing Pain Questionnaire/interviews where a student indicated that they had not experienced any playing-related discomfort/pain since we last spoke. Although not unexpected, these numbers are substantially higher than those indicated in Spahn et al. (2014), where only 51% of tertiary students reported a problem that affected their playing at least once during their study (p. 13).

Table 9

Fry's Overuse Injury Scale: Number of Students Selecting Each Grade

Semester	No discomfort/ pain	Grade						Average
		1	2	3	4	5	6	
1	0	8	16	9	4	2	1	2.48
2	0	6	15	9	4	0	0	2.32
3	2	12	12	2	3	0	0	1.77
4	0	11	8	5	4	2	0	2.21
5	0	6	10	5	4	1	0	2.32
6	1	9	9	2	7	0	0	2.11
7	1	5	8	3	2	1	0	2.11
8	1	4	10	1	2	0	0	1.94

There was an increase in the proportion of students selecting Grades 4 and 5 (given the decreasing number of students still enrolled in the program) during Semesters 5 and 6 (third year). (A similar pattern was noted in Guptill et al., 2000, p. 88.) When compared with the McGill Pain Questionnaire Present Pain Intensity (see Table 10) it is evident that a much higher percentage of students were also experiencing discomfort/pain away from the instrument in the third year, after which students have the option of exiting the program. Six students admitted that their experiences of playing-related discomfort/pain had influenced their decision not to continue into fourth year (Susie, Tom, Mary, Anna, Rachel, and Donna; five female, one male). One of the

benefits of having a variety of the pain measurement tools was the potential ability to check and cross-reference for consistency, as demonstrated here.

Table 10

McGill Pain Questionnaire: Present Pain Intensity

Semester	Students with Pain Present at Time of Interview
1	17.50%
2	8.82%
3	6.45%
4	26.67%
5	34.62%
6	42.86%
7	26.32%
8	11.11%

When looking at these pain scores it is necessary to keep in mind that there were a number of other factors that could also influence a student's pain scores. For example, it was not uncommon for a student's pain scores to decrease because they had gone from describing a relatively infrequent severe pain whilst playing to a less severe pain that was present all the time. Scores were influenced by factors such as the time between playing and completing questionnaire and stamina/increasing pain tolerance, which was mentioned by several students. The individual students' scores also changed regularly and it was quite common for students to have had a period of a week or two of really severe limiting pain which had resolved by the time of their next interview. This information was only revealed through the ongoing qualitative interview component of the research. The ability to triangulate the data is one of the main strengths of this

research project and is evident throughout the following discussion chapters.

Part 2

Because of the many limitations of the quantitative data obtained through the questionnaires, the qualitative component of the data analysis was critical and most time-consuming. The data was analysed according to the general process identified by Creswell (2014, p. 197) (see Figure 8). As he advises, I used this format as the base for an interactive process, where the different stages were interrelated and not necessarily done in the order presented.

Figure 8. Creswell's Process for Qualitative Research

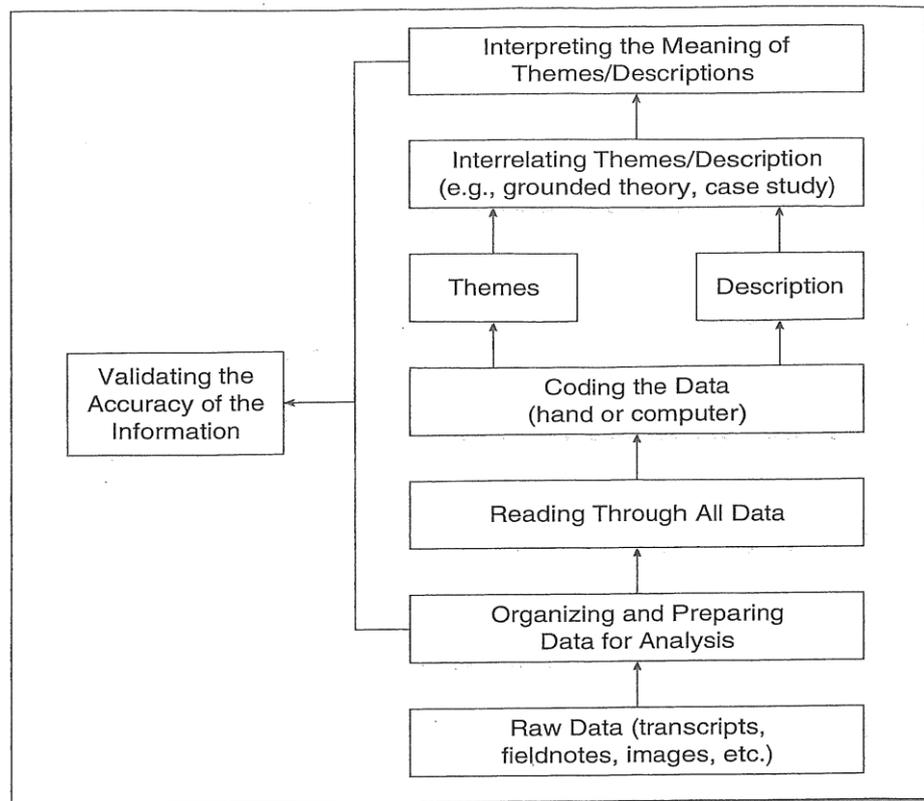


Figure 8. Data analysis in qualitative research. Adapted from “*Research design: Qualitative, quantitative, and mixed methods approaches*,” by J. W. Creswell, 2014, Thousand Oaks, CA: Sage Publications. Copyright 2014 by SAGE college. Reprinted with permission.

Part 2, the qualitative analysis of the individual semi-structured interviews, began in late 2007. Over the first few semesters of data collection I would listen to the interviews straight away and handwrite answers in to the questionnaires. Paper copies of documents were then stored in a locked filing cabinet within the institution. However from 2009 onwards, my physical disability meant that I was no longer able to handwrite the answers. I started storing data electronically, summarising and/or transcribing answers into Microsoft Word documents using Dragon NaturallySpeaking software. Existing questionnaires were also scanned as PDF documents, and the relevant pages were cut and pasted into each individual students Microsoft Word file. The process of storing the data electronically remained ongoing until data collection was complete in November 2011.

At the end of 2009, some of the initial intake of students opted to exit from the Bachelor of Music program. At this point I started the process of listening to all of their questionnaire/interviews again, double checking and inserting any other relevant quotations, and paying attention to more precise detail. During this process, all spoken words were inserted included the words *um*, *like*, *okay*, *yeah*. However generally only the students answers to questions were transcribed, not the questions as precisely spoken by the researcher, unless necessary, as in in an ongoing conversation. The following punctuation guidelines in Table 11 were used.

Table 11

Legend of Terms used in Questionnaire/interview Transcripts

Symbol	Definition
,	Used to indicate a short pause in the researcher/student speaking
.	Used to indicate the conclusion of a thought, accompanied by a pause
...	Used to indicate that words or sentences were emitted from the transcription. Possible reasons for this included them being inaudible, not relevant, or the student coming back to the same idea after discussing something else
[Pause]	Used to indicate a long pause in the speaking
[Laughs]	Used to indicate that the thought was accompanied by laughing
[]	Used to indicate participants' other non-spoken actions
[MW: "..."]	Used to insert words/questions that the researcher was speaking within the quotation
[Sounds of agreement]	Used to indicate that sounds of agreements made by students other than the speaker (i.e. in group situations)
(Student Pseudonym, SEM X)	Used at the conclusion of the transcription, including the student's reference followed by the semester

The extended quotation below illustrates the complexity of transcribing in this manner. The example is from Sally in SEM 8, taken from the relevant questionnaire/interview.

[MW: "So how did you find Opera in general?"] Um, to begin with it was, tough, like, getting into that many hours a day of, you know pretty much almost constant playing with the way, because this particular one, it didn't really have a lot of rests in it like most, like the last Opera I played. So um, yeah it was it,

took a while to get used to but after a while um, I found the problems were getting less and less. Like there was like I think, one performance where, everything seemed like it was the end of the world [laughs] and you know I didn't want to play anymore but it um, [MW: "Yeah."] [laughs], I think that was just exhaustion more than anything like, [MW: "Okay."] yeah. [MW: "So what parts of your body were you experiencing the pain in when you did the Opera?"] Um gee, my back a bit you know kind of like along the spine there [MW: "Yep."] you know, just from, sitting for so long because usually when you practise you are standing and it is a completely different set-up, whereas, sitting down for that long and playing, is, yeah, a bit of a shock to your back, [MW: "Yeah."] and um, [pause] yeah that is when I started getting the, yeah the problems with the shoulder blade and the, the right the left forearm...

... The more I paid attention to what I was doing and how I was sitting, [MW: "Yep."] the, the more it subsided sort of thing like it wasn't as much of a problem it would come back occasionally when I'd slipped up and wasn't concentrating but you know when you, when I started, pushing my shoulders back again and, sitting up properly, it would fix itself again, um. [MW: "Okay. So did that stop like, as soon as you stopped playing, all that funny stuff that was going on?"] Um, no not so much there was, a couple of days at the beginning I think. There was one day in particular where I had to go home and put a heat pack, on, basically that side of my body and my neck and stuff [MW: "Yep."] and so, and that helped a lot, kind of just, relaxing it, [MW: "Yep."] and, yeah. But um, [pause] and it got less and less that much the case as well, as it went on, yeah. (Sally, SEM 8)

In order to get such precise details I had to listen to words, sentences, and passages over and over, re-correcting the transcriptions. The process of doing this for a single questionnaire/interview could take anywhere from one hour to several days. Analysing the data in this way was extremely time-consuming and at times tedious, however it helped me to better understand each student's experiences as they had revealed them to me and I felt this was critically important, given the nature of the research. At one stage a third party was paid to transcribe selected focus groups and questionnaire/interviews. This was helpful in getting some of the basic gist of conversations on the page, however the extremely high level of error within these transcriptions meant that I had to redo them. I am confident that the transcribed quotations submitted in the attached appendices are very accurate. Though it is possible that there are still minor errors, these would not affect the overall intent and meaning of the words.

Part 3

Part 3 of the data analysis was ongoing from 2011 to 2013. It involved writing a summary of each of the 40 original cases, as well as identifying six particular cases (Mary, Tom, Robert, Anna, Steve, and Caitlin) for further analysis in the *Case Studies* chapter of this thesis. During this stage I went through each case separately, going back through their questionnaire/interview transcripts and PDF documents and listening to all of the recordings of their interviews again, taking care to correct any further errors in the Microsoft Word files. I then wrote a one to two page overview of each individual student's journey, which included a table (see Table 12 below for example) containing the following by semester enrolled:

- Fry's Overuse Injury Scale: grade;

- McGill Pain Questionnaire: pain at worst, Present Pain Intensity (modified to most recent experience, if not present at time), number of words to describe most recent experience; and
- Practice: average per day, most amount of playing in a single day.

The summaries contained a summary description of each student's perceived pain per semester, with relevant quotations, and paragraph summaries of all perceived contributing factors as identified in the Ongoing Pain Questionnaire/interviews, again accompanied by supporting quotations. Student summaries ranged from less than 500 words (Frank) to several thousand (Susie), depending on the number of semesters they remained enrolled at the institution, and the richness and complexity of the data contributed. Each of the 40 individual case summaries is contained in the Appendix B.

Table 12

Example Table Summary for Student 26 (Pseudonym: Melissa), a Female Violinist

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1-2	2	Doesn't specify when	Back right side of neck, right middle of back	3	1-2 hours	N/A
2	2-3 (was 4)	2-3	Present at time, 1	Back and shoulders	2	2 hours	5 hours
3	1-2	3-4	Present at time, 1	Back	1	1-3 hours	5 hours
4	1	1-2	Last week during Orchestra	Left shoulder	2	2 hours	6 hours
5	1-3	1-2	That morning during lesson	Thumbs	3	1.5 hours every day or two	7 hours
6	1-2 (was 4)	3	That morning	Right shoulder	3	1.5-2 hours	8.5 hours
7	1 (was 3-4)	3-4	Previous day	Left shoulder and neck, right side of back	3	2 hours	6-7 hours
8	1-2*	1-2	Previous week	Left shoulder and neck/jaw area	2	2 hours	7-8 hours

*On reflection 5 at worst

In the summaries, the quotations from the original Microsoft Word files were refined according to the following guidelines. Generally, incidental words not affecting the perceived meaning such as *like, um, you know*, were omitted. The three full stops came to mean that multiple words including incidentals were omitted. Any questions/comments from myself during the interview were inserted in square brackets, preceded by my initials (MW). Teacher names were concealed and inserted in square brackets with individual teachers identified by letters A-S. In some instances, an implied word was also inserted in square brackets. See the insertion of “but” below, which is required in order to understand the full meaning of the refined quotation that was used in the previous section.

[MW: “So how did you find Opera in general?”]... To begin with it was, tough... getting into that many hours a day of... pretty much almost constant playing... because this particular one... didn’t really have a lot of rests in it... like the last Opera I played... [but] the more I paid attention to what I was doing and how I was sitting... the more it subsided. (Sally, SEM 8)

During the process of doing each summary I also kept track of categories of contributing factors or keywords that were emerging in a separate Microsoft Excel file entitled “Keywords”. As in the *Pain scores* spreadsheet, in this particular file each student was listed across the top of this file, and relevant keywords as they emerged were listed down the left-hand column. The original *Keywords* spreadsheet eventually contained more than 300 variables identified under the following categories: Instrument, Practice, Orchestra, Attitudes, Carrying instrument, Travel, Career, Outside work, Health professionals, Pain tolerance, Strategies for preventing pain, Exercise, Warm-up, Teacher, Concern, Posture, and Technique.

The purpose of this file was not for in-depth quantitative analysis, though it did aid in the identification of categories and subsequent themes and also laid the foundation for some basic statistical analysis. Later on the Keywords file was refined and separated into 10 different spread sheets in preparation for thesis submission: General, Warm-Up, Orchestra, Practice, Technique, Other Influencing Factors, Perceived Cause, Attitudes, Treatment, and Strategies.

The process of compiling the summaries and keywords file was hindered by my physical disabilities which limited my ability to work on the computer, and the fact that I was having to listen to recordings and dictate into Microsoft Word at the same time. However the process proved invaluable as I was able to identify five key areas of influence: The Learning Environment, Orchestra, Practice, Technique, and Other Influencing Factors. I was also able to identify a number of overarching, primary, secondary, and subthemes (see Table 13) and six cases for additional in-depth discussion.

Table 13

Thematic Structure

Overarching themes	Primary Themes	Secondary themes	Subthemes
Inconsistency	Cultural beliefs	Teacher/conductor as authority figure	Misunderstandings Assumptions
Discontent		Conformity	Uncritical Acceptance Mimicry
Priorities			Unrealistic Expectations
	Lack of control	Playing time	Rest breaks, rehearsal duration, rehearsal techniques, repertoire selection
		Academic Requirements	Scheduling/timetabling, Teacher attitudes/behaviours
		Environmental conditions	Equipment provided (e.g. chairs, stands), visibility, temperature of the playing space
	Self-efficacy	Motivation	Proactivity, Self-responsibility
		Mindfulness	Self-awareness, adaptability, reflection, body awareness
		Perfectionism	Obsessive tendencies, compulsiveness
		Time Management	“Panic practicing” unrealistic expectations, avoidance
	Stress/anxiety	Fear	Public criticism, intimidation
		Suffering	
		Insecurity	Distrust, Scepticism
		Anger/frustration	

Conclusion

The original mixed methods design of this research project proved to be extremely beneficial in that it provided a flexible framework from which I could work. As the most valuable data was coming through the qualitative components of the research the research methodology was adapted to take this into account. The nature of the data analysis reported in the following chapters reflects the relative value of the quantitative and qualitative components.

Chapter 4: The Learning Environment

Introduction

Throughout this research it was clear that many participants were perceiving a link between their learning environments, both past and present, and their playing-related discomfort/pain. The specific learning environments most commonly discussed by students in this research were within the Major Study and Orchestra courses at the institution. However students also talked to a lesser extent about their experiences outside of the institution, as well as the perceived influence of their early education.

Unfortunately, most of the participants in this research perceived that at least some of the different elements within the Major Study and Orchestra courses at the institution were contributing to their playing-related discomfort/pain. Despite this the range of different experiences and perceptions of these courses were revealing. Students were largely directed through these courses by their individual Major Study teachers who were all reportedly working within the same guidelines. Yet students frequently came away with contrasting interpretations of teacher attitudes and priorities. In some instances they also had varying understandings and experiences of the general course requirements.

This chapter gives an overview of the range of students' perceptions of the learning environments at the institution. It moves on to a brief overview of the Orchestra course and other orchestral learning environments, which are discussed in more detail in the next chapter: *Orchestra*, before concluding by considering students' perceptions of their early learning environments. Each chapter section consists of a discussion and subsequent thematic summary.

Learning Environments within the Institution

The Major Study course

At the time of this research, the requirements for completing the general Bachelor of Music program were 80 credit points per year over a period of three years, with the option to do an additional fourth year. For most students, the Major Study course was worth 20 of the 80 credit points they were required to take per year. However the relatively small number of students in the Bachelor of Music Education strand received fewer credit points for the main instrumental study (10 CPs), and those in the Advanced Performance strand received more (30 CPs).

Students in the main strand of the Bachelor of Music in Performance generally received a one-hour lesson with a teacher specialising on the instrument per semester week. They were required to attend a weekly combined string workshop during semester and encouraged to perform within this workshop. They were also required to complete two examinations a year, one at the end of each semester. During Semester One this was generally a technique exam consisting of scales, a study, and an unaccompanied work. During the second semester this examination was an accompanied performance of repertoire meeting the criteria specified for that year level. Over successive years the requirements for the exams became more demanding and the performances became longer.

Students were also required to complete a Professional Development Journal. This involved a number of written tasks such as documentation of workshops, reflections of their Major Study lessons, answering specific questions, and documentation of their attendance at a number of concerts. This part of the course was non-graded but had to be completed in order to progress.

Thus there were not that many contact hours required within the Major Study course. The bulk of the work was individual practice which was done at the student's discretion. The general understanding was that students were expected to be practising upwards of three hours a day however some students claimed to be practising upwards of six or seven hours per day. The implications of this amount of practice on their playing-related discomfort/pain are discussed in detail in *Chapter 6: Practice*.

Students were allocated an individual teacher depending on their preference and also the availability of that teacher. At the time that this research began, there was only one full-time violin/viola teacher and one full-time cello teacher at the institution. By the conclusion of this research a second full-time violin/viola teacher had been appointed to the staff. The majority of participants were learning from one of these teachers. The remainder of the workload for this component of the Major Study course was shared by approved sessional teachers with varied, and often otherwise limited, involvement at the institution.

Individual teachers

As was also the case in studies of tertiary/professional musician populations by Carey and Grant (2015, p.5); Gaunt (2011, p. 159); Guptill (2011a, p. 87; 2011b, p. 276); Ioannou and Altenmüller (2015, p. 137); Perkins et al. (2017, pp. 6-8 of 15); and Wood (2014, pp. 41-42), the data collected in this research project clearly showed that participating students had a variety of different perceptions of (and experiences with) their individual instrumental teachers. Strikingly, it appears that students' perceptions and experiences of the overall learning environment within the institution may have been greatly influenced by their interactions with these teachers.

Teacher D, who taught almost all the cello students at the institution, was generally known among students as being tough and having high expectations of his students. He held one additional group cello class each week outside the curriculum that his students were expected to attend and perform in. Generally speaking, his students perceived that Teacher D expected they do a minimum of three hours practice a day, preferably more. Some of the students in this research project claimed that Teacher D's perceived no-nonsense attitude and high expectations were exactly what they needed to focus on their studies. However, experiences of the participants were varied with others feeling victimised by this teacher and/or anxious during interactions with him.

When it came to student perceptions of Teacher D's attitude towards pain and injury, again there was much discrepancy. Cellists Mark and Wendy consistently stated in an interview situation that they believed Teacher D had a very proactive and logical approach to preventing/dealing with playing-related pain. They both discussed their experiences with him and found his advice (including advice regarding practice) to be very helpful.

[Teacher D] said that, "If it's real pain... something's wrong pain, to stop... but if it's, just, your hand's not used to it... then keep going because you have to, make it used to it", which is what I was doing with the strengthening exercises.

(Wendy, SEM 3)

Yet other students of the same cello teacher had a completely different perception. Erin said she bought up her experiences with the teacher but found that not only did he have little useful advice, she perceived that he was not very interested in what she had to say.

[Teacher D] is a bit like... I don't know I don't think he's ever experienced any pain from playing cello so he is just like “Alright everyone gets it so it's okay”, sort of thing... he is not really focused on... that sort of aspect. (Erin, SEM 7)

Sam, a cellist, offered the opinion that this particular teacher was only an effective teacher of the most talented students. This student then went on to state his own opinion that the most talented students did not have any problems with playing-related pain. “He’s [Teacher D’s] good at teaching... talented students... they don't have any problems... but ... I don't think he's good at teaching, students who has got, problems” (Sam, SEM 6). Whilst Mary, a cellist, said “I could, but I don't think it’s necessary [to discuss with Teacher D], I'm sure... he's got pains too” (Mary, SEM 4).

This particular student also claimed that she had to do a minimum of five hours practice each day to get through the work that Teacher D expected. The different interpretations of Teacher D’s expectations of them regarding practice, from Mary and Wendy, are revealing. “The amount of work that [Teacher D] gives us... there's no way I can fit, all my pieces in one hour or... two hours I have to, spend... a lot of time on every piece” (Mary, SEM 6). “[Teacher D] said to us in cello class last semester that we really only needed to do two hours a day if we are doing proper practice” (Wendy, Focus Group 1).

Significantly, the perceived characteristic traits of each of these students seemed very similar to their perceptions of this teacher. During interview Mark and Wendy came across as logical, confident, studious, and sensible with regards to many aspects of their lives. Erin came across as more easy-going in general and Sam identified having many problems with anxiety and insecurity in everyday life and music performance. Mary, on the other hand, was a very high achiever who practised long hours and

consistently stated that she believed pain was a normal part of playing a string instrument.

Interestingly, Sam, who consistently reported having a poor relationship with Teacher D, chose to go on and complete a Graduate Diploma in Education. He said that his main reason for wanting to teach was so that he could have better relationships with his students than he had experienced with Teacher D. On the other hand Mark, who consistently reported a good relationship and much admiration for Teacher D, said that he wished to become a teacher of advanced students just like him. Mark's experiences align with research by Guptill (2011a), who found that professional musicians may hold the opinions of their tertiary instrumental teachers in extremely high regard (p. 87); and Perkins et al. (2017), who reported some similar opinions among current and recently graduated tertiary music students (p. 6 of 15).

Chris, another cellist, had yet another different experience of Teacher D. This particular student was an individual who generally stood out from the other participants. He presented as a typical “cool” kid, with cap on backwards, baggy clothes, a penchant for extreme sports, and taste for alternative music. As he progressed, Chris reported in interview situation that he believed he was experiencing a lot of issues with Teacher D. He perceived that these issues were a result of Teacher D not liking his unique personality rather than having an issue with his playing ability. For example, it was common knowledge among research participants that, if Teacher D was taking string workshop, you could expect some brutal (and what could be perceived as possibly unfair) feedback. On one occasion Chris actually challenged the teacher in this situation, something that would most likely have been unexpected to Teacher D. Chris perceived that interactions like this made him unpopular with Teacher D.

I'm not that kind of person, I'm not... one to suck up... one day [Teacher D] had a crack at me in workshop and... I lashed back and everyone has gone, "Jesus", even [Teacher D] was shocked... I wasn't nasty or anything... I just, said my opinion... he looked at me and I looked at him and... he knew exactly that... I was just going to keep fighting back so he stopped. (Chris, SEM 6)

In contrast to the research by Park et al. (2007, p. 91) and Perkins et al. (2017, p. 9 of 15), Chris had a negative perception regarding the influence of cliques and perceived a lack of support and community in the Conservatorium environment. He perceived being singled out by his fellow students because he was unconventional. He commented that the cello students were like "a little club", competing and backstabbing for the top position. Although this is not directly related to Chris's experiences of discomfort/pain, it gives a lot of insight and a different perspective of the cello teacher and indeed the general learning environment that this research project was taking place in.

In the... cello group... it's very backstabbing... very nasty... everyone tries to be your friend but then they turn around and do something... I'm not that kind of person, I'm not... one to suck up... never will be, which I suppose I should maybe in some areas. (Chris, SEM 6)

Clearly when it came to this particular cello teacher, there were many differences among students' perceptions. Yet when it came to the perceptions of students towards one of the sessional staff members not employed full-time at the institution, there were many similarities.

Viola students Anna and Rachel, who learnt from Teacher I, both reported suffering playing-related injuries throughout their program. Although they found the

teacher to be initially sympathetic (apparently she had had an injury herself) they found she had little constructive advice. They also found many inconsistencies between what this teacher would say and what would actually occur in their lessons. Teacher I had a way of scheduling lessons so that there would either be one long lesson or two lessons within one week, and then one week with no lesson at all. As Anna and Rachel believed that their ongoing issues with pain were exacerbated by playing for long periods of time and/or stress they perceived that this scheduling was less than ideal. “She [Teacher I] is not here every second week... so, we have a lesson... two days, in one week and no lesson, next week which makes it really hard because... I experience a lot of pain” (Anna, SEM 5).

Both students went to the Head of Strings to seek advice regarding this issue. They were reportedly advised that this method of lesson scheduling was generally not acceptable but that they must first raise the issue with Teacher I personally. Anna and Rachel claimed in interview situation that they did in fact go ahead and do this and subsequently said that, although Teacher I appeared to be listening and taking what they were saying on board, she continued to behave in the same manner. Unfortunately, in the end no changes to the lesson scheduling for these particular students were made.

Me and Rachel talked to [Teacher A] about it and she, didn't know that this was going on and she, fully disagreed with it but, we have to first tell [Teacher I] that, we are having a problem with it... [but]... it's really hard... we tell her things... but, it... just goes... into her head for a second and then it leaves. (Anna, SEM 5)

Rachel was able to find a new viola teacher at the end of the second year of her study and found her new teacher to be much more satisfactory. Among other things, she

said that her new teacher had more practical advice and she perceived that they were now moving forward productively. Her reported experiences with different teachers bear a striking resemblance to those recounted in Wood (2014, p. 42), and Perkins et al. (2017, pp. 7-8 of 15). Unfortunately for various reasons Anna had no option but to continue with the same teacher. This student's experiences are discussed in more detail in *Chapter 9: Case Studies*.

I find it much better... my old, other teacher... she has, suffered... from pain... and I found... she was very concerned about me but... wasn't getting anything done... but with, my new teacher... cause she has also had injuries... from playing... she is a lot more direct and to the point and, she knows how to fix it, straight away. (Rachel, SEM 6)

Other students in this study also perceived inconsistencies between their teacher's words and actions. Susie, a violinist, also learnt from a sessional violin/viola teacher. Although she found him initially sympathetic as he had reportedly had various students with injuries before, she found that he had little practical advice and felt that he did not understand the extent of her problems. She would find that, during the lesson, she would state that she was in pain and he would reply that they would take it easy but then they would continue the lesson in the same manner.

He's [Teacher O] had quite a few students with injuries so he's... understanding, but... I... say "I've got a sore wrist" so he says "We'll take it easy" but we still do it the same... I don't think, they really realise... the extent of it I suppose if I was more assertive and I turned around and said "No I have to stop", then maybe we'd stop. (Susie, SEM 4)

Susie also experienced additional difficulties related to lesson scheduling. Her playing-related pain was impacting on her to the point that she perceived her practice was greatly restricted so, in order to give her more time to practise she moved to fortnightly lessons. However she then had to have lessons up to two hours in length and of course these exacerbated the problems with pain. Towards the end of the program she commented that the lesson was unproductive after 45 minutes as she was in so much pain. Yet at the same time, she said that her lessons were going much better because she had longer to practise in between. Inconsistencies thus reportedly came from both the teacher and the student herself.

Significantly, towards the end of her program, Rachel, who had a comparatively favourable outcome, perceived that there was some flexibility within her overall learning environment to accommodate those with playing-related discomfort/pain and/or other issues and that she had access to some adequate support services. On the other hand Susie and Anna unfortunately had the perception that the learning environment was not very flexible, that staff did not have their best interests at heart, and that there was limited support for them. The variation in perceived experiences is similar to that reported in Stanek et al. (2017), where only half of college music students who sought help from their teacher and/or other source were satisfied with the result (p. 24); and Perkins et al. (2017), who found that tertiary music students perceived support services could be significant enablers or barriers to optimal health (p. 5 of 15).

The experiences of these students are quite different to those generally recounted by the students of a full-time violin/viola teacher at the institution. Like Teacher D, Teacher A held an additional workshop once a week for her students only. During this workshop they would incorporate and reinforce strategies they perceived as healthy

such as stretching and warming up. At various times this teacher had special health professionals (including a practitioner of Alexander Technique and a physiotherapist) come in to give advice. These workshops were mentioned specifically in the interviews by nearly all of this teacher's students as being particularly beneficial. "[Teacher A] has, gotten us on to... Alexander Technique... so... we've been conscious about standing properly and stuff... we learnt about... supporting, your... top half with your lower back" (Jill, SEM 4).

As a direct consequence of the workshops several students began to adopt perceived preventative strategies such as stretching. Examples include Jill, Caitlin, Cassie, Gary, Steve, and Robert. Note that Teacher A also reportedly passed on the names of an Alexander Technique practitioner, and a physiotherapist with experience treating musicians, to some of her students who came to her for advice when experiencing playing-related pain/injury. As was also the case in Manchester and Park (1996), students who were injured or experiencing pain were more likely to take lessons in Alexander Technique (p. 21). Alexander Technique workshops were also mentioned by students in the study by Wood (2014), where one participant recommended that they be included in the curriculum (p. 41). In addition Stanek et al. (2017) found that 22.8% of 1007 college music students and staff used Alexander Technique as a relaxation technique, regardless of pain (p. 23); and Topoğlu et al. (2018) found that 21% of the Turkish State Symphony Orchestra musicians in their research had received some education in conscious body use such as Alexander Technique (p. 120).

Over the course of five years of this research, in conjunction with Teacher A, the institution arranged for some sessions held during Project Week and "compulsory" String Workshops. These sessions featured visiting practitioners and focused on the

prevention of playing-related injury. Yet despite many students in this research project stating in the Initial Questionnaire and subsequent questionnaire/interviews that they were open and eager to learn more about musicians' health problems, very few attended. (This was also the case in Park et al., 2007, p. 94; and Perkins et al., 2017, p. 9 of 15). Those who did, such as Rachel, Melinda, and Sally, found them to be very beneficial. "I went to the... physio, session in [Project Week]... and so, I use some of his, techniques... to wake-up the muscles... [MW: "... Have you found that helps?"] Yes, so much" (Rachel, SEM 4).

I think through, all the workshops, that happened in Project Week... I'm a lot more aware... of problems so, beforehand, I would just ignore it... but now... if I notice, my back is hurting or something like that... I'd stop... and then, take a good break. (Melinda, SEM 2)

Melinda, Rachel, and Sally's experiences are supported by the findings of Lopez and Martinez (2013), who found that tertiary music students who participated in a preventative health program increased their body awareness by 91% and decreased the frequency of their injuries by 78% (p. 100). Spahn et al. (2017) also reported that participation in a preventative health program increased preventative behaviours among tertiary music students however there was no decrease in the incidence of playing-related health problems (p. 227).

As was also the case in Ioannou and Altenmüller (2015, p. 135); Stanek et al. (2017, p. 23); Williamon and Thompson (2006, p. 411); and Wood (2014, p. 37), students in this research primarily sought advice on any playing-related issues from their instrumental teachers. The perceived general reaction to students discussing their pain with their teachers was usually initial understanding from the teacher and a

recommendation to seek the opinion of a health professional, followed by general advice including regulating and taking breaks during practice, stretching, and using heat. There are similarities to the findings of Ioannou and Altenmüller (2015), where affected students were primarily advised by their instrumental tutors to take time off from playing. However a point of difference to this research is that they generally did not direct affected students to seek medical advice when problems persisted (p. 141).

Unfortunately, many of the students in this research who were affected by ongoing issues, like Susie and Anna, discussed above, perceived that the teacher either lost patience with them or didn't understand the extent of their problems. In these cases a portion of the responsibility for this misunderstanding must lie with the student, as they all admitted to downplaying the extent of their problems to the teacher.

Another perception was that certain teachers would react differently to students experiencing pain. Participants in this research perceived that different teachers may have been more sympathetic to students with PRMDs than others (similar perceptions were also reported in Perkins et al., 2017, pp. 7-8 of 15). For example, during Focus Group 2, Mark said

I think a lot of this comes back to the teachers, [sounds of agreement] because... so many teachers who work in the Strings Department, don't ever think about this sort of thing and you know it is a real shame that they [their students] miss out [sounds of agreement]. (Mark, Focus Group 2)

David agreed, stating that had he experienced the injury he later had whilst learning from his previous sessional violin/viola teacher, he most likely would have been told not to worry about it. However his current teacher told him to get it seen to straight away, so he sought prompt attention from a recommended physiotherapist.

Jill: “It’s just hard to access the resources, if you don’t have a teacher that cares about that kind of stuff...”

David: “... That’s true actually... I remember when I was learning off [Teacher E] he would have been just like ‘Grrrrr’, [sounds of agreement] ‘don’t worry about it.’” (Focus Group 2)

David was lucky in that he consulted a specialist with experience in musician injuries in the first instance, and received a quick resolution to his injury. He therefore had no further need to discuss his experiences with his Major Study teacher.

Unfortunately something which did become clear through the ongoing interviews was that it was very common for other students in this study to stop discussing their playing-related pain with their Major Study teacher, particularly when it did not resolve. This was consistent across many teachers of different instruments regardless of whether they were full-time or sessional staff, and was more likely to occur among those students experiencing severe ongoing problems such as Susie, Tom, Mary, Anna, Steve, Donna, and Robert.

Significantly this tendency was not isolated to students of teachers who were perceived as being generally unhelpful in this regard. Donna, a violinist who developed a lump in her left hand during the second year of her program, learned from Teacher A. This teacher was generally perceived as promoting preventative strategies, as well as being understanding and accommodating to students with injury. Donna was originally quite open with Teacher A about her ongoing issues with pain and reportedly spent much time with this teacher analysing issues of technique and posture. She was referred to and consulted numerous doctors and specialists over the years, and at one stage was considering surgery. However Donna expressed many reservations regarding the

possible outcomes of any surgical procedures, as well as a general distrust of surgeons and their ability to treat and understand her needs as a musician. She therefore did not go ahead with the surgery. Many of the quotations obtained from her on this subject are strikingly similar to those of injured student musicians in Park et al. (2007, pp. 92-93), and those from an injured cellist in Rickert et al. (2014b, pp. 130-131).

Towards the end of her program Donna perceived that Teacher A was beginning to lose patience with her. However at the same time she admitted that she had begun to downplay her problems to her teacher. She acknowledged that Teacher A may have been acting this way because she didn't realise that the reason that Donna didn't want to practise or participate in rehearsals was because her pain was still so severe.

I've talked about it a bit with [Teacher A] I think she's kind of given up on me a little bit I don't blame her... I don't really, practise that much and then [Teacher A] gets upset with me because I am not practising... but then I can't... [MW: "Does she know, the extent of the problem...?"] Of course I downplay it a bit, [laughs]... I hate people who are dramatic. (Donna, SEM 6)

By this stage the particular student had taken off the splint that she was wearing as part of her treatment as she perceived that it was not effective. She had also virtually given up hope that the issues could be resolved after consulting numerous doctors and specialists to no avail. Because the visible sign of injury had disappeared the student's perception was that her teacher thought that the problem had been solved.

Unfortunately, as with other injured students Susie and Anna, by the end of her participation in this research this particular student was conveying a negative perception of her overall learning environment. Wood (2014) similarly found that many musicians

who sought help from health professionals were generally dissatisfied with the treatment/diagnosis given (p. 41).

Thematic Summary

Throughout this section a number of primary, secondary and subthemes have begun to emerge that will recur throughout this thesis (refer to *Chapter 3: Methodology*, Table 13). The primary theme of *Cultural beliefs*, its secondary themes of *teacher/conductor as authority figure* and *conformity*, and subthemes misunderstandings, assumptions, mimicry and unrealistic expectation all feature prominently. For example, students perceptions of Teachers D, A, I, E, and O show the potential impact of beliefs such as “no pain, no gain” and downplaying problems on the development of playing-related discomfort/pain. They also show the extent to which students may project their own attitudes about pain and injury on to others. The primary theme of *Self-efficacy* (and its secondary themes of *motivation*, *mindfulness*, *time management*, and *perfectionism*) is also clearly evident when comparing the different approaches and perceptions of Teacher D’s students Mark, Wendy, Mary, Sam and Chris to their practice.

The primary themes *Lack of Control* (secondary themes *playing time*, *academic requirements*, and *environmental conditions*) and *Stress/anxiety* also feature. The reported experiences of Rachel and Anna with Teacher I highlight issues regarding scheduling and teacher attitudes and behaviours that are particularly evident when considered in contrast to those of students of Teacher A. *Fear*, *suffering*, and *insecurity* come through strongly in the discussions involving cellists Chris and Sam, violists Rachel and Anna and violinists Susie and Donna. *Inconsistency*, *Discontent* and *Priorities* also emerge as general overarching themes, particularly in these six cases.

Sessional teachers

Not all the students in this research who were enrolled in the Bachelor of Music program were able to learn from full-time staff based at the institution. Some were taught by sessional staff members, who were not full-time employees with regular weekly hours. Over time it appeared that there may have been a unique set of issues that arose for the students of these sessional staff members, who may have been less familiar with the institution's formal and informal policies and procedures. In particular, some of their students didn't seem to know who they could go to for advice and claimed to feel quite alone and unsupported.

Rachel, discussed in the previous section, is a striking example. This violist withdrew from her Major Study course in the second semester of her program, after experiencing severe playing-related discomfort/pain during the Project Week Opera rehearsals. At the time she claimed to be feeling depressed and unsure of whether she could continue her studies should she be scheduled in similar orchestral programs in the future. Rachel was encouraged during one of her research interviews to talk to the Head of Strings about the issue. At her following interview she revealed that the Head of Strings was very supportive and agreed not to put her in any more of the Opera programs. This student was also subsequently able to change to a different sessional teacher. "I... talked to [the Head of Strings] about it... because I was considering leaving. [she] said... I should stay because, I like doing what I do... [and that I won't]... be put in the Opera Orchestra" (Rachel, SEM 3).

In the case of Susie, a violinist with very severe ongoing problems, another issue was that she needed to change the direction of her undergraduate study program from Music Performance to Music Education. She claimed many times that she perceived her

sessional teacher was unable to provide any advice. Moreover she also felt that the institution made the process very difficult for her and that she was unsure who she could go to for help. Although in the end the issue was resolved and she consulted the correct staff member, reportedly it was a very stressful experience which she perceived further aggravated her ongoing health issues.

If I get the Cross Institutional, I will apply to do Winter... and Summer Semester up there [at a different institution]... obviously... I have to try and... fight, with The Con... be nice if it was just like “No you can do it if it's going to help you”.
(Susie, SEM 6)⁴

Aside from the lesson scheduling and perceived lack of ongoing support already identified by Susie, Anna, and Rachel; Susie, Melissa, and Leah mentioned having particular difficulty with certain requirements of the Technique Exam. In the case of Susie, having to do tenths (that require a significant stretching and twisting of the hand and elbow) was extremely painful and rendered her unable to play afterwards. Leah also claimed to experience great pain when having to do double-stop scales on her second instrument, viola.

With the viola... I actually have a lot of neck pain when I play, because it is so big... because I am holding it with my head my whole neck just feels like it's going to fall off... there's a scale that I have to do for my exam and... it hurts, to actually reach up. (Leah, SEM 3)

The claims that certain requirements of the technique examination were causing some pain were not unusual across the institution. At the time there was in fact an informal policy adopted by the Head of Strings that students who were experiencing on-

⁴ Students who attend the institution commonly refer to it as “The Con”. All references to “The Con” in this thesis refer to the institution where this research took place.

going pain had been granted exemption from particular elements of the examination such as the tenths. Had these students and their sessional staff teachers been more aware of this informal policy, the students would most probably have been exempted from those particular requirements of the technique exam. However in the case of Leah, when she mentioned her pain to her sessional teacher, she was reportedly advised to keep going.

It is important to keep in mind that some of the sessional teachers may have been in a difficult position. In addition to perhaps being less familiar with such informal policies, it is possible that the students were not entirely honest with them about the extent of their problems with pain. What does seem to be clear from this research is that some students perceived that their teachers had limited understanding of both formal and informal policies within the institution. It may therefore be the case that students of sessional staff members were inadvertently placed at a disadvantage.

Thematic Summary

This section has expanded further on Rachel and Anna's experiences with Teacher I, as well as Susie and Leah's experiences with their respective sessional teachers. The primary theme developing is *Lack of control* (secondary themes *playing time, academic requirements, and environmental conditions*), which features prominently in all of the students' reported experiences. However the other three primary themes (*Cultural beliefs, Self-efficacy and Stress/anxiety*) and secondary themes (*teacher/conductor as authority figure, conformity, motivation, mindfulness, time management, and fear*) are also evident in the discussion of these six cases.

Viola students

The data collected during this research project revealed that all those who had the viola as Major Study instrument experienced playing-related discomfort/pain requiring medical treatment. The numbers are small (with two females and two males who completed a Bachelor of Music program) but striking nonetheless. As mentioned previously, violists Anna and Rachel both had a partial resolution of their pain when they purchased smaller lighter instruments. It is unfortunate that both students came to the conclusion that the size and weight of the instrument may be affecting their pain of their own accord. They went on to purchase their new instrument without the guidance of their sessional teacher. Significantly, both these students reported that they had had been playing on their original instruments since their first viola lessons. On reflection, they perceived their early learning experiences and playing on these instruments as greatly affecting their past and present playing-related discomfort/pain. Both also stated on reflection that they believed they were not technically advanced enough on their instruments when they were accepted into the Bachelor of Music program. The experiences of Anna and the similarities to Rachel are also discussed in *Chapter 9: Case Studies*.

A further two female Violin Performance Majors in this research project were required to play viola at some stage of their program. Cassie and Melinda, assigned to play viola in at least one block of Orchestra rehearsals, both noticed a corresponding increase in pain when playing the larger instrument. Their reported experiences are in line with Bird (2013) who noted that changing from violin to viola may be a common cause of problems due to the difference in instrument size and weight (p. 476) and

Kaufman-Cohen and Ratzon (2011), who found that instrument weight was one of the main predictors of PRMDs in orchestral musicians (p. 90)

“I’m doing viola in Orchestra now... I really noticed it I was thinking this thing is so heavy... After a three-hour rehearsal I could really feel it in my back... I don't get that from violin” (Melinda, SEM 7).

At the time some of the violin students in the Bachelor of Music program were being encouraged to also try the viola for a semester. Reasons included broadening their experiences and future employment possibilities as well as a relative shortage of viola players enrolled in the program at the time which was having an obvious flow-on effect to the Orchestra course. The institution purchased several smaller violas for this purpose and only students who were deemed physically suitable for the instrument were encouraged. The implications of accepting less advanced viola students into the institution (and encouraging violin majors to play viola for Orchestra programs) are discussed later on.

Thematic Summary

In this section the primary theme of *Cultural beliefs* is prominent. Rachel and Anna receive inappropriate advice/support regarding the impact of instrument size/weight on playing-related pain and injury and Leah’s teacher has a lack of knowledge of the requirements for the technique exam. In both instances these misunderstandings impact directly on the amount of discomfort/pain experienced by the student. The institution may also have unrealistic expectations as to the ability of the accepted viola players.

Note also the continuing emergence of the primary theme *Self-efficacy*. The secondary theme of *mindfulness* is evident as Rachel and Anna use self-analysis and

reflection in coming to the conclusion that they should purchase another instrument. There is also a perceived *Lack of control* (regarding aspects of *playing time, academic requirements, and environmental conditions*) for all of the students discussed in this section.

Music Education majors

Two of the violin students in this research who began their Bachelor of Music program in 2008 were enrolled in the Bachelor of Music Education strand. As discussed previously, the requirements for the Major Study course within this strand were slightly different. Students were to sit two exams each semester, one on the Major Study instrument worth five credit points, and one on the other string instrument they were required to study in that particular semester, also worth five credit points. Both students in this strand of the Bachelor of Music program noticed an increase in pain when having to play the additional instruments. Their reported experiences contrast with the findings of Ranelli et al. (2011), who found that playing three or more instruments was actually protective of monthly playing-related musculoskeletal symptoms in a population of adolescent musicians (p. 123).

Violinist Leah learned viola during the second year of her program. At this time she claimed that she was experiencing a lot more pain, particularly when shifting position. As already noted, she tried to adapt by bringing her thumb further around the viola however the viola teacher reportedly corrected this.

With the viola... my teacher... was... like... “You can't bring your thumb right up because when you come back down, your thumb is not going to be, in a position... where you can get back down”... so, I had to... stretch my hand over and that was... hurting. (Leah, SEM 3)

Robyn, a violinist who learned cello in the third year of her program, also noticed an increase in discomfort/pain whilst learning the additional instrument. In her case, the affected area was the right arm. Up until that stage she had been experiencing very little playing-related discomfort/pain. However, she remained unconcerned about her experiences, as the following quotation shows. “It’s, ’cause I’ve got bad posture... with the cello... I’m like ‘Yeah whatever.’ I only have... three weeks to go” (Robyn, SEM 6).

Despite apparently not caring about the technicalities of playing the cello, however, at the end of her program Robyn nonetheless would have been qualified to teach the cello to beginner string students in a school. Unfortunately some cello students in this research who had been taught in group situations by such teachers perceived that they were not set up to play their instrument with the correct techniques. The long-lasting implications of early learning experiences will be discussed further on in this section.

Thematic Summary

The experiences reported in this section further highlight three of the primary themes emerging. The first is *Lack of control*: clearly students have a limited amount of control over immediate *academic requirements*, due to course guidelines. The second is *Self-efficacy*: had Robyn utilised self-reflection in a positive manner when learning the new instrument she may have been able to minimise her discomfort/pain. The third prominent theme is *Cultural beliefs*. Leah’s experiences with her teacher demonstrate the perceived importance of *conformity* and use of mimicry when learning the techniques for playing her new instrument.

The Orchestra course

As the research progressed it became increasingly clear that many students had a very negative perception of the learning environment within the Orchestra course at the institution. Concerns were wide ranging, from generally negative perceptions of staff, to dissatisfaction with rehearsal scheduling, through to factors identified specifically as impacting on playing-related discomfort/pain. The main perceived influencing factors will be identified here but further intricacies relating to the Orchestra course are discussed in more detail in the next chapter *Orchestra*.

One of the major problems identified by students in this research was that they generally perceived having little or no control over what happened in this learning environment. For example, in regards to the rehearsal schedule, students identified a lack of control over the amount of time they were playing and how many breaks they could have. Guptill (2011b, pp. 273-274); Rickert et al. (2013, p. 219); and Zaza et al. (1998, p. 2018) similarly found that injured orchestral musicians perceived that a lack of control over the work environment contributed to PRMDs.

Ioannou and Altenmüller (2015) found that 30% of tertiary music students affected by playing-related pain were unable to follow medical instructions fully because of their school obligations (p. 137). Similarly, some injured students in this research perceived that they were unable to follow through on the advice of a teacher or health professional due to the perceived inflexibility within this particular learning environment. The block scheduling of rehearsals, workshops, and competitions in certain weeks was also perceived as not being conducive to preventing playing-related pain and/or injury. This perception is discussed in more detail in the following chapter.

Students also perceived and expressed generally negative perceptions of the Orchestra course staff, including their perceived attitudes towards those experiencing playing-related pain. For example, the majority of students in this research project (including those experiencing severe problems) were of the opinion that the Orchestra course staff at the institution would not find it acceptable if they stopped or stretched during a rehearsal. Some, such as Donna, an injured violinist, went as far as to say that she perceived the Orchestra staff would reprimand her for stopping and not playing all of the rehearsal. However she could not specify an occasion where she had actually been reprimanded. The perception seemed to have come from general interactions with the staff that found them to be very unhelpful and inflexible in other ways, and observations of general interactions between the conductor and different musicians within Orchestra rehearsals. “They are not very nice, I'm not going to lie, and... [Teacher C] hasn't been very helpful... I just don't appreciate his attitude or, the way that he conducts thing[s]” (Donna, SEM 6). “I have never ever really seen anyone do it... I think they are not game to try... taking a break and stretching” (Sally, SEM 8).

On the other hand there were a few students who said that they would be comfortable stopping and stretching during Orchestra if their pain reached a level that required it. Melissa, a violinist, also experienced a playing-related injury that impacted on her ability to play during Orchestra rehearsals. In interview she said that she found that Orchestra staff were very understanding and allowed her to simply sit through a couple of rehearsals without playing. A variety of experiences with management staff was also reported by injured orchestral musicians in Rickert et al. (2014b, p. 133).

I hurt my, left hand... right before we started Opera actually, so I took a couple of days off... and didn't play... took about two and a half, three weeks for it to be

fully healed [MW: “And, did you play at all during that time... in Orchestra...?”]... I was playing lightly, because... I talked to the conductor, about it and he said “Yep that's fine if you need to sit out”. (Melissa, SEM 6)

It is interesting to consider that there were some major differences between the reported experiences of Melissa and Donna. Melissa only required sitting out of rehearsals for a couple of days before she was able to resume playing. She also presented as having a more positive attitude towards the Orchestra course and overall learning environment at the institution. On the other hand Donna suffered ongoing problems with pain that persisted for the remainder of her program and during her interviews she expressed a lot of negative sentiment regarding the Orchestra course. The issue for her was that she could only play for a certain amount of time before she needed to stop. So it was not so much that she needed to sit out entire rehearsals, she needed flexibility within them to accommodate her personal circumstances.

There were also some students who said that they thought that it was acceptable for others to stop and stretch during rehearsals, but that they personally wouldn't. Violist Robert is a prime example of this, stating that he preferred to “soldier on” even when in severe pain. This student seemed to adopt similar strategies in the practice room and other orchestral environments. His circumstances are discussed in more detail in *Chapter 9: Case Studies*.

Thematic Summary

In this section the theme of *Lack of control* is highly prominent. It is particularly evident in students' perceptions as to the influence of *playing time* and *academic requirements* on their playing-related discomfort/pain. The primary themes of *Cultural beliefs* and *Self-efficacy* are also present.

Other Orchestral Environments

Many of the students in this research project revealed that they were also participating in various local, state, and national orchestral programs outside of the institution. Generally speaking, there appeared to be less negative sentiment expressed regarding these other orchestral learning environments than to the Orchestra course at the institution. Nonetheless there were several instances where students identified that they were experiencing similar problems with playing-related discomfort/pain. Student experiences are discussed in more detail in *Chapter 5: Orchestra* under the heading *Other Orchestral Situations*.

Influence of the First Teacher

Many of the participants in this research project stated that they believed their very first teacher had played a vital role in setting them up with their current playing techniques and habits. In some instances there was a positive association but, for the most part, students were associating what they perceived as being “incorrect” playing techniques with these formative lessons. As was the case in Árnason et al. (2014, pp. 76-77); Britsch (2005, p. 42); Raymond et al. (2012, p. 19); and Topoğlu et al. (2018, p. 120), participants generally perceived having received little or no education in their formative years regarding practice habits and their role in preventing playing-related discomfort/pain.

Several students were able to link an initial increase in discomfort/pain in the first semester of their studies to the correction of perceived “incorrect” playing techniques. They then claimed to notice a gradual decrease in pain. Examples include violist Melanie, who linked the increase/decrease to correcting her posture whilst playing, and cellist Mark who linked his to improvements in his bow hold.

Given the perceived importance of their first teachers, it is unsurprising that most participants also claimed to attribute great responsibility to the role of early educator. However that they did not necessarily portray a great amount of respect for those who chose to pursue or work in that particular career. Mark stated

I would really like to become a teacher, in like 20 years... after I've done... quite a lot of, playing and professional work and I actually know what I'm doing... people that, try and start teaching immediately... they are just wrecking kids and they've all got bad posture and neck problems. (Mark, SEM 8)

This type of sentiment was more common among those students who were determined to make performing their future career. However Mark's assumption is contrary to case study research by Persson (1996), which suggested that experienced performers may not necessarily be effective teachers (p. 25).

Other students reacted differently to this perceived sense of responsibility. Violist Rachel, who began learning in a group situation, was convinced that much of her playing-related discomfort/pain could be traced back to her first lessons. When she arrived at the institution her career aspirations all focused around playing the instrument. However, she suffered serious pain and injury from early in her program and, as a result of this decided to change her focus to classroom music and other subjects. Rachel stated this was specifically because of her own experiences of playing-related pain and injury, as the following quotation shows.

I don't feel that I'm, ready or capable to... enter a... school education... instrumental... system because... I don't, know how to play the cello... the bass... and I don't want to teach a child... if I can't play the instrument I don't, want to inflict, harm... I guess... because I came from... school system and, were I to start

with a private teacher I might not have... some of the... injuries that I have had...

I'm, considering classroom music. (Rachel, SEM 7)

Susie, a violinist, also perceived a link between her playing-related pain and injury and habits learned in these formative years. In her case, she was reportedly encouraged to practise long hours, never receiving any advice regarding matters such as practice breaks. She also claimed that she was taught a rigid posture which encouraged tension. Unfortunately she too went on to have very severe problems with playing-related pain and injury and identified these factors as being very detrimental to preventing pain. As with Rachel, this particular student also didn't want other young players to have a similar experience to her own. However, rather than giving up teaching the instrument altogether, she believed the best way to do this was for her to continue teaching beginner string players in what she perceived to be a more appropriate manner.

Thematic Summary

The primary theme of *Cultural beliefs* (in particular subthemes misunderstanding and assumptions) again features strongly throughout this section. The students' perceptions suggest underlying concerns about players as teachers, and the potential impact of limited teacher training. There is also a general lack of respect for certain parts of the teaching profession underlying student remarks. This particularly evident in Mark, Rachel, Susie and other students' broad assumptions about early childhood teachers, their playing and teaching skills and attitudes.

The themes of *Self-efficacy*, *Stress/anxiety*, and *Lack of control* also come through. Mark, Susie, and Rachel's use self-analysis and adaptability when considering their future teaching careers. It is interesting that Susie assumes that her experiences of

discomfort/pain will have a positive effect on her teaching style, (displaying self-confidence), whilst Rachel assumes that they will have a negative effect. In Rachel's case *fear* is evident: this comes through in her *insecurity* and avoidance behaviours.

Learning in a Group Situation

Rachel, discussed above, was one of several in this research who perceived that there were a set of unique issues experienced by teachers in group situations. These included the teacher perhaps not being a specialist on the instrument, and the teacher being unable to give as much one-on-one attention as he or she has several students to attend to. The follow-on effect to this was a perceived difficulty to maintain constant attention to each student's posture and technique.

Significantly, five other students in this research project also mentioned their early learning experiences in a group situation as impacting on their past and present playing-related pain. Caitlin, a violinist with severe playing-related pain prior to her studies at the institution said

I played in just groups for ages I didn't get private lessons until Grade 7... I think that if I had of started in private lessons I would have started on the right track... it's hard to teach, proper technique in a group... I do think... it [my playing-related pain] is because of that. (Caitlin, SEM 4)

This particular student clearly believed that she could trace her issues of pain injury back to these early lessons.

Three of the cello students in this study (Brad, Jack, and Felicity) specifically mentioned learning from a violin specialist in a school group situation as setting them up with what they perceived to be an incorrect technique. These students reportedly then spent the following years and much of their tertiary studies attempting to correct these

techniques. Yet Brad had another different response to those of Mark, Susie, and Rachel (already discussed) to the perceived responsibility of the first teacher. He decided that he would only teach private tuition one-on-one to cello students, specifically avoiding group situations where he might have to teach another instrument. The following quotation shows his thoughts on the subject.

If I can avoid teaching the violin I will try... you actually notice teaching, cellists that have learnt from a violinist... bad postural things... I think, it's better, for the student they can get more out of it if you... experience the instrument yourself.

(Brad, SEM 7)

Brad was one of several in this research who took great interest in and completed various Pedagogy (teaching) courses at the institution. One of the perceived main focuses of these courses at the time was reportedly to teach the importance of one-on-one tuition and the responsibility and significance attached to role of the first teacher. Brad claimed to find the courses particularly beneficial, as did Cassie, Tina, and Melissa. All four of these students believed that one of the key focuses was the individual and adapting their teaching style to them. "Pedagogy is very insightful... and, I get lots of things that are useful for my, teaching and my playing" (Cassie, SEM 6).

However Susie claimed to find the course she took useless and stated that she believed the material was trying to imply that every student was the same and could learn from the same method. This completely opposite interpretation was just one of many instances that will be discussed in these chapters where different students came away with widely different perceptions of the same learning environment.

Thematic Summary

As in the previous section, the primary theme of *Cultural beliefs* is highly prevalent here. Rachel mentions the possible impact of teacher priorities in the group situation. Both Rachel and Caitlin perceive that there is a lack of support in this type of learning environment. Several cello students assume that there is a general ignorance among group teachers as to the correct way to play the cello, and that there is potential for misunderstanding on the part of students and teachers.

The theme of *Self-efficacy* also develops further. Brad, Cassie, and Susie use self-responsibility and reflection in applying their learning from Pedagogy to real life situations. The students seem to use this as a way to counter the perceived *Lack of control* they experienced in their early learning years. Overarching themes of *Inconsistency* (between reported experiences in the Pedagogy class) and *Discontent* (Brad with the prospect of violin specialists teaching cello, and Susie with the range of methodologies presented) are also apparent.

Conclusion

This section has given a general overview of participants' perceptions of their past and present learning environments, including the perceived influence on their playing-related discomfort/pain. Students clearly identified variables within the learning environments of the Major Study and Orchestra courses at the institution as having the potential to either directly or indirectly impact on their playing-related pain. As expected, they also identified their early learning experiences as being extremely important in shaping their playing habits, attitudes to discomfort/pain, and even future career choices.

In this chapter, the three overarching themes, all of the four primary themes and the majority of secondary and subthemes emerge strongly through the discussion.

Unlike most of the other chapters where one primary theme tends to be dominant, in this chapter the range of themes are represented relatively equally and this underlines the overlapping nature of the thematic divisions. In in the next chapter on the orchestral learning environment *Lack of control* will emerge as the central theme.

Chapter 5: Orchestra

Introduction

Students in this research project consistently identified that a large portion of their playing time was being spent in orchestral learning environments. The most commonly mentioned of these was the Orchestra course within the institution. However, some students were also regularly participating in other orchestras including various local, state, and national orchestral programs.

Unfortunately, students in this research conveyed generally negative perceptions of the Orchestra course within the institution. In addition, all of the 29 students in this research project who completed their Bachelor of Music program claimed at some stage that they were experiencing increased discomfort/pain as a result of their participation in this course. In some cases this perceived impact was significant to the point that the student chose to defer from the course and/or claimed to reconsider their career options. In other cases it was merely that the student occasionally (and understandably) noticed that their discomfort/pain could be aggravated when participating in intensive blocks of Orchestra rehearsals.

The factors within the Orchestra course at the institution identified by students in this research as influencing their playing-related discomfort/pain included rehearsal structure and scheduling, breaks, the psychosocial work environment, repertoire, stretching, environmental conditions, and the Opera component. Many students acknowledged that some of the practical issues raised were also applicable in other orchestral environments. However over time it became clear that a large element of the discontent was related to the perceived atmosphere and lack of control within those

specific orchestral learning environments. The purpose of this chapter is to explore the variety of student experiences and perceptions of these orchestral learning environments and highlight the relevant themes.

The Orchestra Course

At the time of this research all students enrolled in the Bachelor of Music, Orchestral Instrument Major (including all the research participants) at the institution were required to participate in and complete the Large Instrumental Ensemble (Orchestra) course. This course was worth 10 credit points per year, or a total of 30 or 40 credit points depending on length of program chosen.

The requirements of the Orchestra course were as follows:

- A screened audition of specified orchestral excerpts at the beginning of every semester that the student was enrolled. This audition was graded out of 100;
- Full participation in assigned Orchestra programs; and
- Submission of a written assignment as specified in the course material.

The number of Orchestra programs each student was scheduled to play in was at the discretion of the Head of the Strings Department. However, the general tendency was for students to participate in three different Orchestra programs per year. Due to a general lack of players, viola and double bass students were more likely to be scheduled in additional programs.

If students completed all the specified components of the Orchestra course successfully, they were awarded a Graded Mark. Provided all the other fulfilments of the course were completed satisfactorily, the mark was largely based on their respective

audition results out of 100. Students were required to pass this course each semester in order to be awarded their specified Bachelor of Music program.

Rehearsal Structure and Scheduling

Within the interview and focus group environments, many participants stated that they were unhappy with the way that Orchestra rehearsals were structured. As was also the case in Andersen et al. (2013, p. 124) and Rickert et al. (2013, pp. 222- 225); in some instances they perceived that elements within the rehearsal such as infrequent breaks were directly impacting on their playing-related pain. In others the perceived impact on playing-related discomfort/pain was less direct and a complaint was more along the lines that the student found the rehearsal structure tiring, confusing, or counter-productive.

At the time the general policy within the Orchestra course was for all rehearsals to take place over the weeks immediately prior to each concert. Initial rehearsals would be weekly, increasing up to five consecutive days in the week of the concert. Rehearsals were generally scheduled to be between 4pm and 7pm, with additional early rehearsals on the day of the concert. Nearly all of the students in this research commented that they found aspects of scheduling such as successive rehearsals over a short period of time physically difficult. Some participants in this research also disliked the scheduled evening time of these rehearsals. Violinist Susie said

I was... in a lot of pain when I did Symphony this year and last year as well... I'd been in [an orchestra before] so I was used to three-hour rehearsals but, the time of day that they, run them... some people have been working all day and they've come in so, four to seven is probably not a great time. (Susie, SEM 4)

Susie's perceptions align with the research of Ackermann et al. (2012, p. 186); Guptill (2011b, p. 274); and Kreutz et al. (2008, p. 8), who similarly found that musicians perceived that rehearsal scheduling impacted on health and well-being; and Perkins et al. (2017, p. 11 of 15), who reported that tertiary music students perceived challenging orchestral workloads and schedules acted as a barrier to optimal health.

Significantly, more students claimed to find the rehearsal scheduling difficult early in their Bachelor of Music programs. Some, such as Robyn, went on to comment that, as they progressed through their program, they became more used to playing longer hours and stopped noticing their discomfort/pain. "Sometimes my back... starts to hurt... I found it in the concert, because we had... rehearsals leading up... every day for... 3 hours... and so during the concert I was like 'Ow'" (Robyn, SEM 2). "Even when I was sitting up in Orchestra the other day like, it was fine... I think I just... got used to it" (Robyn, SEM 6).

However others, such as Susie, found the only solution to their pain was to greatly restrict their playing hours. This particular student eventually changed the focus of her study so that she was no longer required to participate in the Orchestra course.

Another issue raised by students involved the timetabling of rehearsals with lectures. Although according to institutional policy lectures were supposed to be finished 10 minutes before the hour, understandably this was not always the case. In some instances students claimed that they had to rush straight from a lecture into the Orchestra rehearsal with no time to spare. Problems could subsequently arise as students were still expected to be seated, tuned, and warmed up at the rehearsal's start time, generally on the hour.

Violist Rachel claimed to experience physical consequences when lectures ran over time. She perceived that rushing to get to Orchestra resulted in her starting the rehearsal already stressed. In addition, she claimed that she was unable to do any kind of physical or technical warm-up as there was no time. Significantly, for the duration of her program Rachel also perceived experiencing significantly more discomfort/pain during Orchestra rehearsals as opposed to her private practice, where she took care to always warm-up thoroughly beforehand. “It’s... hard, to warm-up for a rehearsal if... your class finishes at 4... or 3:45, and then you have to go to the orchestral, hall” (Rachel, SEM 6). Rachel’s experiences are in line with those reported by Ackermann et al. (2012), who similarly found that professional orchestral musicians perceived that insufficient warm-ups prior to rehearsals contributed to PRMDs (p. 186).

In both interview and focus group situation students also identified that there was a tendency for the Orchestra rehearsal schedule to be changed at the last minute. For those who were also trying to juggle part-time work commitments this reportedly caused many issues and greatly increased stress. The implications of increased stress and anxiety on playing-related discomfort/pain are discussed in detail further on.

Tim: “I have a night job from 5:00 till 10:00. Um, I have had to call in the boss and say I couldn't do this, couldn't do this day couldn't do this day, and then [Teacher C] would have like a surprise rehearsal... and I'd be like ‘Oh... can't do this day either’... work would get angry with you...”

Wendy: “...Yeah and then you would say to [Teacher P] ‘I can't come because I've got work’ and he was like ‘Well this rehearsal has been

up' and you say 'No it hasn't. You just put it up yesterday.'" (Focus Group 1)

This particular approach to rehearsal scheduling also appeared to increase a general negative sentiment among research participants towards the Orchestra course. A striking example is Donna, whose negative perceptions of the Orchestra course have already been discussed in the previous chapter, *The Learning Environment under The Orchestra Course*.

Thematic Summary

The primary theme coming through in this section is *Lack of Control* (secondary themes *playing time* and *academic requirements*), which appears to lead directly to *Discontent*. The relationship between the two is highly evident in the perceptions of Susie, Rachel, Tim, and Wendy as they discuss the perceived impacts of inconsistent scheduling, rehearsal duration, timetabling of lectures and orchestra, and poor planning on their discomfort/pain.

Breaks within Rehearsals

The question of whether or not there were enough breaks within Orchestra rehearsals at the institution was a divisive issue among participants, with many individuals even changing their opinions throughout their program. The unofficial protocol at the time was to have one break (15 minutes) within every three hours of rehearsal. However this was largely at the discretion of the Orchestra conductor. In addition, students were expected to be back seated, warmed up and ready to play at the end of the 15 minutes thus meaning that the break was potentially much shorter.

During Focus Group 1, Wendy said that she perceived the inconsistent timing of breaks could really affect the amount of playing-related discomfort/pain she was feeling. The following quotation shows her thoughts on the subject.

One thing I find with those rehearsals... is that sometimes... we will get a break, after, two hours and fifteen minutes, and we will have a fifteen [minute] break and then we will come back and do a half an hour and... by the time we have got that break... we're just, so past it, and, sometimes then we have a break after forty-five minutes then... that's not good either because then we come back and we have still got two hours to go. (Wendy, Focus Group 1)

Tom, a cellist who experienced severe playing-related pain throughout his program, was also dissatisfied with the frequency of breaks within rehearsals. He commented that there were health and safety procedures in place for professional orchestral musicians. He perceived that, as a direct result of such procedures, those musicians did not play any longer than a certain period of time before having a break. Tom believed that similar regulations should be applied to the Orchestra course within the institution.

I... found it really hard, sometimes, in Orchestra, because it was just so long... compared to... [a professional symphony orchestra], they are only allowed to play for... a certain time and then they have to have a [MW: "Because they've got Health and Safety regulations"] yeah, and here we don't have that... I think... maybe we should... have something in the lines... because, last time we did two hours non-stop. (Tom, SEM 2)

As was the case in Guptill (2011b, pp. 273-274) and Rickert et al. (2013, pp. 224-225), conductor rehearsal technique was also perceived as having the potential to

impact on health and well-being. In particular, some students commented on the impact of the conductor's perceived tendency to play repertoire straight through rather than rehearse specific sections. They perceived that the inadvertent cutting out of smaller breaks could also aggravate their playing-related pain. However other students, such as Melinda and Gary, believed that there wasn't really much that could be done to improve the structure of rehearsals in terms of breaks. It is interesting to note that these two students, like the majority of others in this research project, were still of the opinion that they experienced more pain during Orchestra rehearsals as a direct result of the long hours of continuous playing.

Thematic Summary

This section continues to highlight the primary theme *Lack of control* (secondary themes *playing time*, *academic requirements*, and subthemes rest breaks, rehearsal techniques) which contribute to the overarching themes of *Discontent* and *Inconsistency*. Students strongly perceive factors such as inadequate rest breaks, rehearsal structure, and conductor rehearsal technique as impacting on their playing-related discomfort/pain.

The psychosocial work environment

Holst et al. (2012, p. 639), Rickert et al. (2013, p. 219), and Topoğlu et al. (2018, pp. 121-122) found that professional orchestral musicians perceived a number psychosocial risk factors in their work environment. Students in this research reported some similar risk factors, and perceived them as influencing their playing-related discomfort/pain. In particular, many claimed to feel intimidated within Orchestra rehearsals due to the perceived attitude of the staff towards them. As a result of this

perceived atmosphere they experienced tension, stress, and anxiety, and this increased their discomfort/pain.

As was also the case in Holst et al. (2012, p. 643), certain positions within the orchestra were associated with higher stress. Cellist Mary, whose experiences and perceptions bear striking resemblance to those described by an injured cellist in Andersen et al. (2013, p. 128), perceived that leading the cello section was “the most stressful experience” she had ever had. After this experience she said that she never wanted to participate in Orchestra again. Among other things, she claimed to find that the conductor held her personally accountable for any mistakes that were made by other players in her section.

Jack also led the cello section on at least one occasion. Like Mary, he perceived additional pressure on him however his reaction was less severe, as the following quotation shows.

I was, appointed leader this year therefore... more pressure was... put on me in terms of actually getting everything right so... I felt a sense of stress and I suppose there was a bit of tension that also went in my wrist and shoulder as well. (Jack, SEM 7)

A further two cello students mentioned being singled out for criticism within the cello section. Cellist Julie stated “Where I sit at the back, they have the low chair... and we have to concentrate so hard because... the back is always hard to follow the Orchestra, and [the conductor] always like to pick on us” (Julie, SEM 2).

Chris, whose circumstances have already been discussed in *Chapter 4: The Learning Environment*, also found that he was constantly singled out in the section as responsible for any mistakes that were made. In his opinion this was because the

particular staff member didn't like him, not because he actually was responsible for these mistakes.

I don't get along with [Teacher C] at all... he did not, like me, because of my personality not so much my playing... if, the cello section did something wrong he blamed me. And I'd, one day he did that and I said "Well actually I can play this I'll play it right now" and I played it for him and he has just gone, "Oh well must be someone else" and it's like "Yeah well obviously you are just picking on me so, get bent [laughs]". (Chris, SEM 6)

Clearly cellists Mary and Julie were more affected by the perceived pressure in the orchestral environment compared to Jack and Chris. Holst et al. (2012) found that female orchestral musicians reported more negative psychosocial and stress symptoms than male musicians (p. 639). Kenny, Driscoll, and Ackermann (2012) also found that female musicians, (particularly those aged under 30), suffered more of all forms of anxiety than male musicians (p. 210).

Although the issue of position pressure was most frequently identified by cellists in this research, it wasn't restricted to the cello section. Violist Robert commented that, as he got pushed further towards the front of the section he perceived additional responsibility to continue playing, and violinist Steve reinforced this by adding "It is really hard for them at the back... I think it is a lot easier if the people between you and the front, are switched on" (Steve, SEM 8).

Some students in this research also commented in focus group and/or interview situations that they had observed the conductor singling out other students for criticism within Orchestra rehearsals. During Focus Group 1 violinist Tim recalled a recent occasion where the conductor had been very unimpressed with the way the Orchestra

were playing. As a result Tim perceived that the conductor had become very angry towards the musicians.

One thing I noticed about last... Symphony rehearsal with [Teacher C]... We had Strauss for the first, half... and [Teacher C] chucked a big fit and got everyone scared and all, said things which he probably should not have... and... [when] they came back from the break, and they played... Wagner 'Die Meistersinger' the overture, and, they were... blaring it out and it was... kind of scary how that might had motivated them... the fear. (Tim, Focus Group 1)

Whilst participants in Focus Group 2 perceived that the conductor singled out specific students for criticism largely dependent on his mood at that time, Jack perceived that the conductor was a person of authority who naturally instilled fear in the musicians. Cassie also found that the perceived stress of needing to play everything right during Orchestra was physically tiring. “[MW: “Do you think everyone's a bit afraid?”]... Of course they would be... he's [Teacher C] more of an authority figure so, whatever he says goes” (Jack, SEM 6).

Because you just feel the stress from, you know have to get it, all right otherwise [Teacher C]... can get very cranky... you... feel a bit more pressure, and then, you do get a bit tired after that. (Cassie, SEM 5)

In Focus Group 2 students said that any perceived stressful environment could have follow-on effects to discomfort/pain in terms of increased tension and neglect of technique. In addition, Mark pointed out that often orchestral repertoire was technically more difficult than what students were used to in their private lessons. He perceived that, in situations of high stress people would often not notice any discomfort/pain until after they had stopped playing. Guptill (2011a) similarly found that injured orchestral

musicians may be unaware of pain in certain situations such as concerts or performances (pp. 89-90).

Other students in this research commented in interview situation that they believed students were too “on edge” during rehearsals to try and implement any preventative strategies such as relaxing, taking a break, or stretching. Unfortunately, they perceived that this also had a direct impact in increasing playing-related discomfort/pain.

Thematic Summary

In this section the primary themes of *Cultural beliefs* and *Stress/anxiety* are most prominent. Jack notes the *conductor as an authority figure* and the importance of *conformity*. Likewise Tim and Julie perceive intimidation in the learning environment, which impacts on *Stress/anxiety* and the *fear* and *suffering* they experience. Mary and Jack perceive position pressure when leading the section and Chris perceives being singled out for public criticism in the orchestral learning environment.

The primary theme of *Self-efficacy* (secondary themes *motivation*, *mindfulness*, and *perfectionism*) also comes through. Julie’s *insecurity* and Mary’s *perfectionist* traits see them absorb and take on perceived pressure, with subsequent increases in *Stress/anxiety*, tension, and therefore pain. On the other hand Jack takes self-responsibility and admits that some of the pressure is internal and is able to distance himself; and Chris uses self-awareness and adaptability to assess and deal with the situation.

Repertoire

In various musician populations Ackermann et al. (2012, p. 186); Kreutz et al. (2008, pp. 8-9); Park et al. (2007, p. 93); Rickert et al. (2013, p. 224); and Viljamaa et

al. (2017, p. 198) found that repertoire was perceived as impacting on the development of PRMDs. Twenty-two of the 29 students in this research who completed their Bachelor of Music program also said at some stage that their discomfort/pain during Orchestra rehearsals could be influenced by aspects of the repertoire. These included the general “intensity” of the music (Gary, Steve, Melissa, Natalie, and Robert), the speed of the music (Caitlin, Julie, Steve, Leah, and Robert), prolonged loud passages (Sam, Brad, Steve, and Jack), sustained passages on the G string (violinists Steve and Melinda), and playing at the tip of the bow, including tremolo (David and Sally).

As was also the case in Viljamaa et al. (2017, p. 198), works by certain composers were noted as being more physical demanding. The most commonly mentioned repertoire perceived as increasing discomfort/pain by students in this research included scenes from Strauss’s *Der Rosenkavalier* (Rachel, Donna, and Focus Group 2), Bruckner Symphonies (Steve, Melissa, Melinda, Leah, and Sally) and Mahler Symphonies (Caitlin, Julie, Mark, and Gary). Students who claimed to experience significantly more discomfort/pain whilst playing this repertoire were scheduled to play it during the very first semester of their studies. It seemed to be a pattern in this research where students perceived experiencing more discomfort/pain during orchestral rehearsals in these early stages. As was also the case in Ackermann et al. (2012, p. 186), they generally attributed this increased discomfort/pain to playing long hours. However this trend may have been significantly compounded by the selected challenging and long orchestral repertoire.

On reflection, some students in this research project also recalled how difficult it could be for first-year students with limited orchestral experience to play longer and technically challenging works. Violinist Steve commented “The students... some of

them haven't played in an orchestra before... and we're going straight into playing a full on Bruckner Symphony and, stuff... that is quite challenging, and I remember being in their situation... coming into The Con" (Steve, SEM 8).

The data collected in this research does suggest that student inexperience may have been a factor. This is supported by the findings of Spahn et al. (2014), who found that tertiary music students were better equipped to deal with their work as musicians in the later stages of their programs (p. 10). Yet the impact of long and difficult repertoire was not isolated to those in the early stages of their Bachelor of Music program, nor limited to within the Orchestra course at the institution. Other students revealed that they were experiencing similar issues with regards to technically difficult and long solo and orchestral repertoire in the later stages of their programs. The various perceived impacts of different styles of repertoire and extended playing, are discussed further in *Chapter 6: Practice* and *Chapter 7: Technique*.

Thematic Summary

In this section the primary theme again is *Lack of control*, in this instance over repertoire selection. Notice that students perceive that aspects of their *academic requirements* may be inappropriate for them at certain stages of their program.

Stretching

Stretching as a general preventative measure for injury is recommended in many general sources on musicians' health such as those by Horvath (2010); Norris (1993); and Harrison and Paull (1997). When undertaken correctly, it may play a role in minimising playing-related discomfort/pain. In a study of high school string musicians, Cooper, Hamann, and Frost (2012) found that doing specific stretches at regular 10 minute intervals throughout orchestral rehearsals was beneficial in lowering perceptions

of physical discomfort (p. 74). However to date there is a lack of other evidence-based research in this area.

Students in this research commonly reported that they observed other students stretching before, during, or following rehearsals. However students' perceptions as to whether stretching before and during Orchestra rehearsals was acceptable behaviour varied and in some instances also changed as they progressed through their program. The topic of stretching during Orchestra was discussed in some detail during the focus groups. During Focus Group 1, violinist Susie commented that the only time she had felt that it was okay to stop during rehearsal was when they had a visiting conductor. The Orchestra manager had given her permission to sit through a rehearsal in the past, but based on her observations of the conductor's interactions with other students during Orchestra, she did not feel confident enough to do this.

[Teacher P] says "Just sit there and if [Teacher C] says anything", or he says "I will go and tell [Teacher C] that you are having pain", but I mean, the only time that I have actually been able to go up, to a conductor or anything... was [with visiting]... [Teacher N]... [Sounds of agreement]... he actually took into consideration that... we have been practising, all week twice a day... he doesn't want half his orchestra falling over, and not being able to play on the day of the concert... [Sounds of agreement]... so he sent me home. (Susie, Focus Group 1)

In Focus Group 2 Sally commented that she perceived that the conductor would often get angry with her if he observed her sitting back and relaxing whilst not playing.

I like doing things like... crossing my legs and stuff when we are not playing and if [Teacher C] sees you doing that then he gets aggro at you because he thinks

you are not taking it seriously when really I am just stretching my thighs. (Sally, Focus Group 2)

Similar interactions were also mentioned by many during their individual interviews, with Natalie saying

Sometimes [Teacher C] gets angry if we are stretching... so... we don't... he doesn't like us moving around very much... especially when, we are in the theatre... for dress rehearsals, he doesn't, even like it when we adjust our chairs. (Natalie, SEM 7)

One player who claimed to have personally experienced this perceived anger many times (despite only staying at the institution for one year) was violinist Liam. He commented that

Sitting up straight, hurts my back... because... I've got a, curved, spine... bit of mild scoliosis so... Orchestra practice, sometimes it's painful... that's why I get in trouble for... sitting back in my chair a lot, from [Teacher C]. (Liam, SEM 2)

Unfortunately, there were an overwhelming number of other observations from students in this research project of interactions like this. Given this it is not surprising that several participants specifically said that they did not feel comfortable stretching before or during Orchestra. Examples include Susie, Mary, Julie, Rachel, Natalie, Liam, Sally, and Robert. Significantly, even students who said they were confident enough to stretch in front of their peers and teachers, such as Gary, still perceived that Teacher C would confront anyone who did this during an Orchestra rehearsal. "He will probably say "What are you doing!?" (Gary, Focus Group 3).

Some students claimed to perceive a change in the attitude of their peers and instructors towards stretching over the course of this research project and viewed it as a

positive step. For example, violist David perceived towards the end of his program that it was becoming more acceptable for students to stretch and that he believed more musicians were beginning to realise the importance of prevention. (This was after particular student had experienced an injury and successfully sought treatment.) Similarly, Robert also commented towards the end of his program that he perceived it was becoming more acceptable to practice Alexander Technique and/or stretch before Orchestra. This is in line with the findings of Stanek et al. (2017), who reported that 22.8% of college music students and faculty practiced Alexander Technique, regardless of pain experiences (p. 23).

“It’s, thankfully starting to become common knowledge to do, Alexander Technique... and stretches so... even when we do Orchestra concerts, beforehand... most people will be seen doing stretches and stuff like that” (Robert, SEM 8).

Despite this, there were still a number of other students in this research project who maintained for the duration of their program that they would be embarrassed to stretch during or before Orchestra rehearsals. For example, violist Rachel said that other students didn't really do it and so she was too embarrassed to draw attention to herself in this manner, and violinist Donna felt the same.

“In Orchestra you don't, tend to stretch... but it's not intimidating it's embarrassing... [MW: “... Does anyone at all stretch?"]... Some people but... not everyone and... it’s a bit weird if you see” (Rachel, SEM 7). “Whenever I'm practising at home I do [stretch], but I don't... when I'm at rehearsals... because I mean you can imagine... look a bit stupid stretching [laughs]” (Donna, SEM 2).

Steve, who was leader of the Orchestra at one stage, revealed that he had actually been asked by fellow students to make an announcement before rehearsals about the importance of stretching. Yet, in interview he claimed that he saw no point in doing this. His perception was that anyone who wanted to stretch would already have stretched and that making an announcement would not make any difference. However, the experiences recounted above by Rachel and Donna suggest that it may have been beneficial for a person of perceived high esteem in the Orchestra to say that he thought stretching was acceptable.

Thematic Summary

The two primary themes that come through most strongly in this section are *Stress/anxiety* and *Cultural beliefs*. The conductor is perceived to use *fear* and public criticism/intimidation to maintain order in the learning environment, as a result some students experience *insecurity*, *Stress/anxiety*, position pressure, and feel the need to *conform*. Note the potential for misunderstandings to arise such as when the conductor makes assumptions about Sally's intentions when stretching during rehearsals, or when Steve makes assumptions and projects his own attitude onto others when deciding not to recommend stretching.

To a lesser extent the primary themes *Self-efficacy*, *Lack of control*, and overarching themes *Inconsistency* and *Discontent* are also apparent. Robert's high level of *motivation* means he continues playing when needing to stop and stretch, and suggests that he has double standards. However Liam uses self-analysis to assess the situation and decides that alleviating the pain is more important than conforming. *Cultural beliefs* such as the conductor as person of authority and "no pain no gain" appear to underlie student perceptions.

Environmental conditions

Guptill (2011b) found that general working conditions were perceived by injured musicians as impacting on playing-related injury (pp. 273-274). Similarly, Kaufman-Cohen and Ratzon (2011) found that perceived physical environmental factors were among the main predictors of PRMDs in orchestral musicians (p. 90). Students in this research project also perceived that environmental conditions had the potential to impact on their levels of playing-related discomfort/pain. Experiences were varied but factors identified included the equipment provided, working space allocated, and temperature of the rehearsal space.

At the time of this research project, rehearsals for the Orchestra course were conducted in various venues within the institution. The majority of rehearsals took place in an orchestral hall, however rehearsals and performances also took place in the theatre at the institution, including in the orchestral pit. Over time it became clear that some students perceived experiencing aggravated issues in specific venues.

Twenty-three of the 29 students in this research project who completed their Bachelor of Music program were of the opinion that the severity of their discomfort/pain could be influenced by their sitting position, including the chair provided. (This finding aligns with Wilson et al., 2014, p. 684.) Ten of those students commented specifically that they perceived experiencing less discomfort/pain when using the adjustable chairs in the theatre at the institution. These particular chairs were able to be adjusted in height and tilt according to the individual. However, at the time of this research, use of these chairs was restricted to this specific venue only.

I think... my lower back pain... depends on... what I'm sitting on... I notice I didn't have that problem when I sit on the chairs in The Con, the ones that you can turn the handles... so you can... angle it forward a bit. (John, SEM 2)

The [chairs] that make you sit up straight like you can lean back but still be sitting up straight, they are... better... [MW: "... In the theatre?"] Yeah... they're really good... [MW: "So you think it would be better if they had those in the orchestral hall as well?"] Yeah... then you get the feel of it as well... because you are going to be sitting on those for the concert so... you may as well be, for the practices. (Robyn, SEM 4)

Some of these students felt so strongly about the issue that they tried to rectify the situation. Violinist Melissa claimed that she had a petition going amongst the students to lobby for these chairs to be available in other venues. However she later revealed that this petition was unsuccessful. She understood the reason for this was because the theatre at the institution was a specific venue that was available for hire and those chairs were part of the hire agreement.

What would be nice is... different heights of chairs... because... the ones they have got in there are slightly too short... we did have a, petition to try and get... the, chairs they use on the stage... in there but they wouldn't let us. (Melissa, SEM 8)

However, there were two students (Wendy and Sally) who actually perceived that they experienced more discomfort/pain when they used the chairs in the theatre. Cellist Wendy believed that this was because she was not used to them and was unsure how to adjust the chairs correctly. "In the theatre chairs... after about an hour, in there...

I notice my back starting to cramp up and I just want to keep... stretching it... On the bus on the way home it's usually pretty sore” (Wendy, SEM 7).

Wendy was actually challenged by other students within Focus Group 1 on this point. She went on to acknowledge that, if those chairs were provided in every rehearsal venue, she would most likely get accustomed to them, and learn how to adjust them correctly. The students in Focus Group 2 were also of the opinion that there should be continuity of equipment between venues.

Other issues mentioned included a lack of space in the orchestral hall particularly in the viola and cello sections. The following quotation shows the thoughts of some of the students in Focus Group 1 on this subject:

Rachel: “What I found was... in [the orchestral hall]... it seems to be more squished when there is... ten violas...”

Wendy: “... Especially when there is like 12 cellos and they all back-up behind you...”

Rachel: “... And when you have brass behind you, brass or woodwind... you feel very squished... and then, you get into the, theatre and then there is so much more room.” (Focus Group 1)

As was the case in Reel (2009, p. 63), students also highlighted issues such as having a desk partner of different heights and having to negotiate on the height of the stand, having to sit on the outside of the desk and twist around to see the conductor, and the lack of space in the front desk due to cramped conditions as potentially influencing playing-related discomfort/pain. For example, violinist Melissa said “I was the first desk of the seconds, and we were really squished in at the front so I had to turn... funny so that... I didn't, hit anybody either side of me” (Melissa, SEM 6).

Another interesting influencing factor that was mentioned by one student during interview was with regards to the temperature of the orchestral hall. Violinist Sally claimed to notice that it was extremely cold in this venue and she perceived that the temperature greatly increased her playing-related discomfort/pain. Sally's perceptions are in line with Ackermann and Adams (2004, p. 673); Hagglund (1996, p. 102); and Raymond et al. (2012, p. 22), who similarly found that a cold environment was perceived by some musicians as being a risk factor for PRMDs.

There was this, one time in, Chamber Orchestra where... my whole... left arm... was really excruciating... tense... I think that was, partly because of the cold... it's freezing... I've been talking to other people and they've, said that they find it's really cold too... I was actually thinking of writing a complaining email, saying... "Make it warmer in there", because it's just it's really damaging in some instances especially lately. (Sally, SEM 6)

However at her next interview she said she did not need to raise the issue as the following semester the temperature in that particular venue appeared to have been adjusted.

Students also commented on the limited space available for the musicians participating in the Opera Orchestra. During the dress rehearsals and performances these players were positioned in what they perceived as being a relatively small orchestral pit. Cellist Jack noted that one of the operas that he played in towards the end of his program required a larger orchestra of approximately 75. He perceived that the ergonomic conditions due to lack of available space at the time contributed to his playing-related discomfort/pain.

Thematic Summary

Again, the main primary theme recurring throughout this section is *Lack of control*, (secondary theme *environmental conditions*), over the practicalities of the learning environment such as player space, equipment provided, music stand height, and temperatures of the rehearsal venues. The potential impact of *Cultural beliefs*, for example regarding the appropriateness of stretching in the rehearsal environment, are also apparent. Note the perceived importance of *conformity* and mimicry, as well as the seemingly unrealistic expectations of some staff (such as expecting players to make no noise or adjustments in the orchestral pit). *Discontent* and *Inconsistency* continue to underlie experiences of most students.

Opera

Seventeen of the 29 students in this research who completed their Bachelor of Music program also specifically linked their participation in the Opera Orchestra at the institution to a perceived increase in playing-related discomfort/pain. Given the intensity of the rehearsal schedule for this Orchestra component, this is unsurprising. As noted previously, the initial Opera rehearsals at the institution take place in Project Week. During this week, held once a semester, all regular classes are cancelled, selected students participate in a Large Instrumental Ensemble project, and other students participate in educational workshops, masterclasses, and concerts. During the second Project Week each year, the Large Instrumental Ensemble project is an Opera production.

The initial rehearsals for the Opera production go for six hours a day over the five consecutive days of Project Week. The general policy at the time of this research was for these rehearsals to be scheduled from 10am to 1pm and 2pm to 5pm each day.

In addition to the one-hour lunch break between 1pm and 2pm, there was supposed to be a 15-minute break within each three-hour rehearsal. Some students felt that these breaks were not sufficient. Violinist Sally, who was quite vocal in her disapproval of the Orchestra course and Opera component, commented

For Opera they definitely just need to make that lunch break a little bit longer... because... you are only having about forty-five minutes of actual rest... in between they say it is an hour but it is not because you have to be back early, and sometimes the morning rehearsal goes overtime. (Sally, SEM 8)

This particular student clearly perceived that the shortening of this break resulted in her coming back to the following rehearsal still fatigued from the morning session.

Although other students were not as specific in their criticisms, the general consensus was that the rehearsal schedule was far too concentrated and did not incorporate enough breaks. Project Week rehearsals were followed up over the two weeks preceding several Opera performances with an additional five rehearsals (mostly from 4pm to 7pm in the evening). Students perceived that this accumulation of successive weeks of rehearsals and performances was contributing to increased playing-related discomfort/pain.

“Definitely during the Opera [I experienced increased discomfort/pain]... I think that it was, more of an accumulation” (Jack, SEM 8).

Unfortunately, some of the musicians in the Opera Orchestra reported that they were also attempting to maintain their personal practice hours on the top of the six hours of rehearsal per day. In this situation it was not uncommon for students to be playing their instruments for upwards of nine or ten hours a day. Violinist Natalie pointed out that the scheduling of several competitions and workshops immediately following

Project Week meant that she felt that she had to maintain her private practice in preparation. She perceived that this additional practice further aggravated her discomfort/pain. Tertiary music students described similar intense practice schedules due to a combination of auditions, school, and teacher expectations in McCready and Reid (2007, p. 144) and Perkins et al. (2017, p. 11 of 15).

We had Opera and, that was really intense and I was, getting... a really sore back... during that... we did... six hours and I had to do practice as well, on top of that... because... we had... two competitions, straight after, Opera, so, I was... staying back... after... and practising... three, four hours. (Natalie, SEM 4)

At times students also claimed to feel as though they had no option but to continue practising after rehearsals. Sally recalled one occasion where the conductor singled out her desk for criticism. He threatened to make her play on her own the following day and, as a result she felt that she could not go home and rest after the rehearsal.

There was one day during Opera week where... because [Teacher C] had picked on, my desk during, the rehearsal and freaked me out and told us that...

“Tomorrow I’m going to get you all to play, for me in my office”... Rather than going home and resting like I should have I, went to a practice room after rehearsal and... kept practising. (Sally, SEM 8)

This particular student was one of many (including those with relatively minimal experiences of discomfort/pain) who commented that everyone complained of and expected to be feeling sore during Opera week. Some of the students, including Caitlin, Cassie, Erin, and Tina, perceived that, as they progressed through the week of Opera

rehearsals they could feel their stamina building. “That [Opera] was a test... I could feel myself... building a general stamina... It was okay by the end” (Tina, SEM 4).

However ten of the other students (Susie, Tom, Wendy, Anna, Rachel, Melissa, Natalie, Sally, Robyn, and Robert) specifically said that they perceived that their playing-related discomfort/pain was becoming more severe with successive rehearsals. For example Anna commented

I started Opera Orchestra, near the start of semester... [but then] Project Week... when we had all these rehearsals, six hours every day... I couldn't even, lift up my instrument after that... it was, pain that... I've never, had to experience before when I was playing... I think just, constantly holding my instrument up for a long time and, and then doing that for several hours in the day. (Anna, SEM 6)

The Opera was even perceived by those who claimed to not personally be experiencing significantly increased discomfort/pain as being difficult for other students. Cellist Mark made the following observation.

The Opera is dangerous... it must be the worst for viola players, because it's just, not, safe there... if they did it over two weeks, of... three hours, every evening... that would be way better... than like one week of, two massive sessions a day. (Mark, SEM 4)

Significantly, all four students in this research project who mentioned playing viola in the Opera during their interviews did perceive that they experienced increased discomfort/pain as a result of their participation. Viola major Robert was able to continue his participation through the week and perform in the concerts despite his pain. Cassie, a violin major who played the viola in the Opera during the second year of her program, managed her discomfort/pain by reducing other practice on her violin.

Unfortunately for viola majors Anna and Rachel, they claimed that the Opera was the catalyst for their most severe experiences of pain. In addition, as a result of this pain, they reportedly had to defer their participation in both the Major Study and Orchestra courses. “It started... during Opera rehearsals... that’s when it became... persistent pain... I’ve had to... withdraw from Major Study... because... the required amount of time” (Rachel, SEM 2). “When I did Opera I was playing the viola and I took that up this year, so... the first few rehearsals I did get a bit of pain... because it was a bit heavier” (Cassie, SEM 4).

Many of the research participants were also scheduled to play in the Opera during their first year of study at the institution. As with the general Orchestra component, some students seemed to experience more difficulty in terms of playing-related pain in these early stages. Tim, a violinist who went on to participate in the Opera in consecutive years said on reflection

[This year] I really enjoyed my time in the Opera... it's actually something which I want to do now... first year it was a real struggle... second year... I was getting into it... this time... I had a lot of fun... [MW: “... So it was pretty painful for you the first year?”] Yes. (Tim, SEM 6)

However other students who participated during the later stages of their Bachelor of Music program claimed they were continuing to experience pain throughout. These included Sally, who reportedly found the Opera performed during her final year was much more difficult due to the repertoire, as well as Erin and Jack.

I did Opera this year... so... I was playing for... heaps more a day than I usually would, and I think... maybe just sitting down and keeping... a straight posture and a straight back... it's, just sore from being... in that position. (Erin, SEM 6)

To begin with it was, tough... because this particular one... didn't really have a lot of rests in it like... the last Opera I played. (Sally, SEM 8)

Unfortunately it was common for students who participated at some stage in the Opera Orchestra to also generally associate it on reflection with increased playing-related discomfort/pain. For some this memory was apparently very vivid as it led to them experiencing a playing-related injury. Examples include Susie and Rachel, who were scheduled to play in the Opera during the first year of their program. Both claimed at the time to require medical treatment for playing-related injury as a direct result of their participation. "Excruciating... I was in Opera Orchestra, so that was... every day for three weeks, and... that killed me" (Susie, SEM 2).

For others, including violinist Tina, it wasn't that it was particularly painful but that it was the only experience of playing-related discomfort/pain that stood out in their mind. In any case, the experiences as recalled by the students in this research project can leave no doubt that, for many, their participation in the Opera Orchestra at the institution was perceived and remembered as a difficult and painful experience.

Thematic Summary

In this section all four of the primary themes (*Lack of control*, *Self-efficacy*, *Stress/anxiety* and *Cultural beliefs*) and three overarching themes (*Inconsistency*, *Discontent* and *Priorities*) feature prominently. In terms of staff and the institution, there is poor planning with regards to scheduling/timetabling, in conjunction with a lack of consideration as to the potential impact of intensive rehearsals on players physical health. However some students make the cumulative effect worse through their own poor planning. Examples include Sally, who continues to practice after rehearsal due to

a lack of preparedness and Natalie doing extra practice that could have been distributed throughout the year to minimise the impact in the opera weeks.

Much *Discontent* seems to stem from the perceived general *Lack of control* over aspects such as rest breaks, playing time, equipment provided, rehearsal duration, player space, scheduling, and teacher attitudes and behaviours. The transference of these within the different orchestral learning environments is striking. *Fear* is evident in the conductor's use of intimidation and public criticism to motivate Sally. This increases the underlying *Stress/anxiety* in students' interactions with orchestral staff and increases the general feeling of *Discontent*.

Mark underlined a *Cultural belief* when he claimed that it was to be expected that players of particular instruments, such as viola, would experience severe pain as result of their opera participation. Students and staff may have unrealistic expectations: it is noteworthy that students perceive rigidity. However the experiences of Rachel and Anna show that there was at least some flexibility; when they were both suffering injury they were promptly removed from the orchestral program. Overall, there is general *Inconsistency* in experiences and perceptions of the learning environment.

Other Orchestral Situations

As already highlighted, a number of students in this research project were regularly participating in orchestras outside of the institution. These included various local, state, and national orchestral programs as well as various professional orchestra internships. The experiences and perceptions of students participating in these situations varied. Unsurprisingly however, it appeared that many of the musicians who identified experiencing ongoing problems with playing-related discomfort/pain within the

Orchestra course at the institution were also experiencing discomfort/pain if and when they were in other orchestral situations.

A total of seven students (Tim, Caitlin, Mark, Gary, Steve, Natalie, and Robert) mentioned in their research interviews that they had participated in national orchestral programs throughout their time in this research project. Steve and Robert claimed to find these particularly difficult for them in terms of their playing-related discomfort/pain. (These two students also claimed to be experiencing severe ongoing pain due to their participation in the Orchestra course at the institution.) Yet the other five students claimed to have had relatively minor or no issues in these situations.

The differences in experience are evident by comparing those of Caitlin and Robert. Violinist Caitlin stated that a national music camp she attended was not particularly difficult for her as it was made up of different sessions of mixed playing with frequent breaks. However this student was always proactive in preventing playing-related pain. Violist Robert, on the other hand, experienced very severe pain after his attendance at the same programs. He acknowledged that was probably because he would continue to play through his pain and also to practise during rehearsal breaks, despite seeing other students stopping and stretching. The journeys of both of these students are discussed in more detail in *Chapter 9: Case Studies*.

Most of the other students in this research who also attended these programs said that it was not unusual to see students stretching and/or lying out on the floor during allocated rehearsal breaks. Tim, Gary, and Steve also revealed that well-known music physiotherapist Bronwen Ackermann gave compulsory talks during some of these programs. During these talks she reportedly identified various strategies, demonstrated appropriate stretches, and underlined the importance of taking breaks during practice.

It is interesting to note that both Gary and Steve, (the two who spoke in most detail about these talks), also got to listen to and then have a private consultation with Bronwen Ackermann through a professional orchestra internship. It did seem to be a pattern among participants in this research project that information and advice regarding prevention needed to be relayed and reinforced multiple times if it was to be remembered. Similar scenarios presented in a variety of situations including the research interviews themselves. For example, multiple students asked for advice and were given the names of a specialist physiotherapist, books in the library, and websites. Unfortunately, the majority did not follow through and, in subsequent interviews, struggled to even remember that the advice had been given. (Examples include Susie, Tom, Anna, Steve, Donna, and Robert.)

In regards to his professional orchestral internship, Gary perceived that there was a high incidence of playing-related pain injury among the musicians in this situation, although he claimed that the topic was not openly discussed by the musicians. Cellist Mark, who also completed an internship, but with a different orchestra, thought similarly. Their perceptions align with Ackermann et al. (2012), who found that the incidence of PRMDs within Australia's eight full-time professional orchestras was 84% (p. 181).

However these two students differed in that Gary was of the opinion that the problems would not be as severe among the next generation of musicians. He perceived that they would have a better education regarding how to prevent playing-related injury. “[MW: “Do you think there were many people, in [the professional orchestra] who have got issues?”] Yeah I reckon there's heaps of people who, have got issues but they probably didn't have the education that we've, had” (Gary, SEM 6).

Participation in various state-wide orchestral programs were also mentioned by several of the students in this study. When discussing the impact of cumulative rehearsals in Focus Group 1, Susie specifically mentioned the intensive weekend camps held by each year by one organisation as being particularly difficult. During these camps students are usually scheduled to participate in upwards of 8 hours of rehearsals on the Saturday. This established practice occurs on all the camps including those for the less advanced musicians.

In addition, many other participants, including a high concentration of cellists, commented that the difficulties they had been experiencing with regard to the provided rehearsal equipment at the institution were being replicated in outside situations. Examples include violinist John and cellist Brad.

I notice it [discomfort/pain]... in rehearsals in an orchestra that I am in on Monday nights, because the chairs... are not designed to... sit forward on... so... my butt is... lower down in the chair... that's when I noticed it last. (John, SEM 3)

Some community halls and things have bucket chairs [and] that makes a big difference [to my discomfort/pain]. (Brad, SEM 5)

Students also claimed to be experiencing increased discomfort/pain as a result of repertoire played in these outside situations. Examples include Mark, who attended a camp where the focus was on waltzes by Strauss, known for their repetitive nature, and Caitlin, who on reflection recalled her most painful experience of playing-related pain as having occurred during a state youth orchestra concert. As discussed previously, a number of studies have similarly found orchestral musicians perceive aspects of certain repertoire as contributing to playing-related pain and injury including Ackermann et al.

(2012, p. 186); Kreutz et al. (2008, pp. 8-9); Park et al. (2007, p. 93); Rickert et al. (2013, p. 224); and Viljamaa et al. (2017, p. 198).

Yet when it came to the rehearsal atmospheres, some students claimed that they did notice a difference between the venues within and outside of the Orchestra course at the institution. Rachel claimed to experience far less playing-related discomfort/pain in another orchestra she participated in, due to the attitude of the conductor towards the musicians, and Susie had a similar experience. Unfortunately, their experiences did seem to be in line with other students in this research who reported similar perceptions of the learning environment within the Orchestra course at the institution.

Thematic Summary

Again the prominent primary theme in this section is a *Lack of control* over aspects of orchestral rehearsals that can affect the severity of discomfort/pain such as rest breaks, chairs provided, repertoire selection, and rehearsal durations. There is clearly continuity in these factors throughout the different learning environments (within the institution; in local, state, and national orchestral programs; and in professional orchestral internships). *Discontent* also continues to underlie the experiences of some students. For example Susie perceives that the rehearsal scheduling during a weekend music camp greatly increases her pain. However, generally speaking, there is notably less *fear* underlying these student experiences outside of the institution.

In this section it is refreshing to also see the potential positive impact of *Cultural beliefs* such as mimicry and *conformity*, and *Priorities* on student behaviour. During some national orchestral programs, open discussions about pain and injury and preventative strategies were reportedly encouraged. As a result, students were observed

openly utilizing their break time to stretch. It is striking that, in those contexts, it was compulsory to attend injury prevention sessions and advice was coming from appropriate and knowledgeable sources.

The importance of varying levels of *Self-efficacy* is also apparent. Robert, for example, did not change his behaviour despite any advice to the contrary. This student, who was highly *motivated* and *perfectionistic*, showed a lack of flexibility, short-sightedness, and poor judgement in continuing to practice with the result of greatly increased pain. His *Priorities* suggest deeply ingrained *Cultural beliefs* as to the acceptability of playing through pain. On the other hand Caitlin demonstrated self-responsibility by adapting to the playing environment as required, and reportedly experienced very little discomfort/pain.

Conclusion

The perceptions recounted in this chapter confirm that many students believed that their playing-related discomfort/pain was aggravated by their participation in orchestral environments, both within and outside of the institution. The primary theme recurring most often throughout the discussion has been *Lack of control* leading directly to *Discontent*, with students clearly perceiving that longer rehearsals, less frequent breaks, and a more concentrated rehearsal schedule led to more discomfort/pain. However the discussion has shown again the extent to which the overarching, primary, secondary, and subthemes are interlinked.

Cultural beliefs such as “No pain, no gain” and position pressure appear to have impacted on the students’ perceived *Lack of control* over their orchestral learning environments. Students experienced *Stress/anxiety* as they tried to hide the extent of their problems from fellow students and staff for *fear* of judgement. However it is

striking that there was not necessarily continuity of the high levels of *fear*, *suffering* and *insecurity* within the different orchestral environments. This was dependent on student perceptions of the actual orchestral staff in each particular environment, and the students' perceptions of teacher attitudes and behaviours. This suggests that there is great potential for cultural change with the cooperation of the musicians, orchestral management and teaching staff.

It is unfortunate that, outside of this research project, most students perceived no real opportunity to give honest feedback about the Orchestra course at the institution. Students were reportedly able to fill out a course evaluation at the end of each year. However during Focus Group 1 participants said that they perceived the format of the evaluation was fairly closed and not designed for honest feedback. Students in this focus group believed that, if they were to raise their concerns with any aspects of the Orchestra course, their concerns would be dismissed. As a result they were not proactive in giving feedback and this in turn further reinforced their perceived *Lack of control* over the learning environment.

There were a small number of students including David, Melinda, and Jack, who commented on reflection that they had enjoyed their participation in the Orchestra course. These were generally the students who were not reportedly experiencing ongoing severe issues with discomfort/pain. Significantly, all three of these students also had a generally positive outlook on their whole experience at the institution and acknowledged the potential difficulties experienced by staff when scheduling Orchestra rehearsals.

On the other hand several of the students who were most vocal about their *Discontent* with the Orchestra course were also dissatisfied with many other elements of

their program. In addition, they generally struggled to suggest workable solutions to their issues. Susie voiced concerns about the impact of block scheduling and evening rehearsals on playing-related discomfort/pain. Yet she also acknowledged that it would be inconvenient to both her and others if the rehearsals were to be scheduled earlier, as it would cut into work and study time. Similarly, students who recommended more frequent breaks within rehearsals countered that by saying it would extend the rehearsals too much, and they would rather get them over in a shorter period of time.

In many instances it seemed as though students were happy to talk about the playing-related discomfort/pain they were experiencing during Orchestra and the perceived contributing factors, and to blame it on a *Lack of control* over this learning environment. At the same time, they were not prepared to accept any responsibility for taking steps to make changes to their routines or priorities regardless of the perceived potential benefits in terms of decreased playing-related discomfort/pain. This *Inconsistency* unfortunately emerged as an overarching theme throughout this research.

Chapter 6: Practice

Introduction

Throughout this research issues relating to practice were discussed in detail in both focus group and interview situations. It became clear that the majority of students perceived that the amount, structure, and content of their practice time had a significant influence over the degree of playing-related discomfort/pain they were experiencing. However most also perceived that there were certain strategies they could utilise in order to minimise their pain during practice. These included taking breaks within it, warming up beforehand, and keeping their total playing time consistent.

In the previous section, where the prominent primary theme was *Lack of control*, students perceived experiencing more pain during the Orchestra course because they were unable to effectively utilise or control such preventative strategies. One might therefore expect that, in the practice room where students appeared to have total control over the content and structure of the time, they would have implemented such strategies consistently. However it quickly became clear that this was not the case for most students. Many of them, including some of those who strongly expressed their dissatisfaction with the structure of the Orchestra course, appeared to structure their private practice in a similar manner. This is another striking example of the complexity and *Inconsistency* present among the data collected.

The purpose of this section is to further examine the variety of (and *inconsistencies* within) the students' perceptions and experiences of their individual practice. The discussion starts by considering the perceived effect of total playing time on the amount of discomfort/pain experienced. It then moves on to look at students'

perceptions of their individual practice, including the consistency and content (such as warm-ups, breaks, repertoire, and other factors).

Total Playing Time

Many of the students participating in this research perceived that there was a link between their total playing time and the severity of their playing-related discomfort/pain. A number of other studies of music students and/or professional musicians have confirmed a similar perceived link. These include those by Ackermann and Adams (2004, p. 673); Ackermann et al. (2012, p. 186); Andersen et al. (2013, p. 127); Árnason et al. (2014, p. 79); Britsch (2005, p. 40); Hagberg, Thiringer, and Brandstrom (2005, p. 580); Ioannou and Altenmüller (2015, p. 137); Kreutz et al. (2008, p. 8); McCready and Reid (2007, pp. 143-144); Williamon and Thompson (2006, p. 419); and Rodríguez-Romero, Pérez-Valiño, Ageitos-Alonso, and Pértega-Díaz (2016, p. 193).

The overwhelming consensus among participants in this research was that they were more likely to experience pain when playing longer hours, whether it was through individual practice, chamber music ensembles, or orchestral rehearsals. However, as most found that there would be periods within the semester where their playing time would rise significantly depending on the Orchestra rehearsal schedule, this meant that many students linked increases in their discomfort/pain to their participation in this course. This positive correlation is similar to those reported by Ranelli et al. (2011), who found that increased playing hours were associated with playing-related musculoskeletal symptoms in adolescent musicians (p. 133); Robitaille et al. (2018), who reported that an increase in playing time was associated with an increase in pain among students attending summer music camps (p. 6); and Porter et al. (2018), who

found that there was a positive association between the development of PRMDs and increased playing hours (p. 47). Only one study of professional string players by Aki and Yakut (2003) showed no significant correlation between instrument playing time and overuse syndrome (p. 327).

The largest total amount of playing in any one day by a student in this research project was estimated at being approximately 13 hours. This somewhat dubious honour was taken by Robert, a violist who claimed to experience severe ongoing pain and injury throughout his program. However, as Table 14 shows, there were also many other students in this research who recorded a maximum playing time of 8 to 10 hours a day.

Table 14

Reported Maximum Playing Time per Day in Hours

Student	Semester							Average
	2	3	4	5	6	7	8	
Susie	N/A	N/A	3	1.5	1	2	1.5	1.8
John	N/A	7	UTP	L	-	-	-	7
Tim	N/A	N/A	6	5	6	6	5	5.6
Jill	N/A	N/A	7	5	3	F	-	5
Caitlin	N/A	6	8	8	9	9	10	8.33
Cassie	N/A	2	6	7	8	7	6	6
Tom	N/A	7	5	6	10	F	-	7
Wendy	N/A	6	6	7	8	5	7	6.4
Jena	L	-	-	-	-	-	-	-
Molly	L	-	-	-	-	-	-	-
Mary	N/A	9	9	9	5	F	-	8
Sam	N/A	7	6	9	7	F	-	7.25
Erin	N/A	6	5	6	6	6	4	5.5
Julie	N/A	10	11	DNP	DNP	F	-	10.5
Brad	N/A	8	8	12	11	6	F	9
Mark	N/A	6	7	5	9	8	8	7.17
Chris	N/A	5	7	DNP	NP	F	-	6
Melanie	N/A	L	-	-	-	-	-	-
Anna	N/A	4	3	8	6	4	1.5	4.42
Rachel	N/A	5	6	6	7	6	F	6
David	N/A	7	6	DNP	5	6	4	5.75
Eve	L	-	-	-	-	-	-	-
Frank	DNP	DNP	L	-	-	-	-	-
Gary	8	8	8	7	9	9	9	8.29
Steve	N/A	11	8	10	8	11.5	7	9.25
Melissa	5	5	6	7	8.5	7	8	6.64

Table 13

Reported Maximum Playing Time per Day in Hours (Cont'd)

Student	Semester							Average
	2	3	4	5	6	7	8	
Melinda	N/A	6	7	6	6	5	6	6
Natalie	8	8	10	10	10	10	9	9.29
Liam	8	L	-	-	-	-	-	8
Tina	6	6	7	5	7	F	-	6.2
Leah	3	DM	DNP	L	-	-	-	3
Donna	8	<1	1	DNP	3	N/A	F	4
Sally	7	6	8	5	7	5	7	6.43
Robyn	5	4	6	4	4	F	-	4.6
Robert	6	9	11	13	12	10	9	10
Becky	6	L	-	-	-	-	-	6
Claire	L	-	-	-	-	-	-	-
Jack	6	5	5.5	8	6	9	8	6.79
Felicity	5.5	6	7	9	7.5	F	-	7
Jane	L	-	-	-	-	-	-	-
Average	6.27	6.5	6.67	7.14	7.08	6.92	6.43	6.61

Legend: N/A = Question not asked; DM = Data missing; UTP = Unable to play instrument; NP = Not playing instrument; L = Left conservatorium; F = Finished program; DNP = Did not participate in data collection.

It seems reasonable to expect that those playing the longest hours would have been experiencing the most severe playing-related discomfort/pain. This certainly seemed to be the case for Robert, whose average maximum playing time per day over the 7 semesters was 10 hours. However this assumption could not be universally applied across all participants. In fact, as the research progressed it emerged that there were also many other factors that needed to be taken into account.

Compare, for example, the experiences of Robert to those of Gary. Violist Robert, noted above as experiencing severe playing-related discomfort/pain, went from

sporadically playing six hours a day in the first year of his Bachelor of Music program, to consistently playing upwards of 10 hours a day by his third year. At this time he claimed to be regularly practising for five to six hours a day on top of any Orchestra, Chamber Music rehearsals, and band/gig commitments.

Gary, a violinist with relatively minimal experiences of playing-related discomfort/pain, also regularly reported some periods playing long hours each day. He generally maintained his private practice at around four to five hours a day, and added Orchestra and Chamber Music commitments on top of this as required. His average maximum playing time per day over the seven semesters was 8.29 hours.

Whilst participating in this research, both students attended several intensive national orchestral programs and camps. However Robert experienced very severe ongoing pain during and after his participation. Gary did not, although he did notice that he was more likely to feel fatigue and tension at the end of the long days of playing required.

When looking into this further it is evident that there were some other marked differences between the two cases. Robert noted that in situations like music camps he had a tendency to practise after rehearsals finished and in the breaks whereas Gary did not. Robert consistently stated that during his private practice he usually forgot to take breaks or stretch beforehand. Yet Gary was in a habit of breaks and stretching before his private practice, and he tried to do the same in orchestral situations. The difference in their approaches is clearly evident in the following two quotations: “I can, remember to stretch out more but... I just... forget... [“So how often, would you say you remember to stretch...?”] Maybe once every, 10 times I play” (Robert, SEM 7). As opposed to Gary: “I do probably, five minutes of, stretching before I play each morning... [MW: “And did

you do... that when you were... on camp...?"].... Yeah I think I would be in a lot more, pain or discomfort if... I hadn't" (Gary, SEM 7).

Robert also said that, despite severe pain, he perceived having had no opportunities at all to have any kind of prolonged recovery time with less total playing after these intensive music camps due to various playing commitments. In addition, although he repeatedly expressed awareness from his second year onwards that his increasing pain was linked to the accumulated effect of his playing time as well as a lack of recovery time, he continued to repeat the same behaviours over a period of years, as the following quotations show.

I... came home one Friday and my whole body was just like aching it's like the... whole couple of months just caught up with me on that one day... I'd been doing about two months of... solid... almost nine hours, playing a day. (Robert, SEM 4)

My back is... really bad again... that's probably because... I've forgotten to stretch all the time because I'll be in a rush... [and] I have been... continually doing stuff over the last, couple of months. (Robert, SEM 7)

On the other hand Gary did not have as many playing commitments. In addition, he did not ignore what might generally be interpreted as being warning signs, such as increased muscle tension and fatigue. As he reportedly adapted his behaviours in order to minimise discomfort/pain he didn't seem to get to the stage where he needed a prolonged recovery time.

Unsurprisingly, by the end of his program Robert was experiencing very severe discomfort/pain that was affecting many other activities. Gary on the other hand, claimed that he was still only experiencing some muscle tension and fatigue at the end

of a very long day. These two cases are prime examples of how the individual's personal approach and habits may have been affecting their playing-related discomfort/pain.

One might also assume that those who kept their maximum playing time consistent and at a lower amount than students such as Gary and Robert may also have consistently had less playing-related discomfort/pain. However this was not necessarily the case either. Consider the experiences of Erin and Tim. Cellist Erin's average maximum playing time over the seven semesters was 5.6 hours per day and throughout Semesters 5, 6, and 7 it remained steady at 6 hours. Yet, despite no obvious increase in her maximum playing time per day, she started to experience more pain in Semester 7. This increase in pain came to the point that she had to consult a chiropractor about it.

Through discussion it emerged that, although her maximum playing time per day still averaged around six hours, Erin was now playing that amount of time on more days each week. For the first time she was regularly participating in Chamber Music ensembles and was scheduled to perform in two Orchestra programs throughout the semester. The following quotation shows that Erin was able to link the perceived increases in her pain to this change. In fact, she stated specifically during her interview that she actually requested to be removed from one of the Orchestra programs because of this increased pain. However she did not reveal this information to the Orchestra conveners. Instead she reportedly told the conductor that she was struggling with the onerous workload in her honours year and asked to be excused for that reason.

At the beginning of semester I was in... two Orchestras... I did heaps and heaps of playing and it [my pain] came back, but then I... asked to get out of one... I am only doing one at the moment and... it's gone again. (Erin, SEM 7)

Violinist Tim is another whose maximum playing time per day remained fairly consistent at 5 or 6 hours throughout his program (his average over the seven semesters was 5.5 hours). However, like Erin, in his fourth year he was also playing that maximum amount more days in the week due to increased participation in Chamber Music ensembles. At the time he maintained that he still was not really experiencing much discomfort/pain. However, when the frequency of his reported playing hours increased his pain was present at the time of interview completion for the first time. The experiences of Gary, Robert, Erin, and Tim certainly suggest that similar problems were occurring regardless of whether the maximum playing time was six or ten hours.

Table 14 also shows that some students had an increase in their maximum playing time heading towards the end of the third and beginning of fourth year. This was followed by a drop in a maximum playing time in the final semester. In the case of Brad, a cellist, this decrease was substantial, from playing eleven hours in a day to six hours in a day. During his final interview Brad said that he had not experienced any playing-related discomfort/pain at all for many months. He then went on to reveal that he was no longer participating in the Orchestra course. However Brad didn't think it was Orchestra in particular that was influencing his playing-related pain, as the following quotation shows: "Your faults intensify... over, a longer period of time, whereas if it's, just a little bit of tension for a small amount of practice, then..." (Brad, SEM 7). And Tim and Gary (discussed above) expressed similar sentiments: "I wouldn't say Orchestra itself would be the problem, but... it can aggravate, problems" (Tim, SEM 2).

The words of these students show that they were clearly more of the opinion that any problems were simply the result of aggravation due to extended length of playing time. This perception certainly seems to be backed up by the reported experiences of

some of the other participants including Susie, Steve, and Robert, all discussed in detail later on.

The link between total reported playing time and pain level was also discussed in focus group situations. As was also found to be the case in Ioannou et al. (2018, p. 26) and Robitaille et al. (2018, p. 6), most participants in this research found that they experienced more discomfort/pain as they increased their playing. Yet, when asked if they tried to keep their practice time consistent by reducing individual practice when they had extra orchestral rehearsals, students were divided. Tim, mentioned above, said that he liked to maintain his personal practice on top of rehearsals and that any discomfort was outweighed by a feeling of satisfaction for work well done. This particular student did not suffer much playing-related discomfort/pain throughout his program. “I... practise on top of... orchestral commitment... to be able to, finish a day and... crash, at the end of it is such a, good feeling” (Tim, Focus Group 1).

On the other hand violinist Susie said that she actively tried not to do any individual practice in weeks with cumulative hours of Orchestra rehearsals.

If I was having, 12-16 hours of rehearsals in a week, I wasn't practising, [sounds of agreement] because then that would end up [painful], and I wouldn't be able to play the week after anyway because I had hurt myself. (Susie, Focus Group 1)

Unfortunately, by this point in time Susie was already experiencing severe ongoing playing-related injury. She consistently claimed that it was being aggravated by her participation in long Orchestra rehearsals. It is interesting to note, however, that she perceived her injury first occurred as a result of various behaviours in the practice room. These included practising extremely long hours with limited or no breaks, not warming

up, and crucially, having a mindset where she was determined to continue playing regardless of the severity of her pain.

Thematic summary

This section highlights the impact of the primary theme of *Self-efficacy* and its secondary themes *motivation*, *mindfulness*, *perfectionism* and *time management* on student behaviour. Robert (discussed previously) displays low *Self-efficacy* by engaging in panic practicing (trying to get better through more practice and “breaking through the pain” but without a logical solution for how to address it). He appears to have poor planning skills, displays obsessive tendencies and can be inflexible. He is highly *motivated* but has tunnel vision, focusing on one goal regardless of the long-term consequences.

The actions of Gary, on the other hand, suggest higher *Self-efficacy* in this regard. He stretches consistently, *mindfully*. He uses reflection, self-analysis, and is proactive and adaptable, for example changing his practice hours as necessary to the situation and stretching as a preventative measure. The difference in outcome between the two cases in terms of perceived pain levels is striking.

The primary themes of *Stress/anxiety* and *Cultural beliefs* are also recurring. Robert and Susie are afraid to consider what their pain means in terms of their future so they avoid thinking and dealing with it (this again leads to panic practicing). Their reactions and subsequent behaviours indicate that they may suffer from *insecurity*. Similarly Erin does not tell the conductor of the real reason for wanting to withdraw from orchestral rehearsals (increased pain). Perhaps she is *fearful* of judgement from her teachers and peers, (due to a *Cultural belief* that pain is a sign of weakness or bad technique), or there is a perceived lack of support. In the case of Tim there also appears

to be an ingrained *Cultural belief* that the more practice he can do the better, regardless of the physical consequences. This will be a recurring theme throughout this chapter.

Individual Practice

The practice hours reported by participants in this research are similar to those noted in Brown (1997, p. 16); Hagglund (1996, p. 99); and Pascarelli and Hsu (2001, p. 4).⁵ Generally speaking, most were practising between one and three hours per day, five to seven days a week (see Table 15). However there were some who reported practising long hours, and others who reported practising very little. It is tempting once again to think that those who were practising the longest hours may have been the ones who claimed to be experiencing more severe playing-related discomfort/pain. (This was the case in Hagberg et al., 2005, p. 580; and Miller et al., 2002, p. 170, but not in Ioannou and Altenmüller, 2015, p. 136; Lockwood, 1988, p. 131; and Roach et al., 1994, p. 128).⁶ However, as with the total playing time, this was not necessarily the case.

⁵ Brown (1997) found that young string students practised on average 2.5 hours a day (p. 16); Hagglund (1996) found that tertiary music students practised on average for 2 to 3 hours (p. 99); and Pascarelli and Hsu (2001) found that musicians generally practised 2 to 4 hours per day (p. 4).

⁶ Hagberg et al. (2005) found that those who practised 20 or more hours per week were 2.4 times more likely to experience right hand/wrist and 2.2 times more likely to experience left elbow/forearm disorders (p. 580); and Miller et al. (2002) found that duration of practice was significantly correlated with upper limb pain (p. 170). However Ioannou and Altenmüller (2015, p. 136); Lockwood (1988, p. 131); and Roach et al. (1994, p. 128) did not find a significant difference in hours of practice between students according to frequency of pain

Table 15

Average Daily Practice Reported

Student	Semester								
	1a	1b	2	3	4	5	6	7	8
Susie	2	0	2	2	1	0	0	0	0
John	1	0	0	1	3	L	-	-	-
Tim	0	0	1	0	2	2	2	2	0
Jill	2	1	2	2	2	1	1	F	-
Caitlin	1	1	1	1	1	1	2	2	2
Cassie	1	3	2	1	2	3	1	2	1
Tom	3	3	3	3	3	3	3	F	-
Wendy	1	1	2	2	2	2	1	2	1
Jena	1	0	L	-	-	-	-	-	-
Molly	0	0	L	-	-	-	-	-	-
Mary	3	1	3	3	3	3	3	F	-
Sam	1	1	3	2	2	3	2	F	-
Erin	2	2	2	2	3	3	2	1	1
Julie	1	2	3	3	3	DNP	DNP	F	-
Brad	1	2	2	2	2	3	3	F	-
Mark	1	0	2	2	2	2	3	3	3
Chris	3	3	3	2	2	DNP	DNP	F	-
Melanie	3	1	3	L	-	-	-	-	-
Anna	0	0	1	1	0	1	1	0	0
Rachel	1	2	1	2	2	2	2	2	F
David	0	0	2	1	2	DNP	1	1	0

(continued)

Table 15

Average Daily Practice Reported (Cont'd)

Student	Semester								
	1a	1b	2	3	4	5	6	7	8
Eve	1	1	L	-	-	-	-	-	-
Frank	1	1	DNP	DNP	L	-	-	-	-
Gary	1	2	2	3	3	3	3	3	3
Steve	0	3	0	0	2	1	1	1	1
Melissa	1	1	1	1	2	1	1	1	1
Melinda	1	0	2	2	2	0	2	1	1
Natalie	1	2	3	3	3	3	3	3	3
Liam	1	1	1	L	-	-	-	-	-
Tina	1	0	2	2	2	1	2	F	
Leah	0	0	0	0	DNP	L	-	-	-
Donna	0	0	2	0	0	DNP	0	DNP	F
Sally	1	1	2	1	2	1	2	2	2
Robyn	1	1	0	1	1	1	1	F	-
Robert	1	1	0	3	3	3	3	3	3
Becky	3	2	2	L	-	-	-	-	-
Claire	0	0	L	-	-	-	-	-	-
Jack	1	0	1	3	3	3	3	3	2
Felicity	1	2	1	2	2	2	2	F	-
Jane	0	0	L	-	-	-	-	-	-

Legend: 0 = less than 1 hour daily practice; 1 = 1-2 hours daily practice; 2 = 2-3 hours daily practice; 3 = more than 3 hours daily practice; L = Left conservatorium; F = Finished program; DNP = Did not participate in data collection.

Table 15 shows that there were four male students (Tom, Gary, Robert, and Jack) and two female students (Natalie and Mary) in this research who were

consistently practicing for more than three hours per day. However, of those six identified as practising long hours, Tom, Mary, and Robert experienced very severe ongoing playing-related pain that was affecting other activities. Gary, Natalie, and Jack claimed that they didn't experience severe ongoing pain, just fatigue and tension at times after playing longer hours.

As was also the case in McCready and Reid (2007, p. 144) the tertiary students in this research had a range of approaches to dealing with pain during practice. With regards to the 6 specific cases mentioned, Tom, Mary, and Robert (as discussed in detail in *Chapter 9: Case Studies*) did not stop practicing when experiencing pain. In addition they did not take breaks during their practice, stretch as part of their warm-up, and they maintained their practice at far more than three hours a day. Gary, Natalie, and Jack on the other hand, were more likely to stop playing when they experienced pain during their practice. They were also generally more likely to take breaks within their practice, warm-up beforehand, and allowed themselves more recovery time after ongoing periods of intense playing.

The students also had different reactions to their pain when it occurred. For example, Mary, a female cellist who experienced increasing pain when she increased her practice continued to state the belief that pain was a normal part of playing her instrument. As a result she maintained her practice, making no changes to the structure or length. By the end of her program she had developed a large lump on her neck and reported constant pain. Her attitude towards her pain aligns with those reported by tertiary music students in Kreutz et al. (2008, p. 9) and Park et al. (2007, p. 89).

On the other hand Jack, a male cellist who noticed that he was experiencing more discomfort when he increased his practice, took this as a sign that he needed to

take more breaks within his practice and also to spread it out throughout the day. He adapted his practice accordingly and his problems did not escalate. Clearly there are other factors to consider, however these were two different reactions with very different outcomes for these students. It seems reasonable to assume there was some link between the students' behaviours, attitudes, and their eventual outcomes.

At the other end of the practice spectrum Table 15 also shows that Susie, Tim, Anna, Leah, Donna, and Robyn struggled to maintain more than one hour of practice per day at various stages of their Bachelor of Music program. (The higher proportion of female students practicing fewer hours aligns with the findings of Zetterberg, 1998, p. 160.) Yet once again these students did not necessarily remain pain and injury free. In fact, Susie, Anna, and Donna also experienced severe ongoing playing-related injury, and Leah reported ongoing pain whilst playing and during everyday activities. Of these students only Tim and Robyn claimed to remain relatively pain-free. Clearly in all of these cases there also must have been other influencing factors aside from the actual quantity of practice being undertaken.

Through looking at their cases in more detail, it becomes apparent what some of these were. For example, much like Mary and as already discussed, Susie admitted that in the past she had consistently practised extremely long hours, with limited breaks, and persisted through her pain until it became unbearable. It was only at this stage, which coincided with her early semesters in the Bachelor of Music program that Susie began to limit her practice, thus accounting for the marked decrease in both the severity of her pain and the amount of practice during her final semesters. The two students reactions to their playing-related pain are similar to those reported in Ioannou and Altenmüller

(2015), where 25.3% of tertiary music students “very often” (and only 8.9 % “never”) continued practising when experiencing pain (p. 137).

Tim, on the other hand, had always maintained a very easy-going and preventative attitude towards his practice. He took frequent breaks regardless of discomfort/pain and, like Jack, consistently stated the belief that tension and pain were a sign that something, whether it be technique or behavioural-related, needed to be adjusted. Throughout his program he claimed to experience only minimal playing-related discomfort/pain.

Clearly in all these cases the individual student’s overriding approach to (and general attitude towards) their playing-related discomfort/pain and implementation of preventative strategies was a key consideration. However other factors such as the consistency and content (practice breaks, warm-ups, repertoire, and other factors) also had the potential to influence the students’ perceptions as to the severity of their playing-related discomfort/pain. Over time it was evident that this was also the case across the spectrum of participants in the research.

Thematic Summary

The experiences discussed in this section continue to highlight the potential impact of *Self-efficacy* on playing-related discomfort/pain. Students with higher *Self-efficacy*, such as Gary, Natalie, and Jack, claim that they pay attention to the signs that their bodies are giving them. They incorporate strategies such as stretching and taking regular breaks during practicing to safeguard against future effects. They use forward planning and utilize *time management* skills. On the other hand, Susie and Mary’s experiences of panic practicing demonstrate poor planning skills, and may be linked to their ingrained *Cultural beliefs*. Mary and Susie state that they subscribe to the notion

of “no pain, no gain.” There is *fear, suffering* and *insecurity* underlying their perceptions, this in term increases *Stress/anxiety*. The difference in perceived pain levels between the two groups of students is striking.

Consistency

It was fairly common for students in this research project to vary the amount of individual practice they were doing day-to-day. In most cases these variations were relatively small and depended on factors such as the students’ academic timetable for that day, work commitments, Orchestra rehearsals, and their motivation at the time. However in some instances the variations were large and in the vicinity of several hours practice a day. The extent of these variations are not necessarily evident in Table 15, given the restrictive properties of the quantitative questionnaire and the coding method used.

The most obvious trend was for students to (understandably) greatly decrease their practice during holiday periods, before then resuming their full practice amount of several hours a day in a very short space of time. This was especially the case over the extended three-month Christmas holiday at the conclusion of each year of study. The majority of students in this research who were regularly following this pattern noticed that they were more likely to initially experience pain when the semester resumed. Their perceptions align with Manchester (1988), who found that tertiary music students were more likely to suffer hand problems after such elongated breaks (p. 17); and Ranelli et al. (2015), who found that practice patterns (specifically, playing more or less than usual) was associated with PRMP among children aged 7-17 (p. 390).

Violinists Leah and Sally stated that they perceived that such discomfort/pain was normal and to be expected as they increased their stamina and motivation. “If I practise heaps I notice that... from stamina... lack of, [practising] my arms tend to get sore, but once I... get used to it... muscles settle back in and... [I get] ... used to it” (Leah, SEM 3).

However once again there was a range of perceptions and experiences. Cellists Erin and Julie and violinist Melissa perceived experiencing less discomfort/pain after the long Christmas break as a result of the extended physical rest. Cellists Wendy and Mark actively tried to minimise any discomfort/pain by re-introducing their playing and practising slowly. There were also a limited number of students who actually used their holiday periods to practise more, rather than less. The most striking example is violinist Susie who has already been identified as experiencing severe playing-related injury. She increased her practice during the Christmas break at the end of the first year of her program, and noticed an increase in the severity of her playing-related pain. “It got worse, over the Christmas break because I was practising a lot more” (Susie, SEM 3).

Susie initially persisted through the pain for some weeks, before subsequently reducing her practice hours. Thankfully, by the end of that year her pain had reportedly gradually started to decrease, and continued to do so over the final two years of her program. However she perceived that this was at least partially due to the fact that she never resumed regular practice hours due to struggling with motivation for various reasons (including her experiences of pain).

Two other students in this research project also greatly increased their practice for a period of weeks and subsequently experienced an injury. The first is John, a violinist who admitted to being unmotivated and practising infrequently throughout his

program. During his fourth semester of study, he experienced a severe injury that affected his ability to play his instrument as well as perform other everyday activities. John was adamant in his interview that this injury, later confirmed through x-ray as a left shoulder impingement, was related to lifting too much weight at the gym in a “seated bench press”. However, he went on to reveal that, in the weeks prior he had greatly increased his practice from relatively nothing to four to five hours per day, on top of Orchestra rehearsals. In addition, he continued these long hours of playing after the initial injury occurred (against medical advice) until it reached the stage where he was unable to move the arm. It therefore seems reasonable to assume that there was some connection between the injury and his practice habits. “It was... a week before the Orchestra concert... so I kept playing through it... the physio was like ‘No, don’t, don’t, don’t’. I was like ‘I really want to’... so I just... did” (John, SEM 4).

Unfortunately the outcome of his injury past this point, including when and if he was able to resume practising, are unknown. During semester four John was already on academic probation and required to raise his grade point average, and claimed that he was relying on his marks in the Major Study and Orchestra courses to do this. As he chose to defer all of his studies for the semester he was therefore unable to meet this requirement and not permitted to continue in the Bachelor of Music program.

As was also the case in Kreutz et al. (2008, p. 8), the second student in this research, violist David, similarly attributed his injury to factors other than the amount of practice he was doing. In his case these included his posture, playing technique, increased stress, and also heightened awareness of his own health due to tragedy in the family. Yet when questioned further as to whether there had been any other changes in his routines prior to the injury occurring, he too revealed that he had greatly increased

his practice. On reflection, he also recalled that his Major Study teacher had told him at the time that she believed that the injury was most likely a result of these changes.

Actually, I just remembered... I was doing more practice when the pain started as well... at the beginning of this year I was doing about five hours a day of practice... I was really into it then, and... [Teacher A] thought that that might have played a role. (David, SEM 6)

Unfortunately, for various reasons (reportedly unrelated to playing-related pain) for the remainder of his program David also struggled with motivation and never resumed the amount of practice he was doing prior to his injury. It does seem likely that there was some connection between the two factors. However it is unknown whether his injury would have recurred or been aggravated had those circumstances been replicated.

All three of these students were clearly feeling extremely motivated to play their instruments at the time that their injuries occurred. That John in particular reportedly continued playing through his pain to the point that it was excruciating is astonishing. However, nearly every other student in this research study also commented at some stage that their motivation to play/practise their instrument could potentially override any experiences of discomfort/pain. The most obvious examples include Steve and Robert, whose circumstances are discussed in detail in *Chapter 9: Case Studies*.

In various populations Ackermann and Adams (2004, p. 673) and Árnason et al. (2014, p. 79) found that musicians perceived sudden increases in playing time as contributing to PRMDs. The two male students in this research who reported the largest variations in the amount of day-to-day practice they were undertaking, (Steve and Robert), also perceived that such variations in playing routine were aggravating their discomfort/pain. Strikingly, violist Robert claimed at one point that his practice could

vary from nothing one day to eight or nine hours the next depending on how motivated he was feeling.

Every now and then I'll, spend a day when I've got to do other stuff and I won't practise on that day, but then I feel the need to catch up, so then I will do twice as much practice the next day... so I guess... pacing myself out a lot more would be better. (Robert, SEM 5)

It is therefore regrettable that Robert reportedly continued with this method of practising regardless and, by the end of his program was experiencing severe and ongoing playing-related injury. The strategy of continuing playing regardless of pain was not isolated to this case. Many other students also admitted to doing this on a regular basis, including injured students Susie and John.

Thematic Summary

Again, the primary theme recurring in this section is *Self-efficacy*. Susie and John are clearly *motivated* to practice around the times that their injuries occur. Unfortunately the method by which these students go about their practice suggests a lack of *mindfulness* regarding its impact on their health. John in particular exhibits extremely poor judgement by continuing to play against medical advice, and according worsens his injury. He is focused on a short-term goal and seems unwilling to consider the bigger picture including his long term playing health and wellbeing. Similarly, Leah and Sally believe that pain is to be expected so they keep playing; Susie has no practical solution to her pain in the long run except not to play; and Robert seems to know that pacing himself would be better but has no confidence in his ability to actually do that.

Content of Practice

Warm-ups

All of the students in this research who completed their Bachelor of Music program claimed at some stage that they were doing a warm-up as part of their practice routine. This finding aligns with Russell and Benedetto (2014) who, in a study including 350 school aged music students, found that nearly all occasionally/regularly did some kind of warm-up before playing (p. 265); Shoup (1995), who found that 79.5% of 425 high school and junior high musicians performed warm-up exercises prior to playing (p. 101); and Wood (2014), who reported that 68% of 160 tertiary piano students claimed to warm-up before practice and/or performance (p. 40).

The most common form of warm-up undertaken by students in this research project was technical work, with 97% (28) claiming to incorporate this into their practice regularly over at least one semester. However Table 16 shows that a surprising number of students (23, or 80%) also claimed during at least one interview that they tried to incorporate stretching into their warm-up.

Table 16

Students Doing a Warm-Up at Some Stage of Program

Type of Warm-Up					
Any		Technical		Physical	
n.	%	n.	%	n.	%
29	100%	28	97%	23	80%

Participants in this research generally perceived the warm-up to be a very important part of their practice routine that could help to minimise discomfort/pain whilst playing. Their perceptions align with Williamon and Thompson (2006), who

found that tertiary music students perceived that a failure to warm-up contributed to physical health problems (p. 419); and Ackermann and Adams (2004), who recorded similar perceptions among injured musicians and health professionals (p. 673). Despite this, many students struggled to incorporate it consistently over the three or four-year period.

Table 17 shows that, of the 28 students doing a technical warm-up, only 11 did so for the entire program. The remaining 17 students admitted at one or more interviews that they were regularly or permanently omitting the warm-up from the practice routine. When looking at a physical warm-up, the numbers are even smaller, with only four of the 28 students (Mark, Rachel, David, and Gary) consistently implementing it over consecutive semesters. These figures are similar to those reported by Kaufman-Cohen and Ratzon (2011), who found that only 50% of professional orchestral musicians regularly dedicated time to warm-up exercises (p. 92).

Table 17

Students Doing a Warm-Up Regularly for the Duration of Their Program

Type of Warm-Up					
Any		Technical		Physical	
n.	%	n.	%	n.	%
29	100%	11	38%	4	14%

Despite a general consensus as to its importance, there was a wide variety of opinions among students in this research as to the content and structure of the ideal warm-up. (This is in line with results reported by Britsch, 2005, p. 41; Russell and Benedetto, 2014, p. 265; and Shoup, 1995, p.102.) Twenty of the 28 students who began with a technical warm-up also believed it was better to start with slow playing. These

included Wendy who during Focus Group 1 talked at length about this topic. “Always start with really slow scales... then... speed it up like Galamian system, that's a really good warm-up, [sounds of agreement] and then arpeggios and... double stops” (Wendy, Focus Group 1).

However there were other students who found that starting with slow playing could actually aggravate pain due to the excess muscle tension required to sustain long bows. A good example is Sam, a cellist who experimented with many different types of warm-up throughout his time in this research. Through personal experience, he eventually decided that the best way to minimise discomfort/pain was to do a physical warm-up away from the instrument before moving on to more rapid technical work. “I'll do bowing exercises and stuff... not too slow, because, I have to try to... relax the muscle” (Sam, SEM 3).

When it came to the benefits of a physical warm-up, student opinions were also divided. Fifteen students perceived that, when they did some gentle stretching before playing, it was beneficial in helping them to reduce their playing-related discomfort/pain. (This did not necessarily mean that they actually remembered to do it.) On the other hand three students (Melinda, Tina, and Jack) were of the opinion that there was no real benefit to stretching before playing.

A further two students (Susie and Cassie) said that they were especially flexible (hypermobile) and at risk of overstretching and hurting themselves. Susie and Cassie's perceptions are in line with research that has linked hypermobility to musculoskeletal problems in musicians including that by Shoup (1995, p. 104) and Vinci et al. (2015, p. 143). The topic of hypermobility is discussed in more detail in *Chapter 8: Other Influencing Factors under Pre-Existing Medical Conditions*. “I have, lots of stretches

and stuff to do... when I remember... about half the time” (Jill, SEM 6). “I tried once [stretching]... and it didn't really feel much of a difference so... I thought there was no point in trying to... continue with that” (Jack, SEM 6).

Regardless of whether the students found it beneficial to stretch before playing, most still admitted to using stretching as a strategy once they were experiencing pain. As was the case in Ioannou and Altenmüller (2015, p. 140), these tertiary music students were more likely to stretch before playing if they were already experiencing pain, or had experienced it recently.

Whilst considering the issue of warm-ups, it is interesting to also keep in mind that many of the students who claimed to be doing one regularly were undertaking multiple practice sessions throughout the day. Yet over time it became clear that the tendency was to only do a warm-up before the first session of the day, regardless of how long it had been since they stopped. In subsequent practice sessions most were either skipping or greatly cutting back the warm-up routine to a scale or two. Reasons given were varied but most frequently included a lack of time and/or the perception that there was no need to do another warm-up as they had been physically active in the time since. “I do probably, five minutes of, stretching before I play each morning... if I've taken an extended break then maybe I will do a couple of stretches but, generally just, the first time” (Gary, SEM 7).

Of course, there were also students who struggled more than others to consistently incorporate the warm-up within their practice routine. One of the best examples is Anna, who experienced severe playing-related injury. In her case, she received much advice regarding the importance of stretching and doing a thorough warm-up before playing from medical professionals but still struggled to implement any

recommendations. Her circumstances are discussed in more detail in *Chapter 9: Case Studies*. “I don't actually warm-up... I just start playing my pieces” (Anna, SEM 8).

Several others who experienced severe pain and injury and were advised by health professionals of the importance of doing a warm-up also reportedly struggled to get into the habit of stretching. These included violinist Susie who, by the conclusion of her program, had greatly reduced her practice and noticed a decrease in her pain. She therefore felt it was no longer necessary to do any kind of warm-up, and injured violist Robert, who consistently stated that he had to prioritise his time for other things.

Unfortunately these approaches to the warm-up were not unique in this research. Students frequently stated that, when they were feeling pressured for practice time, they would first eliminate what they considered optional elements of the practice routine regardless of the perceived benefits in terms of reduced discomfort/pain. In addition to frequently omitting warm-ups in these situations, students also tended to reduce the amount of practice breaks.

Thematic Summary

Throughout this section the primary theme of *Cultural beliefs* is prominent. Students generally believe that a warm-up is a key component of the practice routine, and that it can help to minimise discomfort/pain. However there appears to be a lot of *Inconsistency* and misunderstanding among students as to how they should ideally warm-up. The majority of students believe that stretching is beneficial but display no knowledge as to how that element should be incorporated. There seems to be mimicry and uncritical acceptance underlying their beliefs about stretching, they have heard that it's good but have no information from appropriate sources as to whether that is actually the case.

The primary theme of *Self-efficacy* also continues to recur. Due to their poor *time management* skills, lack of *motivation* and lack of *mindfulness* students such as Robert, Anna and Susie are unable to incorporate a regular warm-up routine of any type in their practice. On the other hand Sam not only plans his practice time but also uses self-awareness and proactivity by paying attention to what is happening in his body. As a result he is able to ascertain what type of warm-up benefits him and he thus experiences less discomfort/pain.

Practice breaks

Lopez and Martinez (2013, p. 102); Shoup (1995, p. 101); and Zaza (1992, pp. 48-49) found that the majority of tertiary and/or school-aged music students took breaks in their practice. All of the students in this research who completed their Bachelor of Music program (29) also said at some stage that they were taking breaks during their practice. The most common reason given for taking such a break was a lapse in mental concentration, with 28 students indicating this was the case. However when asked specifically, 24 of the 29 students also said that they would take a break if they were experiencing playing-related discomfort/pain, and they perceived that the situation allowed it. These figures are somewhat higher than those indicated in Paarup et al. (2011), where only 42% of orchestral musicians reported that they had paused from practising when at home and/or alone due to playing-related musculoskeletal symptoms (page 10 of 14).

As was also the case in Ioannou and Altenmüller (2015, p. 137) and Kreutz et al. (2008, pp. 8-9), students in this research believed that factors such as practising without breaks contributed to PRMDs. Twenty-six claimed that taking breaks during their private practice was one of their strategies for preventing their playing-related pain.

Unfortunately though, this did not necessarily mean they were consistently implementing the strategy. The overwhelming tendency was for students to continue playing through their pain with a specific practice goal in mind such as perfecting a particular passage or work, or completing a set number of hours of practice. This tendency was apparent across the range of discomfort/pain experiences, from those with reportedly minimal discomfort/pain (such as Tim) to those claiming to experience severe pain (such as Robert). “I don't even think about time... I just... stand there and... go through methodically and look at what's going on and, time will pass” (Tim, SEM 6). “I... get obsessed with a passage and try to improve it until... I feel like it's been good” (Robert, SEM 8).

Steinmetz et al. (2012) found that tertiary music students had a variety of approaches to taking breaks during practice (pp. 628-629). The content, length, and frequency of practice breaks taken by students in this research is also difficult to summarise as it varied greatly from individual to individual. As was also the case in Stanek et al. (2017, p. 23), in some cases these factors did actually correspond with the degree of discomfort/pain being experienced. Yet the decisive factors overwhelmingly appeared to be concentration and motivation. These two quotations from Sam and Erin are representative of the general approach adopted by most. “If I don't really have to practise, then I won't practise, but otherwise I just keep on playing [when I experience pain]” (Erin, SEM 5). “If I, have... half an hour, and then I have a break, then I will lose the concentration so I try not to do that, I try, to do longer, so two hours three hours... in one go” (Sam, SEM 5).

Some of the most common general activities undertaken during practice breaks included using the computer, socialising, going to the toilet, getting a drink, and eating

food. It is encouraging that some were also actively utilising the time to prevent or ease any playing-related discomfort/pain. Twenty-two of the 29 students claimed during at least one interview that, depending on circumstances, they would do some form of light stretching or moving around. In a handful of instances, including Caitlin, Mark, and David, this was done solely as a preventative strategy, before they were experiencing any discomfort/pain.

As was also the case in Barton et al. (2008, p. 75) and Stanek et al. (2017, p. 23), students in this research including Susie, Tom, Mary, and Tina used ice and/or heat during practice breaks to minimise discomfort/pain. There was some awareness amongst the cohort that it might be counter-productive to continue using their hands in repetitive activities such as typing or texting during their practice breaks. As a direct result a number of participants, including Susie, Mark, Melissa, and Jack, went through phases where they actively tried to avoid these activities during breaks. (The perceived effect of computer use is discussed in more detail in *Chapter 8: Other Influencing Factors*.)

However, in some circumstances students would continue playing with their pain until they literally could not hold the instrument and were forced to modify behaviours. The most striking examples of this were injured violinists John, who has already been discussed in some detail, and Susie. Susie acknowledged many times that the reason her injury first occurred was because she was practising extremely long hours without breaks. She started taking breaks during her practice when her pain was so severe that she had no choice. Whilst her pain was relatively severe, she took care to continue taking breaks but specified that this was so that she could extend the amount of time she could play. However she later reduced her practice and, when she did so,

eliminated all of her preventive strategies (despite still experiencing pain whilst playing). “I was practising up to four hours a day... that's when I started putting in the breaks, so that I could extend the time” (Susie, SEM 3). “I used to have to [take breaks during my practice]... but now, I don't... If I am planning on doing a lot more practice I will” (Susie, SEM 6).

Susie said that she became very depressed as her pain worsened. However she thought it was the fact that she no longer wanted to play that depressed her more than the pain itself. Susie said outright that if she had the motivation she would continue practising through the pain, because that was what she had done in the past. Now that she no longer had the motivation to do this, she claimed to be depressed, and was later diagnosed medically with depression. Her experiences align with McCready and Reid (2007), who found that some injured music students reportedly became very depressed when unable to play (p. 144); and Rodríguez-Romero et al. (2016), who reported a link between pain and poorer mental health in Spanish music conservatory students (p. 193).

Because the pain is not right there... and it's not, every day, every moment like it used to, it's more the fact that I don't want to play any more... I just hate it... I mean, if I liked it, I would play through the pain, I really would... I've done it before. (Susie, SEM 5)

There were a limited number of students, such as violinist Gary and cellists Mark and Jack, who had a refreshingly different approach. Jack had the particularly unique strategy of “snoozing” during practice time. He came upon this strategy one day when he fell asleep for a few minutes in the middle of his practice and found that he felt much better when he awoke. Afterwards he adopted this as his main preventative

strategy. As he did most of his practice at home, he was able to lie down and set the alarm for 15 minutes later after approximately each hour of practice.

When I practise, I've, actually, just had... a bit of a snooze... to, relax the muscles and when I come back to it I... have more intense work... you get a lot more out of it because... your brain actually, takes on more information when it has... had that rest. (Jack, SEM 3)

Towards the end of his program he stopped the actual “snoozing” and said that he thought the reason it was so beneficial earlier on was because he was actually not receiving enough sleep at night. However he continued to utilise the strategy of taking frequent breaks during his practice during which he would try to relax and have some type of meditative time.

Along with Mark and Gary, who also claimed to take regular breaks during practice, Jack was able to then keep his total playing time and practice hours relatively high throughout his time in this research project. Yet all three of the students claimed to suffer minimal playing-related discomfort/pain. Clearly there are many other factors unique to each individual to consider in all of these cases. Nonetheless, it seems likely that there was some connection between their practice behaviours and their experiences of playing-related discomfort/pain.

Thematic Summary

The experiences discussed in this section continue to highlight the primary theme of *Self-efficacy* and its secondary themes *motivation*, *mindfulness*, *perfectionism* and *time management*. Students with lower *Self-efficacy*, such as Robert, Susie, and John, find themselves completely focused on (and highly *motivated* to reach) specific practice goals regardless of any negative feedback such as pain. These students

prioritize practicing obsessively for hours on end without breaks through pain (panic practicing). On the other hand students who demonstrate higher *Self-efficacy* in this regard, such as David, Mark, Gary, and Jack are more adaptable. They appear to better utilize strategies such as self-awareness and reflection when planning and doing their individual practice.

Repertoire

In various musician populations Ackermann and Adams (2004, p. 673); Hagglund (1996, p. 102); Wilson et al. (2014, p. 685); and Wood (2014, p. 40) found that participants perceived aspects of repertoire had the potential to impact on PRMDs. A number of students in this research also indicated at some stage that aspects of repertoire had the potential to impact on the severity of their pain during personal practice. As was also the case in Park et al. (2007, p. 93), most of these students perceived that they were more likely to experience playing-related discomfort/pain when playing music that was fast, repetitive and/or technically difficult. However, as with the Orchestra repertoire (discussed in *Chapter 5: Orchestra* under the heading *Repertoire*), some students mentioned particular works as having more impact.

Violinists Cassie, Melinda, and Melissa all said that they were more likely to experience playing-related pain when practising the Bach solo E major Prelude. This particular work requires constant repetitive fast bowing movement across several strings. Violist Robert identified that his most severe experience of discomfort/pain occurred when he was practising an unspecified Bach partita. Whilst violinist Steve noted the physical difficulties required when playing the *Introduction to Rondo Capriccioso* by Sain Saens. All of these students acknowledged a tendency to physically tense their body in preparation for the difficult sections. “In my arm, when I’m playing...

fast... for instance... the E major Prelude... when you play it very fast [laughs] once you get to around the last page.... then you notice it” (Cassie, SEM 3).

I think repertoire has a lot to do with it actually... the piece I have been practising a lot in the last week, which is when the pain [has] really gotten worse, is, the *Introduction to Rondo and Capriccioso*... every time I get to a run or something I... tighten up. (Steve, SEM 6)

Specific techniques required by certain repertoire were also identified by students as impacting on their pain. Violinist Sally noticed that she would experience more pain when practising a particular concerto that required a lot of shifting. Susie and Leah, also violinists, noticed that they were experiencing more pain when having to do certain double stops. Whilst fellow violinist Melinda experienced severe pain in her left wrist when playing repertoire that utilised the high positions on the G string. “When I was doing really, big shifts... in... this concerto I am doing... I’d get... pain” (Sally, SEM 8). “For a week... when I was shifting... into high positions, mostly on the G string... I... had this... weird, pain in my wrist” (Melinda, SEM 6).

Other students noted that factors such as the dynamic volume of playing required or relative length of the work could influence their discomfort/pain. Cellist Sam perceived that he was more likely to experience discomfort/pain when having to play sustained loud passages, and cellist Julie claimed to notice increased discomfort/pain when rehearsing a long Sonata with piano. Once Sam realised that the dynamic volume he was playing at had the potential to impact on his pain levels he developed a strategy whereby he would not practise above *mezzo forte* in the practice room. This was very successful in helping to reduce the amount of pain he was experiencing during his individual practice, however he continued to experience severe

pain in lesson and performance situations when he was required to play the music as written. “In practice room, I always get tense, but try to... play... *mezzo forte* whole time not playing *double forte*... while I practise and... it’s much better now and I can practise a lot more” (Sam, SEM 4).

Other students commented on the perceived impact of their emotional state whilst practising on their playing-related discomfort/pain. Violinist Sally noticed that she had a tendency to get frustrated when she couldn't play something that was technically difficult. As a consequence of this frustration she would find that she would become tense and thus experience more pain. During Focus Group 2 participants also claimed that they had noticed this tendency among certain students in this research whilst watching them play their instruments. The overriding impact of a student’s emotional state, personality, and generalised and situational anxiety are discussed in more detail in *Chapter 8: Other Influencing Factors*.

Thematic Summary

This section mainly highlights the primary theme of *Lack of control* and its secondary themes *playing time* and *academic requirements*. However it is interesting to again consider the potential impacts of varying levels of *Self-efficacy* as well as *Stress/anxiety* on student behaviours. Sam utilises self-awareness and reflection and comes to the conclusion that playing loudly during his practice aggravates his discomfort/pain. In this regard he demonstrates high *Self-efficacy* and adapts his practice routine accordingly so that he experiences less discomfort/pain. On the other hand Sally is aware that she experiences more discomfort/pain when she becomes *angry/frustrated* but does not have the *motivation* to look at ways to reduce her underlying *Stress/anxiety*. This particular student, who appears to have lower *Self-efficacy*, thus

continues to experience discomfort/pain in similar situations for the duration of her program.

Other factors

A number of other factors related to practice content were also perceived by students in this research as having the potential to influence their playing-related discomfort/pain. The most frequently mentioned related to the availability of practice rooms at the institution. At any given time there are several hundred students enrolled in a variety of different programs at this institution, however there are only approximately 30 practice rooms available for students to utilise. Around half of these are able to be booked, but only for a maximum of two hours a week. The rest of the practice rooms cannot be booked and are utilised on a first-come first-served basis.

At the time of this research there was a policy that practice rooms were to be vacated on the hour in order to allow more students to practise throughout the day. However this was not strictly enforced. Students tended instead to come in early in the hope of keeping their practice room for as long as possible and generally perceived that, if they were lucky enough to get a practice room, they needed to utilise the time for practising. The unfortunate perception was that warm-ups and practice breaks were not a good use of that time.

In addition, the common experience of students in this research was that, if they left their practice room to have a break, other students would take it. As a result, many felt that they needed to keep practising as long as possible without breaks. Some also worried that their personal property including their instrument might get stolen if they left their room for even a few minutes. "I don't usually leave... because... once you

leave... someone will take it... and I don't want to leave... my instrument... I am scared that, it will get stolen” (Melinda, SEM 2).

There were some students who felt confident enough to not only take breaks during their practice at the institution, but to challenge any student who took over their practice room whilst they were doing so. The most striking example of this is cellist Mark. He presented as a particularly self-assured young man who had very definite opinions.

I usually come back and say “What you are doing?”... if they are... I just, take breaks... it's more important that you, don't damage your hands... and also, for the mental concentration, you can't keep... productively working... past... about an hour. (Mark, SEM 4)

Mark consistently implemented strategies to minimise his playing-related pain regardless of the situation. However many other students in this research project said that they would practise in a different manner when they were at home, as they were able to pace themselves better. Violinist Melinda was able to link a decrease in her playing-related discomfort/pain during her final year to practising at home, where she was able to take frequent breaks during her practice. Cellist Jack, discussed previously with relation to his unique strategy of snoozing during practice, also readily admitted that he would not be able to do this if he was practising at the institution. “I'm, practising at home a lot more... I used to practise here... you know how hard it is to get practice rooms and everything... at home it's a lot easier to take breaks” (Melinda, SEM 7).

However, the recurring theme was that students in a particular mindset who wanted to continue practising would do so regardless of the situation (and how much

discomfort/pain they were experiencing). The most striking example of this is Susie, who has already been discussed in some detail. Unfortunately, she continued practising long hours at home through her pain until she was severely injured.

Thematic Summary

This section features the primary themes of *Lack of control*, *Stress/anxiety*, and *Self-efficacy*. Melinda is *fearful* of losing her practice room and/or her instrument being stolen if she takes a break, likewise other students are *fearful* of confrontation if they leave their room. As a result these students, who demonstrate low *Self-efficacy* in this regard, continue to practice for as long as possible. On the other hand Mark *Prioritises* his health above his fear of confrontation, and Jack adapts by doing his practice at home where he is free to structure it as he pleases. Mark and Jack show higher *Self-efficacy* because they are proactive, take self-responsibility, are adaptable and utilise their *time management* skills to organise their practice.

Conclusion

The discussion in this chapter has showed the potential influence of differing levels of *Self-efficacy* on student practice behaviours and the amount of discomfort/pain experienced. Students including Gary, Mark, and Jack demonstrated high *Self-efficacy* through their positive application of *motivation*, *mindfulness*, *perfectionism*, and *time management* skills. Rather than conducting their practice in a similar manner to the orchestral rehearsals that the majority of students were so *Discontent* with, these three students largely kept their *playing time* consistent, took regular breaks during practice, and utilised effective practice strategies.

On the other hand students with lower *Self-efficacy* in certain regards such as Robert, Mary and Tom continued with practice behaviours that aggravated their pain. It

is important to note that these students did not suffer from low *motivation* to practice. In spite of their pain, they were three of the students in this research who practiced the longest hours. However they remained unwilling or unable to consider the long-term consequences in terms of their health and well-being. Their reported behaviour aligns with Rojas and Springer (2014), who found that music performance majors displayed high levels of *Self-efficacy* to maintain practice, and that the number of days and hours of practice per week significantly predicted *Self-efficacy* to maintain a practice schedule in adverse situations (p. 39).

The other primary themes of *Cultural beliefs*, *Lack of control* and *Stress/anxiety* and many of the secondary and subthemes also featured in this chapter. Mary, for example, had an ingrained *Cultural belief* that pain was normal and nothing to be concerned about. Robert experienced increasing *Stress/anxiety* in the forms of *fear*, *suffering*, *insecurity*, and *anger/frustration* in line with his discomfort/pain and Tom continued to downplay his experiences. To a certain extent students also had a *Lack of control over academic requirements* such as lesson scheduling and aspects of their *playing time* like repertoire selection. The overarching themes of *Discontent*, *Inconsistency* and *Priorities* also featured strongly. The presence of these themes once again underlines the overlapping nature of the thematic divisions.

Chapter 7: Technique

Introduction

According to Lister-Sink (2005, p. 20), technique is “the means by which we make music, and the very foundation on which we build our music making. It is not what we play or sing, but how”. Unfortunately, there can be a great deal of pressure placed on musicians to conform and use the “correct techniques” as dictated by their teachers and peers. Performance injuries can be a result of this pressure when music students are told they must play in a certain way despite individual anatomic differences (Brandfonbrener & Kjelland, 2002, p. 94).

In various musician populations Ackermann and Adams (2004, p. 673); Hagglund (1996, p. 102); Ioannou and Altenmüller (2015, p. 135); Rickert et al. (2014a, pp. 96-97); Robitaille et al. (2018, p. 10); Stanek et al. (2017, p. 23); Williamon and Thompson (2006, p. 419); Wood (2014, p. 42); and Zaza et al. (1998, p. 2018), found that many perceived inappropriate/poor technique contributed to PRMDs. The data collected in this research project similarly showed a high proportion of participants believed that their playing-related pain was linked to their playing technique.

Eighteen of the 29 students in this research who completed their Bachelor of Music program indicated in the Initial Questionnaire that they agreed with the statement “I believe that pain is caused by faulty technique”, suggesting that for many this was an ingrained cultural belief. Strikingly, 16 of these 18 students, as well as an additional 10, went on to also link the word *technique* to playing-related pain during one or more of their research interviews. Only one of the 29 students (violinist Melinda) did not

mention the word *technique* when discussing her perceptions as to the nature and causes of playing-related pain at any time.

At the same time it is important to keep in mind that the word *technique* was used by participants in a variety of different contexts and with various different meanings. In some instances they were referring to a specific playing technique such as shifting or double stops. In other contexts the same student would use the word in a general sense, for example to describe their way of holding their instrument or even the way they approached their practice.

When talking about issues of technique students also invariably went into detail as to elements of their posture and instrument set-up, as well as the degree of tension involved whilst playing. In this context one or numerous aspects of technique were linked to playing-related discomfort/pain by all of the 29 research participants on at least one occasion. It was also common for students who appeared to be struggling to articulate their thoughts in interviews to blame any pain on a general "bad technique" without giving any details as to what they were actually referring to.

This chapter begins by giving a general overview of student experiences and perceptions of playing technique. The discussion then moves on to talk about specific issues of posture, instrument set-up, and tension whilst playing.

General Overview

Most of the participants in this research believed that an overall playing technique was something that was unique to the individual, encompassing their entire approach to the instrument including their posture and instrument set-up. The common opinion was that the correct playing technique for each individual could only be discovered through an ongoing process of trial and error and that it could not be

generalised over the entire population. Despite this, students noted a tendency for certain teachers to openly encourage both general and specific techniques for aspects of playing irrespective of individual differences. There was also a tendency for participants to deliberately copy the techniques that they had observed in musicians they admired.

Steinmetz et al. (2012) found that the majority of tertiary music students believed they could not play their instrument without experiencing some physical limitations (p. 629). Students in this research also perceived that it was normal to experience either some tension, discomfort, or pain when playing an instrument as it was not a natural position to be in. Many believed that it was normal to experience some initial discomfort or pain when learning or practising a specific technique such as double stops. As was the case in Britsch (2005, p. 43), some participants in this research perceived that they would experience less pain as they became used to the relevant technique. Students who discussed their discomfort/pain with their teachers believed that they reinforced this perception. “They [my teachers] said... it's just a matter of getting used to it, because... they have had a, similar experience... themselves... I think it's the same with everybody” (Jack, SEM 5).

Kreutz et al. (2008) found that unusual and/or new techniques were perceived by tertiary music students as causing playing-related pain (p. 8). The most frequently mentioned techniques to which students in this research project attributed increasing playing-related discomfort/pain were double stops, playing in high positions, and shifting. Some players, such as cellist Mark and violinist Gary, noticed that over time they were able to build strength and stamina and that executing a particular technique became less painful. “There's a difference between, something that's painful... and

something that you are just not used to... doing tenths or something... might hurt a little bit but if you do more of them you are... more uncomfortable” (Gary, Focus Group 3).

However there were other students who found that the initial discomfort/pain from practising a specific technique was so severe that they could not persist with practising it. This was particularly the case for female viola students Anna, Rachel, and Leah, who all experienced severe pain when playing double stops.

Several female violin students (including Susie, Melissa, and Tina) also stated that they experienced ongoing increased pain when having to play double stops. Melissa reported an extraordinary experience of injury when attempting one particularly difficult chord. This student said that she anticipated problems attempting the chord and so waited until her violin lesson to do it under the guidance of her teacher. It was in this environment that she did what she referred to as "pulled" a tendon. This particular student did not seek treatment at the time and this was her self-diagnosis. “I hurt my, left hand... I pulled, a tendon... doing a chord, because my hand is small” (Melissa, SEM 6).

Melissa later experienced a recurrence of the same issue and at that time sought the help of a physiotherapist who has specialised in working with musicians. She subsequently learned that her pain was actually a result of the placement of the left shoulder in relation to the instrument. “[The physiotherapist] said it was my shoulder placement... now my shoulders back, in a... more normal position it has been a lot more comfortable” (Melissa, SEM 7).

In contrast to the findings of Wood (2014, p. 41), Melissa found it beneficial to get the opinion of a health professional regarding her general playing technique and posture. As a result of following his recommendations she noticed a significant decrease

in discomfort/pain that she and her teacher had previously attributed to other issues such as instrument ergonomics. Only a limited number of students in this research (four in total) did actually consult a physiotherapist who had experience with musicians.

However the majority of participants said that they found it useful to get opinions and perspectives from different musicians, teachers, and visiting artists regarding various aspects of technique.

I find... talking to different, people who play the same instrument... especially, when we have had Masterclasses [sounds of agreement]... it... really helps to see how they, play and if, you are one on one with them... that... is a good thing... thinking differently from how... your teacher [is]... telling it to you all the time.

(Tim, Focus Group 1)

Wilson et al. (2014) found that musicians tended to copy individual teachers' postures, techniques, and playing styles and that this could impact on the development of PRMDs (p. 685). Some students in this research also went through phases advocating certain playing techniques after observing specific musicians. The most striking example of this tendency was violinist Caitlin, who seemed to immediately adopt the playing techniques and ideas of whoever she had interacted with most recently. Note however that, after time this student would instead work to incorporate aspects of different playing techniques to suit her. She readily acknowledged being very open to suggestion and went into great detail about the minute aspects of her playing technique during interviews. (Her case is discussed in more detail in *Chapter 9: Case Studies*.)

Cellist Brad also tried many different bowing techniques depending on his teacher at the time. He claimed to notice that he had a tendency to revert to old habits when playing pieces he had played previously, with a different technique. "I... started

off with, different bow techniques... I'm learning a French technique at the moment... so it's a lot of moving back and forth, and, it's... very free... but... I started with a Russian teacher” (Brad, SEM 3).

The more I develop my bow technique, the better it gets, but sometimes I'll revert to... old way of doing it... especially if it's in a piece you've already played before, you just... naturally do the habits you used to. (Brad, SEM 3)

Some students perceived that other musicians' techniques looked uncomfortable and unnatural. During Focus Group 2 Mark, David, and Sally specifically commented on what they perceived to be bizarre elements of the playing techniques of several famous violinist including Vengerov and Perlman. Mark said that the position of Vengerov's neck in relation to his instrument looked uncomfortable. He stated that this particular player must have neck problems due to this awkward technique. He later said that he thought it was possible for people to become less affected by discomfort/pain over time, but that they might experience problems in the long term.

David: “Vengerov... has got the most shocking technique [sounds of agreement and interjections] but he is better than everyone so...”

Mark: “... He must have an absolutely, ridiculously stuffed neck because...”

David: “... The way he holds the instrument is really ridiculous, [sounds of agreement] it looks so uncomfortable...”

Mark: “... Some people then seem to become less affected... mind you that is when they are 30, [sounds of agreement] I mean when they reach 60 it might be... a different story, they might be completely ruined.”

(Focus Group 2)

On this point it is particularly interesting to also consider the personal experiences of Mark. In interview situations he mentioned several times that Teacher A had commented that the positioning of his neck whilst playing looked stiff and painful. However Mark said that he never felt any stiffness or tension in his neck, that what looked awkward to her was actually comfortable and painless for him.

[Teacher A]... always thinks that I must have an incredibly sore neck because I sit like this... but, I never find that that's actually an issue... I feel my neck and it's never really stiff or my version of stiff anyway. (Mark, SEM 8)

Mark did not find it particularly beneficial to have this perceived strange aspect of his technique pointed out to him. However, in other cases students said that having someone else pointing out something perceived as unusual about their technique was helpful. For example violinist Natalie commented on reflection that she never realised how much tension and discomfort she had whilst playing until the same teacher pointed it out to her in her lessons.

In fact, students' opinions as to the influence and usefulness of advice from different teachers on playing technique were varied in general. Some of the varying perceptions and experiences of the Pedagogy courses at the institution have already been mentioned in *Chapter 4: The Learning Environment*. During Focus Group 2 students also talked about this course in direct relation to playing technique:

Mark: "It's all about, getting your notes in tune, in the end..."

David: "... That's why I... react a bit to... Pedagogy... how, precise [Teacher J] was... with how she sets everyone, [sounds of agreement] up..."

Mark: "... How everyone has to be so absurdly perfect..."

David: “... Yeah because... [sounds of agreement] I refuse to believe that that works for everyone, [sounds of agreement] just because everyone is, is different.” (Focus Group 2)

These students clearly believed that the courses were enforcing the idea that playing technique would be the same for everyone. Yet other students, including Brad, Tina, and Cassie, interpreted the same teaching course in a different light. This was just one of many instances in this research where students came away with completely different perceptions and experiences of a particular learning environment.

Thematic Summary

In this section the dominant primary theme is *Cultural beliefs* and its secondary themes *conformity* and *teacher/conductor as authority figure*. Due to *Cultural beliefs*, students tend to copy the techniques of their teachers regardless of individual differences and teachers seemingly encourage the practice. Students also assume that others experience pain and therefore believe it is acceptable. There is the potential for such assumptions to lead to misunderstanding as to the serious nature and causes of pain and injury.

Cultural beliefs around the assumed suitability of players as teachers and the acceptability of limited teacher training are also evident. As a result of such beliefs musicians may have unrealistic expectations of their teachers and peers and seek/give/take inappropriate advice about health matters. Injured student Melissa, for example, initially relied on the advice of her teacher and fellow musicians and ended up with an incorrect self-diagnosis. It is concerning that not all teachers in this research referred their students on to more appropriate sources when dealing with such matters.

Finally, the discussion in this section highlights the continuing relationship between *Cultural beliefs* and *Self-efficacy*. The use of mimicry and uncritical acceptance as learning strategies may be long-established traditions. However such strategies may also encourage low *Self-efficacy*. Students who directly copy what their teachers do/say do not develop self-responsibility and awareness through the reflection of what technique is correct for them. This has serious implications given the continuing emergence of low *Self-efficacy* as a key contributing factor to playing-related pain.

Posture

Twenty-eight of the 29 students in this research project who completed their Bachelor of Music program (all except for Chris) mentioned on one or more occasions that they perceived aspects of posture while playing were linked to their playing-related discomfort/pain. This finding is in line with numerous other studies of musician populations including those by Ackermann and Adams (2004, p. 673); Ackermann et al. (2012, p. 186); Árnason et al. (2014, p. 79); Hagglund (1996, p. 102); Ioannou and Altenmüller (2015, p. 137); Kaneko et al. (2005, p. 169); Schoeb and Zosso (2012, p. 132); Williamon and Thompson (2006, p. 419); Wood (2014, p. 42); and Zaza et al. (1998, p. 2018), who have similarly found that poor posture was perceived as contributing to PRMDs.

There was a general perception among the students in this research that having “good” or “correct” posture was essential to limit playing-related discomfort/pain. This perception seems to be supported by the findings of Chan, Driscoll, and Ackermann (2013), who reported that the majority of injuries seen in professional orchestral musicians were attributed by therapists to poor postural control (pp. 6-7 of 9); and Steinmetz et al. (2010), who found that insufficient postural stabilisation and lack of

lower back support contributed to PRMDs among musicians (p. 603). However as with general technique, there were a variety of opinions as to what this “good” or “correct” posture entailed.

The most common perception among participants was that standing or sitting up straight whilst playing was the trademark of a good playing posture. However there were exceptions to this. Some students believed that an upright posture encouraged tension and therefore pain whilst others noted that fellow musicians playing with perceived good posture still admitted to experiencing playing-related pain. “It could be, poor posture... if you are hunched over a bit... but... people with perfectly good posture still... get playing-related pain” (Melinda, SEM 8).

Some students identified that they were more likely to experience what they perceived as being posture-related pain during their individual practice. For instance, at one point violinist Steve stated that the perception of others watching him play forced him to pay more attention to his posture in public situations. As a result he perceived that he would experience less pain regardless of whether he was sitting down or standing up.

Violist Robert also said that at times he was more likely to experience pain during “intense” private practice. In his case he would get increasingly involved in the music and adopt a hunched over posture, leaning into the stand. Robert’s perceptions are in line with those reported by Wilson et al. (2014) who similarly found that musicians perceived factors including hunched posture as contributing to PRMDs (p. 684); and Wood (2014), who suggested that students who were immersed in the music were less likely to be paying attention to aspects such as posture (pp. 40-41).

As already discussed in *Chapter 5: Orchestra* and *Chapter 6: Practice*, the majority of students (including Steve and Robert at other times) were also able to specifically identify experiencing more pain when sitting whilst playing during Orchestra. “If it is, something that I'm really getting involved with... I'm really intense and I'm... getting too close to the stand... playing stuff, and I will be using the most awful posture” (Robert, SEM 4).

Some students in this research project had the perception that they could be reprimanded in Orchestra if they did not maintain a straight, upright posture at all times. As already highlighted in *Chapter 5: Orchestra*, violinist Liam, who was only enrolled in the Bachelor of Music program for one year, stated that he was publicly chastised by the conductor for sitting back in his chair during rest periods on several occasions. This student suffered from scoliosis and sitting back in his chair (and stretching) were two of the strategies he used to ease his pain. Many other students also perceived that the conductor would publicly reprimand them if they did not sit up straight or stretched during rehearsals.

Violinist Leah also perceived that she must maintain an upright posture during Orchestra rehearsals. Like Liam, she suffered from scoliosis and increased pain whilst playing sitting down. However in her case she discussed the issue with her Major Study teacher. The teacher advised that it was okay for her to sit back and relax when appropriate and, after the student started doing this she noticed that she was experiencing much less pain during rehearsals. (She too withdrew from the Bachelor of Music program soon after changing her approach. As a result it is unknown whether she was able to continue doing this without reprimand.) “In Orchestra... it still hurt... but

then... my teacher said ‘if you want to lean back [you can]’ ... I found that helped a lot” (Leah, SEM 2).

Some students perceived that certain items of clothing and shoes forced them to modify their posture and that this could have an effect on the amount of playing-related pain they were experiencing. Violinist Jill found that heels or open shoes affected her balance, and as a result she would notice more pain in her back. “[I have] been working on balance a lot... and, I haven't really felt anything... [Also] I've been wearing, proper shoes” (Jill, SEM 5). Later on she also reported that wearing really tight pants that pushed the pelvis forward had a similar effect. While violinist Gary found that the restrictive properties of wearing a tuxedo when playing made him more likely to adopt a tense posture and therefore experience pain. “I find that I do experience a lot more pain if I have to wear suit and tails” (Gary, SEM 7).

Several students also commented that they found it beneficial to observe and monitor their posture whilst playing by practising in front of a mirror. Violinist Natalie said that using mirrors allowed her to see and correct any perceived unusual elements of her posture. Cellist Sam, who experimented with many different ideas in order to minimise his playing-related discomfort/pain throughout his program, also believed that his use of mirrors in the practice room was key to minimising his discomfort/pain. In his case he listed this as one of the main reasons why he experienced less pain whilst practising as opposed to performing and playing in other venues.

Thematic Summary

Again in this section the primary theme of *Cultural beliefs* and its secondary themes *teacher/conductor as authority figure* and *conformity* feature strongly. To an extent the *Cultural beliefs* about acceptable posture are based on observed

conductor/teacher/student interaction. There is a perceived assumption in the orchestral environment that students who are not sitting up straight at all times are not paying attention. This is not true but, as a result, students experience additional *Stress/anxiety* and are afraid to relax and sit back for *fear* of public criticism. Note again the perceived *Lack of control* in this learning environment and the interactive nature of the primary themes.

The potential differences in student outcomes depending on aspects of *Self-efficacy* are also apparent. To consider a few specific examples, Robert's lack of *mindfulness*, when combined with his *perfectionism* and *motivation* to practice/play see him entirely focused on musical goals. Although there is awareness that he experiences discomfort/pain in certain playing situations he is unaware of posture and pain in the moment. His poor *time management* skills and *Priorities* also mean he struggles to take precautions perceived as limiting discomfort/pain such as warming-up before and taking breaks during practice.

On the other hand violinist Jill uses self-awareness and *mindfulness* to notice postural factors aggravating her pain in the moment and make adjustments. She learns from past experiences and uses forward planning to minimise future discomfort/pain. Similarly Leah actually asks her teacher about posture in the orchestra environment. Through proactivity she learns her assumptions about posture were leading to misunderstanding and ultimately more pain. She implements a change and notices a marked decrease in pain in that particular situation.

Instrument Set-Up

Factors of instrument set-up have been perceived by Icelandic music students (Árnason et al., 2014, p. 79) and Australian professional orchestral musicians

(Ackermann et al., 2012, p. 186) as impacting on their PRMDs. Fourteen of the 29 students in this research who completed their Bachelor of Music program (Susie, Caitlin, Cassie, Tom, Wendy, Julie, Mark, Anna, Rachel, David, Steve, Melissa, Natalie, and Sally) also came to perceive a link between their playing-related discomfort/pain and certain elements of their instrument set-up. They noted that these in turn could affect their playing posture and technique.

The most commonly mentioned aspects of set-up mentioned by students in this research were violinists'/violists' shoulder rests and chinrests (Susie, Caitlin, Cassie, Anna, Rachel, David, Steve, Melissa, Natalie, and Sally). However the weight and size of the instrument/bow (Caitlin, Wendy, Anna, and Rachel), the height of the bridge (cellists Tom and Mark), and length of the spike (cellist Julie) were also mentioned. Similar factors were perceived as contributing to PRMDs in Wilson et al. (2014, pp. 684-685).

Several of the violinists in this research seemed quite fixated on the idea that their pain was the result of their instrument set-up. These students frequently changed their chin rests and shoulder rests, convinced each time that they had found the perfect solution. The most extreme examples of this tendency were Caitlin and Melissa. These two players were close friends and Melissa frequently referenced Caitlin (who presented as quite confident and opinionated in interview) as giving her advice. The following quotations show Melissa's changing opinion regarding the impact of various combinations of chin and shoulder rests on her playing-related pain. "I think I changed my, shoulder rest a little bit, and that... started it" (Melissa, SEM 3). "For a while it was my shoulders because of my shoulder rest but... only changed my shoulder rest last week and it's gotten, better, since then" (Melissa, SEM 5).

I've been having, some problems because... my shoulder rest... will need a more centred, chin rest... and at the moment I've got one that is a bit more, side-mounted... so I've got... a new one on order. (Melissa, SEM 8).

At one stage Caitlin tried playing without a shoulder rest at all. Several other students in this research also attempted playing this way, citing well-known violinists as their inspiration. However all the students in this research project who tried this approach eventually began using their shoulder rests again due to difficulties with pain and tension.

In a study of professional orchestral musicians Kaufman-Cohen and Ratzon (2011) found that the weight of musical instruments was significantly correlated with PRMDs (p. 92). Over time it became apparent that some students in this research were also having issues specific to the weight and size of their chosen instrument. This was particularly the case (but not restricted to) female viola students.

As already discussed in *Chapter 4: The Learning Environment*, Anna and Rachel experienced severe playing-related pain throughout their program. Both eventually purchased a smaller, lighter viola and found that they were able to resume playing with less pain. A small number of other violin and cello players also found that getting a new instrument helped them to decrease their discomfort/pain whilst playing.

I don't get as much back pain, as before... [my new viola] it's a lot smaller... my other one was 16 inch, my new one is... a 15 1/2, and it's not as wide... I got it... beginning of this year... after a certain period... it [the pain] might come back but, it's not as bad as before. (Rachel, SEM 3)

I have a smaller viola... a full inch smaller, and it's changed a lot... it's not as heavy... so I can hold it a lot easier, and... the amount of times I get neck pain is probably... halved. (Anna, SEM 7)

All three of the violin students who were required to play viola at some stage of their program also said that they experienced increased pain due to the increased weight and length of the instrument. In addition, Cassie and Leah perceived that the increased weight when carrying the instrument to and from the institution contributed to their pain. Their perceptions are in line with those reported by Williamon and Thompson (2006), who similarly found that music students believed that carrying their instrument impacted PRMDs (pp. 40-41).

Two of the cello students who experienced either an episode of or ongoing severe hand pain were also able to relate that pain to an element of their instrument set-up. In both cases they put a new, higher bridge onto their cello in order to increase sound production. Over time, as a result of the extra pressure being required from the finger in order to depress the string to the fingerboard, they began to experience increased pain in the left hand.

It is interesting to consider the different reactions of the two students upon realisation that it was the new bridge that was contributing to this increased pain. Cellist Tom, who suffered with ongoing severe pain for the duration of his program, initially put his old bridge back on his instrument. However during his third year, despite still experiencing severe pain, he chose to put on the high bridge again as his priority was to make a larger sound. That was the final questionnaire he completed as he withdrew from the Bachelor of Music program at the end of that year, reportedly due to severe hand pain.

Mark, on the other hand, abandoned the high bridge after some weeks of pain and realising that it was due to this change in his instrument set-up. He did not put it back on his cello, despite acknowledging the benefits with regards to a louder sound. Mark went on to report in successive interviews that his problem had resolved and that he was able to continue in his Bachelor of Music program with reportedly minimal playing-related discomfort/pain. The different outcomes for these two students at the conclusion of their program suggest the extent to which an individual's priorities and aspects of self-efficacy may impact on the development of playing-related pain and injury.

Thematic Summary

In this section the dominant primary themes are *Cultural beliefs* and *Self-efficacy*. There is a common underlying *Cultural belief* that discomfort/pain is caused by incorrect instrument set-up. There is a tendency for *conformity* (for example, students using the same equipment as their fellow musicians and teachers), and again the belief that teachers/other musicians are the ones to consult about ongoing health matters (*teacher/conductor as authority figure*). There is also potential for misunderstandings due to assumptions, inappropriate advice sought and lack of appropriate education (for both teachers and students).

The different outcomes depending on individual levels of *Self-efficacy* (such as adaptability, proactivity, self-responsibility, reflection and avoidance in various domains) are also striking. For example, when she experienced injury Rachel stopped playing, took less than 6 months to reassess her career options and promptly used her initiative to purchase a lighter viola. Likewise, when cellist Mark experienced pain due

to the height of his bridge, he was proactive, reassessed his *Priorities* (bigger sound versus less pain) and changed his bridge back within a matter of weeks.

On the other hand, violist Anna persisted through the pain for a period of three years before she was proactive and went to purchase a new instrument. Although after this she was able to resume her full-time study, she *suffered* considerably and experienced growing *Stress/anxiety* during that time. Similarly, Tom continued to persist with the higher bridge on his cello despite a similar previous experience. He was unable to reassess his *Priorities* and clung to the hope that his pain would resolve itself. He was subsequently unable to complete the optional fourth year of his Bachelor of Music program.

Tension

It was very common for students in this research to state upon coming in to their interview that they hadn't been experiencing any playing-related discomfort/pain. However on further questioning all revealed that they were suffering from what they referred to as tension that at times affected their technique and posture whilst playing. Most also admitted that at times, (depending upon a number of identified factors), this tension did actually develop into discomfort/pain.

Twenty-six of the 29 students (all except for cellists Mary, Erin, and Chris) believed that tension was a major cause of playing-related discomfort/pain among musicians. Their perceptions are in line with those reported by Ackermann and Adams (2004, p. 673); Ackermann et al. (2012, p. 186); Árnason et al. (2014, p. 79); Wilson et al. (2014, p. 684); Wood (2014, p. 42); and Zaza et al. (1998, p. 2018), who similarly found that musicians perceived excess tension as being linked to PRMDs; Davies and Mangion (2002), who showed that excess muscle tension was correlated with increased

musculoskeletal pain/symptoms (p. 161); and Kaneko et al. (2005), who found a statistically significant correlation between tension and pain in professional orchestral musicians (p. 171).

During Focus Group 1 cellist Wendy said that she had observed that many of her fellow cello students had a problem specifically with tension in their shoulders. She believed that the instinct of the cellist was to tense and raise the shoulders when playing something hard or loud, and that this could impact on technique and increase discomfort/pain. This was a common observation across all participants with several violinists also perceiving that they tightened and raised their shoulders when playing difficult repertoire. “A lot of [Teacher D]’s students... [become] tense in our shoulders... when, something’s a bit hard... because... a lot of the, power comes from your shoulders” (Wendy, Focus Group 1).

Other factors mentioned by students in this research project as increasing tension and affecting technique included long sustained bowing, lengthy repertoire with infrequent breaks, sustained vigorous techniques such as tremolo, and playing in high positions. As already noted in *Chapter 5: Orchestra* many of these factors were especially pertinent during Orchestra rehearsals.

Some students in this research project appeared to accept that a certain amount of tension was just the normal state of being for them. Susie, Sam, Anna, and Steve frequently commented that they were anxious people who generally held a lot of tension in their bodies. As a result their perception was that it was normal for them to have a degree of tension whilst they played their instruments. They all claimed to suffer from a significant amount of playing-related discomfort/pain. “I am a very, high anxiety person

so, I, tend to hold all my tension, physically in my body as well as mentally” (Steve, SEM 8).

Some research participants said they viewed any tension whilst playing as an indication that something was wrong. Mark and Gary believed that playing-related pain and injury occurred when people did not pay attention to stiffness in their bodies. Although at times they did suffer from some stiffness and tension whilst playing they claimed that they actively worked to adjust technique and posture accordingly. For the most part both claimed to suffer from minimal discomfort/pain whilst playing their instruments. “I think, the key to playing is always just, trying to be as relaxed as you can” (Gary, SEM 4).

Beyond those students who claimed to suffer from significant generalised anxiety, many more of them also admitted to suffering from heightened anxiety before concerts, exams, and competitions. A common experience was that an increase in physical tension due to anxiety could affect technique and posture and lead to increased discomfort/pain whilst playing. Generally students found that the more they played when nervous, the worse the pain became. For example, cellist Sam found that he became extremely nervous and anxious in any situation where he perceived that there was pressure on him to do well. This included when having to play or perform on his instrument in front of others. At times he reported that his muscles became so tense that he was literally unable to move them. This was extremely painful for him and restricted his playing. “Gets... so hard... [raps fingers on the table], like that... and then so tense, and I can't sometimes play anything, because... my muscle is like so tensed up” (Sam, SEM 6).

However some students had the opposite experience. Another cellist, Brad, said that at times he actually relaxed as he continued to play. Others also commented on a perceived tendency to become used to a certain amount of tension and resulting discomfort/pain over time. Once again, the perceptions and experiences of similar situations varied greatly between individuals.

Thematic Summary

The dominant primary themes recurring in this section are *Stress/anxiety* and *Self-efficacy*. Students perceive a direct relationship between their levels of *Stress/anxiety* in any given situation, their level of tension, and the amount of discomfort/pain that they experience. Some students accept that they will experience a certain amount of discomfort/pain due to high levels of general *Stress/anxiety*, particularly in regards to playing in public (note the impact of *fear*, particularly in the case of cellist Sam). These students perceive increased *suffering* and *insecurity*.

It is interesting to consider the links between aspects of *Self-efficacy* such as *perfectionism* and *Stress/anxiety*, and the potential impacts of *motivation* and *mindfulness*. Students who expect to experience tension such as Steve and Susie may not be challenging it by being proactive and taking self-responsibility. On the other hand, Gary and Mark are self-aware and show adaptability by using reflection whilst playing to make changes and decrease tension. The different outcomes in terms of pain experienced between the two groups of students is striking.

To a lesser extent the primary themes of *Cultural beliefs* and *Lack of control* also feature in this section. Examples of underlying *Cultural beliefs* include that tension is a major cause of discomfort/pain (uncritical acceptance); and that it is normal to experience tension when playing more difficult repertoire (assumptions). As in the

orchestra and practice chapters, students also perceive that a *Lack of control* over aspects of repertoire that are compulsory under *academic requirements* can impact on tension and ultimately discomfort/pain.

Conclusion

The primary theme of *Cultural beliefs* and secondary themes *teacher/conductor as authority figures* and *conformity* have featured strongly throughout this chapter. It is concerning that the uncritical acceptance of certain techniques and use of mimicry as a learning tool continues to recur, despite students claiming to believe that technique is unique to the individual. There is an underlying assumption that students who conform to the cultural norm experience less discomfort/pain. However this assumption is unrealistic, and may be leading to misunderstanding, given there appears to be limited open discussion of the topic of pain and injury in the learning environment.

As in the practice chapter, the primary theme of *Self-efficacy* and secondary themes of *motivation*, *mindfulness*, *perfectionism* and *time management* have also featured. Those students who challenged their thinking and questioned the presence of tension seemed to use proactivity, self-responsibility, and reflection to manage their discomfort/pain more efficiently. However those students who accepted that they would experience pain as a result of their increased tension and *Stress/anxiety* without question generally had a less positive outcome.

Students also continued to perceive a general *Lack of control* over *playing time*, *academic requirements* and *environmental conditions* as impacting on their discomfort/pain. Although not as prominent in this chapter, this was particularly evident when considering the effect of equipment provided (such as chairs and stands) and repertoire selection in orchestral environments. *Stress/anxiety* and its secondary

themes of *fear*, *suffering* and *insecurity* have also featured, particularly in the section concerning the perceived impact of tension on playing-related pain. Overarching themes of *Inconsistency*, *Discontent* and *Priorities* are also evident.

A recurring feature in this research is the interaction of multiple complex influencing factors alongside overlapping thematic divisions. This is further compounded when the terminology itself, namely the word *technique*, is used loosely. The way that the students in this research used this word (i.e. to cover a diverse range of aspects of playing) once again highlights the individuality and subjectivity of their response. This is a major methodological challenge for research of this kind.

Chapter 8: Other Influencing Factors

Introduction

As was also the case in Barton et al. (2008, p. 72) and Stanek et al. (2017, p. 23), students in this research perceived a range of additional outside factors could influence their playing-related discomfort/pain. Factors identified included (but were not limited to) physical exercise, outside work, carrying items, sleeping position, general day-to-day activities, pre-existing medical conditions, psychological health, and personality. Many students perceived that multiple general and everyday activities had the potential to aggravate pain in affected areas.

Due to the unique and constantly changing life circumstances of each individual it became quite difficult to generalise these other influencing factors over the whole sample. Despite this, there were some general and specific trends that emerged. For example, the majority of students believed that their playing-related pain was affected in some manner by their psychological health; and, as a specific point, a small number of students perceived that travelling long distances to the university was aggravating their pain.

In some cases a student was aware of and immediately drew attention to the perceived influences. However for other students it was a process of prompted self-discovery through the ongoing pain questionnaire/interviews. The purpose of this section is to examine the variety of perceived impacts regarding other influences and consider their relevance to the emerging themes.

Exercise and Diet

Baadjou et al. (2015) found that 62% of tertiary music students claimed to undertake moderate intensity activity for 30 minutes 5 days a week (p. 233). Similarly, Hagglund (1996) reported that 73-89% regularly participated in physical activity (p. 103); Wood (2014) that 60.4 % participated in some form of aerobic exercise (p. 40); and Zaza (1992) that 58% exercised on a regular basis (p. 48). The majority of tertiary music students in this research project also reported participating in some form of physical exercise throughout their program.

Of the 29 students who completed their Bachelor of Music, eight students reported consistently exercising (Caitlin, Wendy, Julie, Chris, David, Gary, Robyn, and Robert) with a further 18 (all remaining students except for Sam, Brad, and Melinda) going through periods of regular exercise. The most commonly reported types of exercise that students in this research were undertaking included walking, “cardio”, and weights. Students also claimed to be taking part in a variety of other physical activities including swimming, bodybuilding, personal training, running, cycling, yoga, football, squash, kayaking, and “body pump” (vigorous aerobics).

There appeared to be a general perception among participants in this research that being physically active would bring general health benefits as well as inadvertently help to decrease playing-related pain. Similar perceptions in tertiary and/or professional musician populations have been reported by Ackermann et al. (2012, p. 186); Chan et al. (2014, pp. 184-185); Ioannou and Altenmüller (2015, p. 137); Lonsdale, Laasko, & Tomlinson (2014, p. 159); Ioannou et al. (2018, p. 33); Perkins et al. (2017, pp. 5-6 of 15); and Williamon and Thompson (2006, p. 419). However Baadjou et al. (2015, p. 231) and Brandfonbrener (2009, p. 32) found no correlation between physical activity

and musculoskeletal complaints in tertiary music students; Kochem and Silva (2017) found no link between physical activity and PRMDs in a study of Brazilian violinists (p. 30); and Kenny and Ackermann (2015) found that undertaking physical exercise in any form (whether yoga, swimming, running, or gym classes) did not decrease the risk of PRMDs among professional musicians (p. 54).

As was found to be the case in a study of 23 professional orchestra musicians by Andersen, Mann, Juul-Kristensen, and Sjøgaard (2017, p. 94), some students in this research perceived that the exercise they were undertaking was aggravating their playing-related pain. Many others also perceived that their playing-related pain might not have actually decreased, rather that they had just increased their pain tolerance. Nine of the 26 physically active students (Susie, Tim, Jill, Caitlin, Cassie, Tom, Chris, Natalie, and Robert) in this research specifically stated that they were experiencing discomfort/pain as a result of their exercising. They all perceived that this discomfort/pain transferred over to when they were playing their instruments.

The students who reported that pain transferred from exercise to playing their instrument were all participating in some kind of exercise to build upper body strength such as weights, “gym”, bodybuilding, and personal training. Their perceptions are in contrast to Andersen et al. (2017), who found that those undertaking strength training noticed a significant decrease in pain, and those doing general aerobic training noticed no difference in pain levels (p. 94). They would also seem to be at odds with Baadjou et al. (2015, p. 231) and Brandfonbrener (2009, p. 32), who found no correlation between physical activity and musculoskeletal complaints in tertiary music students.

Four of the female violinists – Susie, Jill, Caitlin, and Cassie – participated at some stage of their program in intensive personal training and/or bodybuilding. Initially

all four were adamant that this intensive training was helping to reduce their playing-related discomfort/pain as it increased their general tolerance of pain. Susie and Cassie reported implementing the strategy of pushing through their pain during exercise with their practising (“no pain, no gain”). However, after a few months, both abandoned or cut back the personal training/bodybuilding, opting instead to focus on less strenuous forms of exercise. In the case of Susie she reported this was because she was in so much pain after a session that she was unable to move certain body parts for up to three days. Susie was in fact prone to changing her mind about the benefits of different types of exercise, as the following quotations demonstrate: “I joined a gym... and I do... weights... to... build up the muscles... definitely I can play for longer now” (Susie, SEM 3). “Yoga and Pilates are really good, for pain” (Susie, SEM 4). “It's [personal training] given me a lot more energy, and... the ability to actually want to do stuff” (Susie, SEM 6). “I, used to be in so much pain after PT [personal training]... [but] Body Balance... is helping” (Susie, SEM 8).

Caitlin and Cassie also said that they had to adjust their exercise regimes due to pain. By the end of their programs both were consciously choosing not to do an intense workout on days when they had to do long hours of playing. The following quotations show how Caitlin's attitudes to such matters changed across her final year. “Personal training has helped me... getting in general more strength in my lower back too and everything” (Caitlin, SEM 7).

I, actually find some days I don't like to exercise because I don't like to make my body sore before playing... I find that... especially if I haven't been doing it in a while I'll select which days I don't think I'm going to have as many rehearsals.
(Caitlin, SEM 8)

Tom and Robert also felt that their physical exercise was aggravating their playing-related pain (although they continued on with it regardless). Both these students suffered from ongoing upper body pain and eventual injury for the duration of their program, and both reported a tendency to both practise and exercise for long periods. At different stages Tom reported exercising for around 20 hours a week and practising up to seven hours a day, and at times Robert was doing nearly as many hours. Tom and Robert also went through periods where they either stopped exercising completely or greatly reduced the hours because of other commitments. The result was that they had sudden and sporadic increases in exercise. Tom became certain that his exercise was affecting his pain, as the following quotations show: “It... fluctuates, I noticed that because of the gym, the extra strenuous work... it causes more pain” (Tom, SEM 4). “It's obvious that it [the exercise] is affecting it... if it's kept in moderation I suppose you can avoid, causing too much” (Tom, SEM 6).

Robert asked various teachers and doctors specifically whether his pain was related to his exercise and whether he should continue with it. He was subsequently advised by two different General Practitioners that they saw no issue with him exercising while various music teachers advised that they simply did not know. “A couple of GPs advised that it was good... as long as I was doing it properly...and with good postural exercise that I do, weight training” (Robert, SEM 7).

[MW: “... Do you find that [the exercise] has any influence over the pain?”] I’m not entirely sure... I’ve thought about it quite often... and I’ve asked my teachers as well... and... they haven't really met... my questionings with any... conclusive result. (Robert, SEM 8)

There was another male student in this research project who also reported being very physically active and acknowledged his compulsive tendencies. Violist David exercised several hours a week yet reported relatively minor experiences of playing-related discomfort/pain throughout his program. His exercise of choice was long distance running, an endurance activity that generally did not overwork the muscles he was using when playing. David participated in Focus Group 2, during which the topic of exercise was discussed in some detail. He stated the perception that exercising was like a compulsion to him, and that if he wasn't playing music, he was exercising.

Only a handful of studies have explored the effects of exercise on musicians experiencing pain and injury. Chan et al. (2014) showed that a tailored exercise intervention program for musicians can be effective in reducing the frequency and severity of PRMDs (p. 181). However, in their study the exercise intervention involved a gradual increase from low level to high-intensity exercise, in conjunction with warm-ups and cool-downs, as opposed to the sudden and abrupt increases in frequency/intensity reported by John, Tom, and Robert. The previously discussed study by Andersen et al. (2017) found that strength training was more beneficial than endurance training in reducing pain among 23 professional orchestral musicians (p.94); and in a similarly sized study of string players Lundborg and Grooten (2018) found that resistance training was beneficial (p. 102). However in a study of undergraduate music students Ackermann et al. (2002) found that endurance training was more beneficial (p. 40).

Many other students in this research project were also participating in physical exercise, however it was generally less intense and not as frequent as that reported by Tom, Robert, and John. Several violin and viola students in this research project

perceived that gentle exercise in the form of classes such as Yoga, Pilates, Body Balance, and Alexander Technique were beneficial in helping to reduce playing-related discomfort/pain. This aligns with a recent study of college music students by Stanek et al. (2017), where 41.8% were found to use yoga and 22.8% Alexander Technique as a means of reducing relaxation, regardless of pain experiences (p. 23). In many cases the students in this research were introduced to these forms of exercise through specific workshops held by one of the Major Study teachers, who appeared to advocate for her students to undertake these types of activities.

Several students (including Susie and Cassie, discussed previously) tried various different forms of exercise and concluded that a less strenuous exercise regime was more beneficial in terms of reducing their pain levels. Cassie also became increasingly interested in what she called a “holistic” approach to health as she progressed through her Bachelor of Music program. In her opinion this involved not only regular exercise, but also a healthy diet, and looking after her mind by working to reduce stress.

I think it's good for your, mentality as well [exercise and healthy diet]... if your physical, is healthy, then it will... make playing easier as well, so that you can, be relaxed, in your mind and relaxed in your playing. (Cassie, SEM 5)

I think, it's important that you do drink a lot of water... to refresh your mind when you are practising and... also rejuvenate your muscles. (Cassie, SEM 6)

Several other students in this research who were focused on physical fitness and exercise were also concerned with their diet. During Focus Group 1, Susie, Tim, and Wendy revealed that they believed that diet was just as important as exercise when it came to preventing playing-related discomfort/pain. In interviews Tom talked in detail about the benefits of eating fruit and vegetables and Tim stated that a combination of

regular exercise, healthy diet, and adequate water intake was improving his stamina whilst playing. The students' perceptions align with those reported by Kreutz et al. (2008), who found that higher nutrition scores were significantly correlated with improved practice and performance and that healthy lifestyles were found to be positively correlated with present health status in tertiary music students (p. 7).

However the most surprising perceived link between diet and playing-related pain was proposed by cellist Wendy. Early in the fourth year of her program she reported that she had had an episode of recurring discomfort/pain in both her thumbs. She discussed it with her Major Study teacher who was of the opinion that she must have increased the amount of playing/practising she was doing. However Wendy said that this wasn't the case.

About, five or six weeks ago... I just, started getting pain... in both hands... I talked to [Teacher D] about it, and he was like... "You've probably just been playing too much". But... I hadn't been doing any differently, it wasn't like I suddenly just started doing like 4 hours more playing a day. (Wendy, SEM 8)

When she sought treatment for this pain in the form of Acupuncture she was advised by the practitioner that her pain was actually due to a lack of protein in her diet. Wendy attended two sessions of Acupuncture and modified her diet to include more protein. She thereafter reported that her pain had disappeared.

I went to get Acupuncture on it... and... she, thought it wasn't to do with playing at all... she said I need to eat more protein which is, true, and ever since then... I have been eating more protein and it has been fine. (Wendy, SEM 8)

Wendy later admitted that the experience occurred around the time of her audition for a national orchestral program and while she was participating in a block of

Orchestra rehearsals. This suggests that Teacher D may have been at least partially correct when he originally linked the pain to increased playing. “On the Monday I was supposed to have my... audition and I could hardly practise before because my hands were really sore, [but] I still did the audition” (Wendy, SEM 8).

A few days before, it actually started, we had the Brahms concert... for Chamber Orchestra... from about halfway through the third movement, to the end of the piece, my right hand cramped up, and by the end... it [had] just... clamped on. (Wendy, SEM 8)

Unfortunately for this research, Wendy's experience occurred in the final semester of her program. As such it is unknown whether acupuncture and additional protein would have worked as long-term solutions for her. As highlighted previously, there were many instances where students thought that they had found ways of minimising their pain only to later discover that the strategy was only effective for a short period of time.

Thematic Summary

This chapter section shows the extent to which aspects of *Self-efficacy* may impact on students behaviours and, ultimately, the amount of pain experienced. Caitlin and Cassie use *mindfulness* and *motivation* in a positive manner. Through their use of self-awareness and reflection they realise that something in their exercise routine is aggravating pain. These students then demonstrate adaptability with their exercise routines and accordingly notice a decrease in pain. It is striking to note the similarities between Cassie's adaptable approaches to both exercise and diet.

Robert and Tom also display some *mindfulness* in that they are aware and questioning whether their exercise routine is impacting on their pain. However their

lack of both adaptability and proactivity sees them continue with their exercise routines unchanged. There appear to be obsessive tendencies and compulsiveness underlying their approaches to exercise. They also display poor *time management* skills and seem to have unrealistic expectations as to what their bodies can handle in terms of exercise and practice. The similarities between their approaches to exercise, practice, and, in Tom's case, diet, are interesting.

The primary theme of *Cultural beliefs* also features in this section. Students clearly see the *teacher/conductor as an authority figure* and place importance on *conforming* to the perceived cultural norms. There is an underlying *Cultural belief* that being physical fit will help to decrease discomfort/pain but again a general lack of appropriate knowledge as to whether this is actually the case (assumptions, misunderstanding). There is a tendency for students to seek inappropriate advice, for example, Robert consulting teachers and doctors about exercise when he should be talking to someone with more specific knowledge. There also appears to be an underlying *Cultural belief* and expectation that teachers will be able to answer questions outside of their expertise (unrealistic expectations).

Sports Injuries

In a study of musicians presenting at a hand clinic over a 15 year period, Dawson (2007) found that sports were the most common cause of injury among musicians aged 10 to 40 years (p. 105). It is arguable whether or not two of the students in this research, Tom and Robert, (already identified as heavy exercisers in the previous section), were also suffering from playing-related or sports injuries. Both acknowledged that their injuries were a result of cumulative stress and overwork in particular areas of

the body and both went through stages where they believed that their pain was at least partially due to their exercise routine.

There were also two other students in this research project who decisively claimed that they had suffered from a severe sports-related injury. Both these students perceived that this injury greatly impacted on their ability to play their instruments. The first such case is cellist Chris, who tore ligaments in his left hand as a result of a football injury several months prior to his studies at the institution. The injury was reportedly very severe, requiring months of intense physiotherapy that was ongoing during the early stages of his program.

Chris perceived a gradual decrease in pain in the area over the years. However he also claimed to be unsure whether or not the pain had decreased or he had simply become used to it. He acknowledged having an extremely high pain tolerance as he had had numerous dislocations of various body parts due to his participation in sports, as the following quotations demonstrate. “I'm playing football again... so, nothing bad, just... popped finger out, and... a couple of sore legs but apart from that” (Chris, SEM 3). “I've been in worse [pain]. It wasn't that bad” (Chris, SEM 4).

Chris's experience of injury prior to his tertiary studies may not be unusual. Kreutz et al. (2008) found that 38% of tertiary music students had experienced an injury prior to starting college that left them unable to play for at least three months (p. 10). Kaufman-Cohen and Ratzon (2011) also reported that sporting activities and hobbies were significantly correlated with PRMDs in professional orchestral musicians (p. 92). However Brandfonbrener (2009) did not find a high incidence of sports-related injury in her study of tertiary music students (p. 32).

Violinist John also reportedly suffered an exercise-related injury, in his case during the second year of his program. During interview he claimed that x-rays had shown an Impingement Syndrome in his left shoulder. He believed that this injury initially occurred as a result of lifting too much weight at the gym. However he also revealed that, in the weeks immediately prior to the initial pain, he had greatly increased the amount of violin practice he was doing. He went on to say that, despite being advised otherwise, he continued playing and practising long hours each day after the initial pain occurred until he reached the stage where he couldn't lift his arm at all. It was only then that he had an x-ray and the full extent of damage was revealed.

At a gym... I did something and it's called an Impingement Syndrome... I can still play... but... it was... 4 or 6 weeks that I had to... not play and let it rest... the week before that's when I first started to do 5 hours and I hurt my shoulder and the next week I was doing 5 hours a day plus all the Orchestra rehearsals... and... I just really over did it... I couldn't move it past here because it would just hurt so much. (John, SEM 4)

Hagglund (1996) reported that 59% of injured Boston University music students resumed their normal practice routines immediately after time off for injury (p. 102). In both cases the students in this research also continued playing their instruments. For John, the consequences were severe in that he had to stop playing for a period of time. Unfortunately, he withdrew from the Bachelor of Music program shortly after his injury for other reasons and, as a result, his eventual outcome is unknown.

Chris was also advised to stop playing completely for an extended period of time in order to let his injury heal, in his case this was shortly before his scheduled audition for the institution. At the time Chris was certain that he wanted to study cello and so he

made a conscious decision to proceed with the audition. On reflection he stated that he didn't think that continuing to practise made his injury worse but acknowledged that it did slow the healing process. He revealed that he was concerned about the long-term outcome for his hand but said he had no regrets, as at that time music was what he wanted to do as his career.

Thematic Summary

Again the primary theme recurring in this section is *Self-efficacy* and its secondary themes *motivation*, *mindfulness*, *perfectionism* and *time management*. John and Chris are highly *motivated* to continue playing to achieve short-term musical goals. However both students show a lack of *mindfulness* (adaptability, self-awareness and reflection) in continuing to practice after their diagnoses. John's compulsive approach to exercise and practice also suggest obsessive tendencies and poor *time management skills*.

Outside Work

All but one of the students (Julie) in this research who completed their Bachelor of Music program reportedly participated in paid employment for at least some of that time. Fifteen were working consistently throughout their program, with a further 13 working at some stage. At the time of each research interview 12 of the 28 workers (Tim, Jack, Robyn, Tina, Melinda, Gary, Rachel, Anna, Mark, Brad, Sam, and Erin) said that they had not been experiencing any discomfort/pain as a result of employment. However of the remaining 16, nine students (Susie, Mary, Steve, Melissa, Sally, Robert, Donna, David, and Chris) stated that they were regularly experiencing pain whilst at work, and a further seven (Caitlin, Jill, Cassie, Tom, Wendy, Natalie, and Felicity) reported experiencing pain sporadically.

Over time it became increasingly clear that many of the students were working sporadically long hours in multiple avenues of employment. Jobs included (but were not limited to) busking, teaching, “gigs”, sales, disability care, child care, waiting on tables, cleaning, driving in various capacities, and administration. As was also the case of orchestral musicians in Kaneko et al. (2005, p. 171), some students were sporadically working in up to three or four different jobs requiring repetitious and/or hand intense activity. Significantly, most in this research also claimed to be sporadically increasing their instrumental practice and physical exercise depending on factors such as time and motivation.

All of the identified 16 students who were experiencing sporadic or regular discomfort/pain whilst working were also regularly experiencing discomfort/pain when playing their instruments. Fifteen of them (all except for Felicity) also claimed that at least one other daily activity was being affected by general discomfort/pain. 11 students (Susie, Mary, Caitlin, Cassie, Wendy, Steve, Melissa, Natalie, Donna, Sally, and Robert) claimed that the discomfort/pain that they experienced as a result of working had the potential to impact in some way on their playing. Their experiences are in line with Dawson (2001), who found that many musicians presenting at a clinic perceived that the symptoms they were experiencing had been primarily caused by non-musical employment (p. 69).

For some students working involved playing their instrument for additional hours. It is therefore unsurprising that they perceived that this work was aggravating their playing-related discomfort/pain. Robert and John (who is not included in the 29 students as he did not complete his program due to injury) were two such cases. Both were earning extra money by busking on various instruments and worked additional

jobs. (Robert also worked in a band, whilst John was a waiter.) Significantly, both these male students have already been identified as experiencing severe playing-related pain influenced by their physical exercise. “Carrying plates... I think that could have contributed to the pain in my right hand because... I'm left-handed, so... I grab the plates and then stack it all up on my right hand” (John, SEM 2).

Susie, Mary, and Donna also claimed that their discomfort/pain was aggravated during their work as instrumental teachers. In order to decrease their general pain Susie and Donna adapted and stopped playing their instruments in lesson situations. However Mary reportedly persisted in playing during lessons and towards the end of her program was experiencing constant pain in the affected area.

I find it really hurts to teach because... the kids [are] smaller than you are and you have to... bend over... to fix the fingering... after, the first two students, it just hurts so much that, I lose my concentration and get really frustrated with the other ones because it just hurts. (Mary, SEM 6)

Several other students whose work involved playing their instruments for additional hours in chamber music combinations also identified that this kind of work could increase pain.

Well the thing with gigs is, you can't take a break very often... and it depends on who you're working with... I did a gig once... and, it was three hours, without a break, and I was absolutely exhausted by the end of it. (Steve, SEM 6)

In a study of tertiary trained jazz pianists Wood (2014) similarly found that some perceived that gig working conditions could influence the severity of PRMDs (p. 40).

Some of those who were working in shop assistant roles also noticed pain whilst working. For example violinists Melissa and Sally were required to stand for long periods of time and reported experiencing pain in the legs and back as a result. Sally said that she was experiencing similar pain in the back during Orchestra rehearsals when she had to stand up: “Sometimes I get a little bit sore [during Divertimenti]... from standing like in the lower back... like I do from work... but not, too bad” (Sally, SEM 7). Jill, Mark, and Melissa also believed that the dress code required in certain sales jobs (such as restrictive suits, high heel shoes, or joggers) could cause pain:

Jill: “Standing up... in retail for hours and hours...”

Mark: “... That is quite a concern...”

Jill: “... [And] there are companies that make it compulsory for girls to wear heels...”

Mark: “... Yeah and that is also really bad... even some men’s shoes can... cause pain [laughter] no I am serious... if you are wearing a suit and tails all day as well, that can be painful.” (Focus Group 2)

Over time it became clear that there was a tendency for students whose work involved lifting or other strenuous physical activity to experience some discomfort/pain as well. Chris, whose work in a hardware store involved the lifting of heavy boxes, and Wendy, a disability carer, both reported experiencing back pain.

I work with children with disabilities, so I take them out and, do things with them to give their parents a break... one girl... she is in a wheelchair and... she can walk... but you have support her... [And] when she sits in the chair you have to go behind her and... pull her back... I've noticed, that, sometimes gives me a bit of pain and also getting her chair in and out of my car. (Wendy, SEM 7)

Susie, who was at that time employed at McDonald's, experienced discomfort/pain as a result of lifting boxes. She revealed that the policy at the time was for workers to lift boxes of food supplies weighing around 10 kg. In her case she asked to be transferred into the cafe section so that she would no longer have to do this. "I work at McDonald's... in the morning... that involves heavy lifting... I'm about to go into café which means I won't, need to do that so that's all right... I've told them that I can't lift" (Susie, SEM 4).

Significantly, Susie suffered from ongoing issues of pain and injury in the wrists and elbows. As was also the case of injured tertiary music students in Park et al. (2007, p. 92), she tried to monitor her activities at work in order to minimise her playing-related pain. She changed jobs several times in an attempt to minimise her discomfort/pain however with each job change she would find that there were new tasks that were aggravating her discomfort/pain. The unique circumstances of this student are discussed further in the following sections.

Thematic Summary

Once again in this section the primary theme of *Self-efficacy* and its secondary themes of *motivation*, *mindfulness*, *perfectionism* and *time management* feature strongly. Many students display poor *time management* skills and continue to juggle several jobs, some of which aggravate pain. These students tend not to regulate their practice routines and appear to have unrealistic expectations as to what their bodies can handle in terms of practice and work. Note the tendency to avoid dealing with the relevant issues and the influence of individual *Priorities* on student behaviour and outcomes.

The potential influence of *mindfulness* skills, in particular adaptability, on student outcomes is also clear. Susie and Donna are able to make changes to their teaching methods in order to reduce pain. However Mary displays a lack of flexibility and reflection by continuing regardless and John and Robert choose to undertake increasing amounts of work despite it aggravating their pain. The students' behaviours suggest a lack of *mindfulness*, obsessive tendencies and compulsiveness.

Day-to-Day Activities

Researchers including Barton et al. (2008, pp. 74-75); Dawson (2001, p. 69); Paarup et al. (2011, p. 1 of 14); Ranelli (2014, p. 102); and Stanek et al. (2017, p. 23) have reported a link between every day activities and playing-related pain/injury in musicians of various ages. It is clear that many students in this research also perceived that their playing-related discomfort/pain was being aggravated by activities such as physical exercise, employment, and computer use. The most commonly mentioned day-to-day activity in this respect was sleeping position, followed by carrying items, lifting, travelling, and housework.

Sleeping

Kaneko et al. (2005) reported that professional musicians with a sleeping disorder were 4.5 times more likely to experience pain (p. 169). Similarly, Kreutz et al. (2008) found a high prevalence of non-musculoskeletal complaints including sleep disturbance in musician populations (p. 6); and Paarup et al. (2011) found that 49% of orchestral musicians experienced difficulty in sleeping due to playing-related musculoskeletal symptoms (p. 1 of 14). 16 students in this research who completed their Bachelor of Music program (Susie, Jill, Caitlin, Cassie, Wendy, Mary, Julie, Mark, Chris, Anna, Steve, Melissa, Natalie, Sally, Robyn, and Robert) also claimed that they

could relate at least one occurrence of discomfort/pain to their sleeping position. As was the case in Kreutz et al (2008, p. 6) and Paarup et al. (2011, pp. 8-9 of 14), a high proportion of those claiming to be affected (12 of the 16 students) were female.

Many of the affected students were unable to pinpoint whether their pain originated with sleeping or with other activities such as playing their instrument. Some of them were adamant that pain they were experiencing whilst playing was caused by their sleeping position. For example, cellists Julie, Mark, and Chris were able to relate experiences of discomfort/pain that transferred to playing as originating during sleep. It is interesting that the students perceived that they had no option but to continue playing and practising whilst this pain resolved. "I have to take the Panadol just for neck and back... I think it's that I didn't sleep well... it's more like the other thing affect my cello" (Julie, SEM 4).

My shoulder was giving me a bit of trouble a couple of weeks ago but that was completely unrelated to the cello... I think that came about because I just slept on it the wrong way... it did hurt a little bit but... I couldn't... not play because I had rehearsals and things and unfortunately that's often the way things are you've got to... put up with [it]. (Mark, SEM 6)

Similarly, Steve claimed to notice neck pain both when lying in bed and when waking up in the morning. As was also the case of some tertiary music students in Perkins et al. (2017, p. 5 of 15), he was one of several in this research who acknowledged the importance of regular and adequate sleep. However he was unsure whether this neck pain was caused by his sleeping position or that he was simply aware of it whilst and after lying down. Wendy and Sally also highlighted their pillows as

influencing pain and experimented with different heights and sleeping positions in order to minimise it.

Carrying and lifting items

Foxman and Burgel (2006) found that lifting or transporting musical and/or other equipment exacerbated soft tissue complaints in musicians (p. 312). Wood (2014, p. 42) and Williamon and Thompson (2006, p.424) also found that tertiary music students perceived that carrying heavy items contributed to PRMDs. Fifteen of the students in this research who completed their Bachelor of Music program (Susie, Cassie, Wendy, Mary, Erin, Anna, Steve, Melissa, Melinda, Natalie, Tina, Sally, Robyn, Jack, and Donna) similarly identified at some stage that their playing-related discomfort/pain was a result of or aggravated by carrying items. Significantly, once again the large majority of the affected students (13 of the 15) were female.

Fourteen of the students who identified experiencing pain whilst carrying items (all identified above except for Tina) specifically mentioned carrying their instruments as contributing to increased discomfort/pain. This was not concentrated across any one instrument type with similar proportions of violinists, violists, and cellists affected.

Cellists Wendy, Mary, Erin, and Jack reported that carrying their heavy instruments could aggravate back and shoulder pain. It is interesting to compare the different reactions and outcomes in each case. Erin adapted by rolling her case along the ground; Wendy actively tried to limit the amount of times that she was transporting her instrument between home and the institution; and Jack, who had two cellos, arranged to leave one at the institution and one at home. All three said that this helped to decrease their discomfort/pain. “When I used to carry the cello on my shoulder I also would get sore... that kind of twisted my back out... I had to stop doing that” (Erin, SEM 6).

When I carry it... my shoulders... really hurts... I try and leave it here as much as I can... and... I come in and practise on the weekends and, everyday... and if I have to take it home I, as much as possible drive, here and then drive home.

(Wendy, SEM 4)

On the other hand Mary, who acknowledged numerous times that her pain was aggravated by carrying her cello using the shoulder straps, continued to do so. By the end of her program this student was experiencing constant and disabling pain. "I carry my cello around a lot... and it's quite heavy, so... my shoulders have been hurting a lot" (Mary, SEM 5).

Of the violin students who identified carrying the instrument as causing discomfort/pain, three purchased a lighter violin case. Violinists Melissa, Sally, and Robyn actually identified the purchase of a new violin case, specifically the brand BAM, as helping them to decrease pain in general and when playing. "I got a new case, I got a BAM... very nice and comfortable... so... that shoulder has been fine" (Melissa, SEM 6).

I'm actually pretty good in the, whole, back thing now... I just got a new case, you know those BAM really light ones... and... it's pretty good... it weighs like nothing... so I feel I can just like carry it around whenever. (Robyn, SEM 5)

As discussed previously two female viola students also experienced difficulties with holding and carrying their viola. Anna and Rachel both purchased lighter violas and found that this helped to decrease their pain levels. Revealingly, Anna was one of several who identified the cumulative effect of having to carry an instrument with several bags of books on increased pain.

I do notice... coming to The Con with my, viola strapped on me and, my, new bag with my viola books, on one shoulder and, my handbag, usually is on the same shoulder... it... activates... the pain... in the sore spots. (Anna, SEM 7)

Several other students also identified that wearing backpacks or shoulder bags consistently over one shoulder only was contributing to pain in that area. In some instances students were able to identify this as contributing to pain in early stages of the research. For others it was an ongoing process of awareness as they participated in continuing interviews.

Some students were extremely inconsistent in consecutive and sometimes even the same interviews. For instance, Steve identified several times that carrying items was aggravating his pain. However in his final interview he said he had never thought about it and that he didn't think so. On reflection he went on to say that it would have been beneficial if we had talked about this earlier in his program when in actual fact we had discussed the issue, at times in detail, in the previous six meetings.

I think that [carrying items] may be part of it... because... I've got like a little, side bag that... I, used to wear it over one shoulder and I think I used to lift my shoulder to keep it on the shoulder so it would not fall off. (Steve, SEM 7)

[MW: "Do you find that carrying things can aggravate it, or not really?"] Never really thought about it. I don't think so. (Steve, SEM 8)

I wonder if having this kind of interaction would have been helpful earlier, because now you have reminded me... carrying heavy stuff over my shoulders... did have an effect. (Steve, SEM 8)

Seven students (David, Anna, Chris, Mary, Wendy, Tom, and Susie) also identified that they could experience discomfort/pain when having to lift heavy items.

Significantly, a higher proportion of these students were male. These particular male students did not identify experiencing pain whilst having to carry things but all were required to lift heavy items as part of paid employment.

Travelling

As was also the case in Williamon and Thompson (2006, p. 419) a number of the tertiary music students in this research project (eight female, one male) specifically identified commuting by public transport as having the potential to increase or prolong their discomfort/pain. Six of the affected students (Susie, Erin, Natalie, Anna, Leah, and Robert) claimed to be spending from two to five hours a day travelling whilst the remaining three (Wendy, Rachel, and Melissa) had a short commute.

Interestingly, Susie and Anna perceived that their pain as a result of travel was aggravated further by having to carry heavy items to the institution and the associated stress. “When I have to, carry my books, in my elbows... from [the train station]... I'm changing arms all the time because my elbows get really stiff... I've noticed” (Susie, SEM 8). “I hate... the train... makes me feel sick... that's part of my anxiety” (Susie, SEM 8).

Violinists Susie and Donna also claimed that their ability to drive a manual car was directly affected by their pain. Both these students developed lumps on their left hand at some stage of their program and had to be careful not to bump the affected area. Unfortunately for Susie, this specific injury was additional to the general pain that she experienced in other parts of the body as a result of travel.

House work

Kaufman-Cohen and Ratzon (2011) found a significant correlation between PRMDs and participation in household chores among orchestral musicians (p. 92). Four

of the female students in this research (Susie, Caitlin, Mary, and Donna) similarly identified that their discomfort/pain was aggravated by household activities such as cleaning and cooking. (Early in their programs Susie and Caitlin were also working as cleaners.) Caitlin was unique among the four in that she reported a substantial decrease in both playing-related and general discomfort/pain over the years. She became extremely proactive, modifying many aspects of her playing and general lifestyle.

The remaining three students each developed a painful and disabling lump in the affected area which, among other things, limited their capacity to perform housework. As a direct result Donna stopped doing chores like washing the dishes, asking her housemates to do them instead: “I don't do washing-up anymore as silly as that sounds, because... the process of, getting plates and actually supporting it with my hand, doesn't work” (Donna, SEM 6). Susie changed employment many times specifically to minimise her discomfort/pain but chose to continue to perform everyday tasks at home, limiting them to shorter periods of time. “When I'm wiping things down, cleaning mirrors that sort of stuff, I can't hold my elbow above my shoulder... so that makes it very hard” (Susie, SEM 5). However, Mary tried to ignore her pain, and persisted as usual.

Significantly Mary also appeared to be utilising a similar strategy of continuing through her pain when it came to playing the cello. By the end of the program she claimed that her pain had become constant and was increasingly disabling. On the other hand Susie, Caitlin, and Donna, students who modified their behaviour, claimed that their pain had stabilised or decreased. The cases of Caitlin and Mary and the possible implications of their different behavioural choices are discussed in detail in *Chapter 9: Case Studies*.

Thematic Summary

In this section the primary theme of *Cultural beliefs* and overarching themes of *Inconsistency* and *Priorities* are evident. However once more the potential impact of differing levels of *Self-efficacy* on student behaviours (and ultimately their outcomes in terms of pain) is most striking. Caitlin is *motivated* to look after her health in the long term. She is proactive in seeking out solutions that minimise her pain during day-to-day activities and shows adaptability by making substantial changes such as giving up certain activities. The fact that her outcome in terms of pain experienced at the outcome of her study is so positive indicates the relative importance of these attributes.

On the other hand Mary, is unable to adapt or make any superficial changes, let alone address her underlying contributing behaviours. She continues to carry her cello in a manner that hurts her thus increasing pain. Similarly Tom, chooses to continue in a job where he is required to lift heavy things. These students are clearly highly *motivated* to continue working as hard as possible but, due to *Priorities*, they are less *motivated* to look after their health. It is interesting to note the aspects of *perfectionism* (such as obsessive tendencies and compulsiveness) that are evident in their all or nothing approaches to numerous elements in their lives.

Computer Use and Writing

In various musician populations Hagglund (1996, p. 102); Pratt et al. (1992, p. 17); Wood (2014, p. 42); and Zaza et al. (1998, p. 2018) found that computer use and/or writing was perceived as contributing to their PRMDs. Eleven students in this research (Susie, Tim, Cassie, Tom, Mary, Anna, David, Steve, Melissa, Melinda, and Robert) similarly reported that their use of computers had the potential to increase their pain levels. Eight students (Sally, Natalie, Melissa, Steve, Anna, Mary, Tom, and Susie) also

claimed that they were experiencing pain whilst writing. At least three of these students perceived that this discomfort/pain was magnified in situations of high stress such as during exams and when working to a deadline.

Violinist Susie (discussed above), who experienced severe pain in her wrists and elbows whilst writing and typing, was working at one stage as a receptionist. She found that the duties required as part of this work greatly aggravated her general and playing-related discomfort/pain. She tried various strategies to reduce her pain such as changing employment and resting her elbows on a pillow at the desk. However there was only so much she could do as she was still required to perform these activities as part of her studies. It is interesting that, by the end of her program, Susie was opting to handwrite the drafts of her assignments rather than use the computer, despite the additional time and pain caused. When questioned as to why she persisted with this she revealed that it was easier for her to clarify her thoughts when physically writing them down and that this was more important to her than limiting the pain.⁷

Several of the 11 students identified that the chair that they were sitting on whilst at the computer desk also had the potential to influence the amount of pain experienced. (Many of them also identified that their playing-related discomfort/pain could be aggravated by the specific chair they were allocated during Orchestra rehearsals.) Some students, for example violinist Steve, actively sought a more ergonomic solution for the home situation:

I try and be really conscious of how I sit at the computer... I, alternate between two chairs and one of them is this one that you, kneel on... and your feet go on a separate thing... but it still supports your bum... it's good from time to time but

⁷ Due to a malfunction of the recording equipment it is not possible to give any quotations from this particular interview.

then... things feel a bit strange so I then get back to my other one. (Steve, SEM 5)

However others, such as violist Robert, made no attempts to find more suitable equipment, preferring instead to persevere through the pain. "I still, haven't got myself a good chair to sit down, and do computer stuff" (Robert, SEM 7). This particular student employed the same strategy when it came to experiencing pain during practice and physical exercise and, by the end of his program, he was experiencing constant pain.

In focus group and interview situations students also claimed that they could experience a unique set of issues when using a laptop. Specifically, students admitted that they had a tendency to use these devices whilst sitting or lying in bed including whilst interacting on social media. Unsurprisingly, they also claimed this had a detrimental effect on their posture and resulted in increased pain during the activity.

Thematic Summary

In this section the primary themes of *Self-efficacy* and *Stress/anxiety* are clearly evident. Students choose to continue to use their computers and phones for hours on end despite acknowledging that it aggravates pain. Their behaviour suggests a lack of *mindfulness* (self-awareness, adaptability and reflection) and low *motivation* to decrease their pain. It is striking that only one student (Steve) used proactivity and reflection to seek out a better solution in terms of the chair he used at the computer.

Students also associate increased *Stress/anxiety* with increased symptoms. However, rather than deal with the underlying issues, they seek other solutions. Susie, for example, seeks to make physical adjustments rather than dealing with her *anxiety*. Her behaviour suggest a lack of self-reflection and it leads to increased *fear*, *suffering* and *insecurity*. It is striking that she is aware that handwriting aggravates her pain

further but, as her *Priority* is to learn the required information that way, she continues to do this anyway.

Pre-existing Medical Conditions

Kenny, Driscoll, and Ackermann (2016) reported that 18 to 23% of professional orchestral musicians had a medical condition that they perceived affected their playing (p. 4). Nine students in this research project (Susie, Cassie, Liam, Leah, Wendy, Gary, Natalie, Anna, and Steve) also claimed to have a pre-existing medical condition that may have been aggravating or causing their discomfort/pain. Five of these students (two males and three females) said that they had been diagnosed with scoliosis, or curvature of the spine. According to Bird (2013), scoliosis is commonly thought to be an aggravating factor for injury in musicians, particularly among string players (p. 478).

Two of the affected students, Liam and Leah, reported that they were diagnosed with scoliosis by a medical doctor prior to starting their studies at the institution. As already discussed in *Chapter 5: Orchestra*, both of these students directly linked what they perceived as relatively severe back pain whilst sitting down playing the instrument to this condition. Leah also claimed to be prone to experiencing back pain with other everyday activities such as travelling and carrying items. “Sitting up straight, hurts my back... because... I've got a, curved, spine... bit of mild scoliosis” (Liam, SEM 2).

“When I was doing Orchestra... [my back] seized up... but... I also have... mild scoliosis and that in my spine so that's probably, didn't help” (Leah, SEM 2).

Cellist Wendy suffered from more severe scoliosis and underwent an operation to treat the condition shortly before beginning her studies at the institution. This operation involved inserting rods from T5 to T12 along both sides of her spine. She said that, after an initial increase in pain as muscles readjusted, her back pain decreased and

that this was greatly assisted by going to the gym regularly. However she did continue to experience discomfort/pain in her back both whilst playing her instrument and doing other general activities such as lifting, carrying items, and travelling. “I had an operation on my spine [to treat scoliosis], a few years ago, some of my muscles are a bit haywire” (Wendy, SEM 3).

Unlike Liam, Leah, and Wendy, violinists Gary and Natalie were not diagnosed with scoliosis until late in their Bachelor of Music program. These particular students perceived that the condition had no or little impact on either their general or playing-related discomfort/pain (although Natalie claimed to experience pain in her back as a result of some everyday activities).

Another two female violinists perceived that they suffered from a different condition that may have been aggravating their pain. Susie and Cassie believed that they suffered from hypermobility, or greater than normal flexibility. Several studies have reported a similar perceived link between hypermobility and PRMDs. In research of adolescent musicians, Shoup (1995) found that musculoskeletal problems were higher among those who subjectively considered themselves hypermobile (p. 104); and Vinci et al. (2015) found that hypermobility was associated with increased risk of PRMDs (p. 143). Dawson (2001, p. 68) and Zetterberg et al. (1998, p. 161) also found a higher incidence of hypermobility among female compared to male musicians.

Susie claimed that she had a long family history of hypermobility and associated pain. She reportedly had several dislocations of body parts as a teenager when playing sport that had been partially attributed to the condition.

I'm very, flexible and my muscles have, stiffened over time and like, contracted to stop my, joints from popping out... [MW: “Did you have... pain problems

before... in everyday life, before you, had all the problems with your violin playing?"] Yeah... when I played netball and stuff, I used to... twist my ankles all the time even just walking... my brother has, Benign Joint Hyper Mobility, Syndrome... BJHS. (Susie, SEM 6)

Both Susie and Cassie said that they hurt themselves by overstretching at least once throughout their time in this research. They both also perceived that they had a high pain tolerance and had to be careful not to push themselves too hard. As already discussed, these young women were participating at some stage in personal training and were applying the strategy of pushing through their pain during exercise to practising.

The final two students in this research project who perceived that their playing-related discomfort/pain was being affected by another medical condition were violinist Steve and violist Anna. TMJ symptoms have been found to be highly prevalent and significantly associated with MPA among professional violin players (Amorim & Jorge, 2016, p. 558). At various stages of their programs Steve and Anna, who both claimed to suffer from high anxiety, also said that they had either been diagnosed with (or were experiencing symptoms of) Temporomandibular Joint Dysfunction (TMJ). The experiences of both these students, including the diagnoses of TMJ, are discussed in *Chapter 9: Case Studies*.

Thematic Summary

In this section the primary themes of *Cultural beliefs*, *Self-efficacy* and *Stress/anxiety* are evident. There is general misunderstanding as to the severity of diagnosed conditions. Liam, Leah, and Susie assume that their pain is due to mild conditions but are not proactive and avoid seeking out further information. It is possible that they have underlying *anxiety* and *fear*: it is easier to blame the pain on something

perceived to be out of their control rather than take self-responsibility to address other contributing behaviours.

On the other hand Wendy, who does suffer from a more severe condition, displays higher *Self-efficacy* through her subsequent behaviour. Rather than avoiding dealing with her condition she educates herself and takes steps to manage her symptoms. She is proactive in going to the gym, takes self-responsibility, uses reflection and is adaptable. As a result of her behaviours she sees long-term benefits in terms of decreased pain both whilst playing and during everyday life.

Psychological Health

The results of a number of studies of musicians have shown links between aspects of psychological health and PRMDs. Baadjou et al. (2015) reported that higher pain intensity was associated with a lower quality of life and a higher level of disability in tertiary music students (p. 231); and Davies and Mangion (2002) that high stress was related to playing-related injury, particularly when combined with a lack of warm-up and practice breaks (pp. 161-162). Leaver et al. (2011) similarly found that the risk of injury was higher in musicians with low mood (p. 549); and Rickert et al. (2014b) that chronic PRMDs caused emotional and psychological suffering among injured cellists (p. 132).

Many of the students in this research project also perceived that their psychological health was related to (or affected by) the amount of playing-related pain they were experiencing. A small number of those affected were subsequently diagnosed with clinical depression. However, students most commonly claimed to be experiencing various degrees of generalised anxiety, stress, and/or concern about their experiences of playing-related pain.

Generalised anxiety and stress

Twenty-one of the 29 students who completed their Bachelor of Music program (Susie, Caitlin, Wendy, Mary, Sam, Julie, Brad, Mark, Chris, Anna, Rachel, David, Gary, Steve, Melissa, Melinda, Natalie, Donna, Sally, Robert, and Jack) perceived a link between their general anxiety and stress levels and their playing-related pain. These results concur with those of Ackermann et al. (2012), who found that stress and performance anxiety were perceived as contributing to PRMDs among professional orchestral musicians (p. 186); Kaneko et al. (2005), who found that 32% of orchestral musicians reported greater pain when under emotional stress (p. 169); and Rickert et al. (2013), who reported that professional musicians and management perceived that increased stress leads to greater risk of injury in the orchestral environment (p. 222).

Perkins et al. (2017) found that 55% (n 11) of tertiary music students in their study reported direct or indirect experiences of stress in the conservatoire environment (p. 8 of 15). In some cases the anxiety/stress felt by students in this research was isolated to certain situations such as when the individual was performing on their instrument in public. However over time it became apparent that some were claiming that tension and anxiety they felt whilst playing could be aggravated by other issues.

Violinist Steve, whose circumstances have been discussed in detail previously, claimed to be affected by severe Generalised Anxiety. He perceived that the resulting heightened awareness of how his body was feeling could be quite debilitating.

I think there are some people who are much more in tune with, what is going on in their bodies than other[s]... I'm aware of everything... it's actually quite debilitating and, frustrating... I get panic attacks and stuff just from, stupid things. (Steve, SEM 8)

Two of the students in the study by Perkins et al. (2017) reported a similar tendency to catastrophize about the possibility of injury due to heightened anxiety (p. 7 of 15). Steve's perceptions also align with the results of Kenny and Ackermann (2015), who found that professional musicians classified as having high trait anxiety had higher physiological reactivity than those classified as low trait anxiety (p. 55), and that 32.8% screened positive for social anxiety (p. 51). Stephenson and Quarrier (2005), also found that those tertiary music students with the highest anxiety sensitivity reported more pain (and less enjoyment) when playing (p. 119).

Violinist Susie similarly stated that her anxiety and panic attacks were crippling in nature. She reported that they could be brought on by such everyday activities as travelling, sleeping through the alarm, and even the prospect of coming into the institution. She perceived that she experienced much more playing-related discomfort/pain on days when she was feeling stressed. As a result, by the conclusion of her program she was making a conscious decision not to play her instrument on days when she was feeling this way.

I get really big knots, and they sit, just above my, shoulder blades and it is really painful... it depends on what has happened, during the day, and the day before that... and how I'm feeling if I'm having a really good day, I will be fine, if I'm stressed, I, don't, really play, because I know, that I just, won't be able to move properly. (Susie, SEM 8)

Susie clearly perceived that her anxiety impacted on her playing and pain levels. Researchers who have confirmed a similar link include Russell and Benedetto (2014, p. 270); and Wristen and Fountain (2013, p. 152). In addition, Kaneko et al. (2005) found that emotional stress triggered pain four times more often in female than male musicians

(p. 170); Zetterberg et al. (1998) that female music students experienced more stress than males (p. 160); and Topoğlu et al. (2018) that professional musicians perceived that anxiety negatively affected performances (p. 120). However Kenny et al. (2012) found that most musicians perceived that their anxiety did not impact on the quality of their performance (p. 219).

Susie sought treatment for her symptoms and was reportedly advised to take anti-anxiety pills. Although she opted not to do this, she did undergo regular therapy to deal with her psychological issues. Another female student who experienced ongoing injury and anxiety throughout her program, violist Anna, also reportedly consulted a psychologist.

I actually have been told to take anti-anxiety pills... to calm myself down... I have... they're not panic attacks but I... get so stressed out that I... either go hysterical or comatose... I'm actually seeing someone at the moment who's helping me, take steps towards managing, everything. (Susie, SEM 4)

Susie, Anna, and Steve perceived that their anxiety heightened their awareness of their playing-related discomfort/pain in a way that proved to be debilitating. Viola player David reported the opposite effect. He claimed that a perceived heightened awareness of his own health due to a period of ongoing anxiety was beneficial in that it led to him seeking early treatment for a potentially serious injury. Interestingly, at the same time this particular student also believed that the stress and anxiety of his personal circumstances (an immediate a family member had become ill and subsequently passed away) may actually have caused his injury. As mentioned previously, however, his violin teacher had a different opinion, believing it was more likely to do with a sudden increase in the amount of playing he was doing at the time.

As was also the case in Perkins (2017, p. 5 of 15), several students in this research project claimed that they experienced stress/anxiety (and a perceived flow-on effect in terms of increased playing-related pain) when their timetable was particularly demanding. As already highlighted in *Chapter 5: Orchestra*, this was particularly true during intensive blocks of Orchestra rehearsals. Generally speaking, students in this research perceived additional pressure, stress, and anxiety surrounding their participation in this course.

Unfortunately injured female students Susie, Anna, and Donna also believed that they received limited assistance and understanding from Orchestra course convenors and administration staff at the institution when trying to sort out various issues. They reported that this lack of understanding greatly increased both their general anxiety and their concern about their experiences of discomfort/ pain. Their experiences align with the research of Perkins et al. (2017), who similarly found that tertiary music students perceived that a lack of support, understanding, and consistency within the levels of conservatoire staff was a barrier to optimal health (p. 11 of 15).

Concern about experiences of playing-related discomfort/pain

At some stage of their Bachelor of Music program, the majority of participants in this research expressed some concern about their experiences of playing-related discomfort/pain. (Other studies of tertiary music students by Kok et al., 2013, p. 489; and Spahn et al., 2002, p. 22, have similarly found that they are concerned/emotionally/psychologically affected by their musculoskeletal complaints.) Understandably, many in this research said that they became more concerned about their discomfort/pain when it was severe. In fact, only four of the 29 students who

completed their program (Jill, Julie, Brad, and Robyn) did not say that their concern was in line with severity. Significantly, none of them reported a severe experience.

As was also the case among musicians in Zaza (1998, p. 2019) students in this research displayed a variety of reactions to their pain. Some classified different experiences of pain as being more concerning than others. For example, violinist Gary, who had two occurrences of a severe pain in his left wrist, classified these experiences as extremely concerning. However the general discomfort/pain that he suffered at a later stage of his program was perceived as being less concerning as he believed it was to be expected after a long day of rehearsals.

Cellist Mary, who suffered from increasingly severe pain whilst playing, also continually stated that she believed that it was normal for people to experience pain when playing their instrument. However she repeatedly used this perception as her main justification for remaining unconcerned about her increasing experiences of pain. It was only when this pain was constant and severe, and affecting many other everyday activities, that she expressed some concern. “You are a string player, so it's normal to get pains” (Mary, SEM 4). Her circumstances are discussed further in *Chapter 9: Case Studies*.

The majority of other students claiming to be experiencing increasingly severe pain over successive months said they were very concerned by their experiences. A small portion of them sought medical help promptly. However, as was also the case in Stanek et al. (2017, p. 20), not all went on to consult a medical practitioner. In addition, some of those who did waited until their pain was constant and therefore affecting many other activities.

Some students were also very inconsistent about whether they were concerned about their experiences or not. Violinist Steve presented in each interview as extremely concerned about his experiences and wanting to address them as soon as possible. However, the tendency was for him to not follow through on any planned action. He later revealed that he became extremely concerned about his experiences whilst they were occurring and whilst he was talking about them but then moved on to the next thing.

Always after a rehearsal you are sort of there going “Man I've really got to do something about my back”... and... then you forget that you, planned on doing something about your back and so, then you are at the next rehearsal and it hurts.
(Steve, SEM 2)

Severely injured violinists Susie and Donna were also inconsistent and changed their mind about whether they were concerned about their experiences. They initially stated that they were extremely concerned because it was affecting their whole life and career. Yet as time passed, as they unsuccessfully sought effective treatment for those injuries, this perspective changed. In fact, both came to the realisation that they were no longer as concerned about it. Donna said that, because it wasn't affecting her ability to function normally in terms of walking, etc., she had come to realise that it was a relatively minor thing. Whilst Susie said that, once she had dealt with the fact that music wasn't going to be her career and had reduced her practice, she became much less concerned about her experiences of pain.

Depression

Fry (1987) found that all of the tertiary music students in his study with pain higher than Grade 3 suffered some degree of depression (p. 38). Similarly Guptill

(2011a) found that musicians used words such as fear, depression, and apprehension to describe the experience of playing-related injury (p. 91); and Wristen and Fountain (2013) that anxiety, depression, and pain were related in a population of tertiary music students (p. 152). It was common for students in this research project to also state that they felt depressed and generally concerned when their playing-related discomfort/pain was severe. In most cases students in this research found that their mood improved when their discomfort/pain was less severe. However two were actually diagnosed with (and sought medical treatment for) clinical depression.

Violinist Jill was diagnosed with clinical depression early in the third year of her program. She did not believe that her depression was caused or aggravated by playing-related discomfort/pain, rather by a difficult personal situation, as the following quotation shows.

I went through a really, shitty breakup, with... someone who goes here... and it kind of got, a bit much because everyone was talking about it and everything and, I couldn't even come here without like throwing up and crying... It was... bad because lots of people got involved and... I got diagnosed with... depression in, April, and... it's, settling down now but it was... hard, because, that was... used against me... I got dragged off to hospital and, they tried to commit me, and stuff. (Jill, SEM 6)

However violinist Susie, already discussed in detail above, perceived that her depression was largely a result of her pain and anxiety issues. Specifically, she stated that she felt as though this pain was forcing her re-evaluate her career options and admit that playing and studying music were no longer enjoyable for her.

I actually have been diagnosed with depression so... I'm taking six months off to get on top of it and then come back... it's all boiled down to the fact that I don't enjoy the course as much as I thought I would... [and] I get angry because it does hurt... I just want to... be able to play for enjoyment and part of it is the fact that it does start hurting and I'm limited... [MW: "So are you worried about the pain before you start to play?"] Yeah, I take Panadol before I start... so I can extend the amount of time. (Susie, SEM 5)

Many of the quotations taken from Susie on this subject bear a striking similarity to those of an injured cellist in Rickert et al. (2014b, p. 129). Susie's experiences also align with Lamontagne and Belanger (2015), who found that tertiary music students who experienced pain in the previous six months reported lower occupational satisfaction, and that the occurrence of pain during musical activity triggered negative feelings towards the occupation and general dissatisfaction (pp. 4-6); and Russell and Benedetto (2014), who reported a significant relationship between enjoyment of the instrument and musculoskeletal discomfort in school-age string players (p. 259).

In the lead up to and months following the diagnosis of depression, Susie reported increasing anger regarding some of the perceived restrictions that her pain was having on her life. Other students in this research project who reported feelings of anger regarding the perceived restrictions of pain included violist Robert and violinist Donna. As was also the case in Wilson et al. (2014, p. 683) and Wood (2014, p. 41), these students were generally dissatisfied with their treatment from health professionals.

Donna in particular perceived that the medical doctors that she consulted had limited understanding and empathy towards her situation including the long term consequences for her career. By the end of her program she was generally

acknowledging that she found it depressing that she could no longer continue as she had hoped but at the same time stated that she was trying to stay positive. As highlighted above, for Susie and Donna acceptance of their injury and the long-term consequences was key to improving their mental state.

Thematic Summary

The dominant theme recurring in this chapter section is *Stress/anxiety* and its secondary themes *fear*, *suffering*, *insecurity* and *anger/frustration*. Students perceive a reciprocal relationship between their levels of anxiety and their pain. There is a tendency for them to feel *fear* when they experience playing-related pain, this leads to increased *suffering* and *insecurity*. As their problems persist, affected students also feel increasing *anger/frustration* at the perceived limitations that their pain is having on their playing and everyday lives.

Students appear to go through stages where they avoid dealing with their pain despite their growing *Stress/anxiety*. This may be due to underlying *Cultural beliefs* such as pain/injury is a sign of weakness and/or a bad player. Some make the assumption that certain types of pain are acceptable. Others have unrealistic expectations as to the amount of playing and *Stress/anxiety* their bodies can tolerate, and seem to underestimate the potential long-term effect on their physical health. There is great potential for misunderstanding due to lack of appropriate advice.

It is interesting to also note the different responses to *Stress/anxiety* depending on aspects of *Self-efficacy* and individual *Priorities*. For various reasons both Steve and David claim to be highly *anxious* and *mindful* as to what goes on in their bodies. However the two students react differently when they experience severe pain. Steve displays *fear* avoidance behaviour and is not *motivated* to make significant change. On

the other hand David is *motivated* to act quickly, is proactive, takes self-responsibility, and seeks help promptly. The difference in reported outcome between the two students in terms of pain experienced is striking.

Personality

The results of studies by Andersen et al. (2013, p. 128) and Kaneko et al. (2005, p. 173) suggest a relationship between pain and aspects of personality. Many of the students in this research similarly believed elements of their personality were affecting their perceptions of discomfort/pain. Most of them were also able to identify the role of personality in their broader approach and strategies for dealing with this pain. Notably, in the majority of instances the reported approach to playing-related pain was also being applied across other aspects of the student's life.

It was common for those participants who appeared to have an easy-going attitude towards their playing-related pain to seemingly mirror this attitude with their approach to study, work, or exercise. Cellist Jack, who reportedly had a unique strategy of “snoozing” during practice in order to prevent playing-related discomfort/pain, said that: “I’m a very easy-going person myself I, I take things, sometimes a bit too easily in terms of life” (Jack, SEM 3). Violinist Robyn's easy-going outlook on life also seemed evident in her approach to practice (that was sporadic and minimal at best) and study. Significantly, the majority of students who presented as easy-going said they were not very concerned about their experiences of playing-related pain. They also generally reported experiencing less frequent and/or less severe pain.

At the other end of the spectrum were students who presented as being very driven and intense. Most of these students said that they believed they were perfectionists and several also said they perceived themselves as being obsessive. In

some cases these characteristics were clearly evident in the way they approached aspects of playing. For example, several students said that they felt unable to move on in practice until the particular passage was perfected. It was also common for participants to detail elaborate warm-up routines that took several hours.

I take... one to two hours to warm-up... my cello it's... so hard to get a... big sound, so I have to... wake him up... so what I have to do is, do bowing... and scales slowly, to faster... and then trying to get intonation, and then do arpeggios, and then double stops. (Sam, SEM 4)

Interestingly, when the variable of pain was added to the equation not all of the students in this research reacted in the same manner. Some students chose to push through the pain believing that a larger goal was more important. Examples include Susie, Tom, Mary, Donna, and Robert. All of these students went on to experience serious pain and injury and all were also reportedly overworking in at least one other capacity such as exercise or paid work. Several of these cases are discussed in detail in *Chapter 9: Case Studies*.

On the other hand students including Mark and Gary took this pain as an indication that something was not right and they needed to stop. These young men presented as extremely confident. They also relayed a very logical approach to their pain, preventative strategies, and other areas of their life such as study. Although these students also experienced discomfort/pain they did not suffer from ongoing pain and injuries.

In some cases a student's general demeanour seemed inconsistent with the information they were giving. For example cellist Mary presented as easy-going, laughing frequently during her interviews particularly when discussing her playing-

related pain. Yet despite this laughter her reported practice habits suggested that she was extremely serious and driven when it came to playing the cello. This particular student reported practising upwards of six hours a day and continued with this practice when she was experiencing pain. She continually stated that she was becoming used to and expected to experience pain whilst playing her instrument. Unfortunately by the conclusion of her program she was experiencing severe pain and injury, although she maintained a joking demeanour when discussing it.

Similarly, injured violinist Donna also laughed frequently throughout her interviews. However the brevity of her language and demeanour seemed in direct contrast to the seriousness of her problems and her reported concern regarding them. This particular student said she had many perfectionist traits and struggled greatly with the knowledge that she was not physically able to perform as well as she expected.

I'm kind of a perfectionist, if I don't get anything over a Credit I get a bit upset, in all my subjects. And because I've been so emotional and stressed all my other subjects are like going down. You know how it is, and so then I'm, just dreadful, I'm a terrible student. (Donna, SEM 4)

As already discussed, Donna was one of several injured students who went against medical advice and continued practising after her injury. The most pertinent examples of this tendency were Tom and Robert, who are discussed in detail in *Chapter 9: Case Studies*. Unfortunately these students had to deal with the consequences in terms of increased playing-related and general discomfort/pain. "I've got a kind of, hard-line attitude... with it... [when] I feel pain I... don't put down my viola, I... go... unless it gets really bad" (Robert, SEM 3).

Some students also perceived character traits in others that they believed were counter-productive to preventing playing-related discomfort/pain. Cellist Mark commented in interview situation that he had observed that people who worried excessively about their pain (and approached it in what he perceived to be an illogical manner) potentially caused themselves more problems. He used this as a justification for trying to remain calm and logical when thinking about his own experiences.

I'm trying not to worry about it [my discomfort/pain]... I find a lot of people here just, blow themselves up over it... they end up causing themselves more problems... so... I try to be quite calm about it and... go about things in a normal structured way. (Mark, SEM 8)

As discussed previously in this section, several participants in Focus Group 2 also drew attention to a particular student and linked their perceptions of his personality (such as obsessive, intense, and driven) to his practice habits, exercise, and subsequent discomfort/pain. Violist David, who was participating in this group, went on to reinforce this idea by adding that his personal experience of practice and exercise was that they were like compulsions to him.

Thematic Summary

The main primary theme recurring in this section is *Self-efficacy*. High *motivation* to practice, when combined with a lack of physical *mindfulness* (self-awareness, adaptability, reflection), high levels of *perfectionism* (obsessive tendencies, compulsiveness), and poor *time management* skills (panic practicing, unrealistic expectations, avoidance) seems to result in a negative outcome in terms of pain for students in this research. This difference is clearly evident when comparing the experiences of Robert and Tom versus Mark and Gary.

The primary theme of *Stress/anxiety* also recurs. To an extent Mary, Donna, Tom and Robert all avoid dealing with their pain. Perhaps this is due to *fear* of judgement and/or *anger/frustration* because of a perceived *Lack of control*. It is striking that Donna and Mary are laughing and joking about their experiences despite the perceived severity and their concern. This appears to be a coping mechanism that masks their *insecurity*, and ultimately downplays the severity of their problems.

Underlying *Cultural beliefs* such as pain is a sign of weakness, “no pain no gain”, and the idea that one should practice as much as possible also feature. Mary, Robert and Tom appear to have all or nothing mentality with numerous aspects of their lives. On the other hand Mark and Gary are highly *motivated* to succeed but because they are more self-aware and able to adapt and use reflection they have a more positive outcome in terms of pain experienced. This once again highlights the importance of these attributes in determining student outcomes.

Conclusion

The opinions cited and discussed in this chapter clearly show that many research participants perceived that their ability to undertake day-to-day activities and/or play their instruments was affected by general pain and other health concerns. Throughout the chapter the primary theme of *Self-efficacy* has been particularly strong. A combination of what individuals are highly *motivated* to achieve, their ability to be proactive and take self-responsibility, and individual *Priorities* appears to be very important in determining student outcomes. However the other three primary themes (*Cultural beliefs*, *Stress/anxiety*, and *Lack of control*) have also featured.

The experiences reported by students suggest that those who use *mindfulness* skills such as adaptability and reflection to modify their behaviours, goals, and

Priorities (for example, Mark and David) are better able to manage when they experience pain. In contrast, those who display obsessive tendencies and compulsiveness in their approaches to diet, exercise and work (for example, Robert and Tom) have a less positive outcome. Some students seem to struggle with *time management*, and report a haphazard and compulsive approach to exercise and work. The similarities between student approaches to practice, exercise, work etc. are striking.

It is concerning that students continue to seek advice on health and injury related matters from inappropriate sources and that they appear to take teacher advice over that of health professionals. Teachers may not be acknowledging their limitations or have the education to refer students on to more appropriate sources. The secondary theme *teacher/conductor as authority figure* recurs strongly, as does the *Cultural belief* of “no pain, no gain.” There is a general lack of knowledge and education about health matters and disregard for health advice due to individual priorities.

The potential impacts of *Stress/anxiety*, depending on student *motivation*, *mindfulness* and *Priorities*, are also striking. Students including Mary and Steve feel increasing *Stress/anxiety* but are afraid to know what is wrong, and are fearful of implications in terms of them having to change behaviours. On the other hand David channels that *fear* into *motivation* to seek help and make changes. You can clearly see *fear* avoidance behaviour from some students (Mary and Robert) versus seeking proper attention (David, Melissa). If students were able to apply *mindfulness* skills in these situations it would be helpful in empowering them to take control of their own health.

In conclusion, the discussion throughout the previous five chapters has highlighted the dynamic and interactive nature of the four primary themes, secondary and subthemes, and three overarching themes. It is clear that individuals may interpret

and react to similar situations differently and that elements of students overall health, well-being, and personality have the potential to greatly affect their eventual outcomes. In order to further understand the deep complexity and interaction of contributing factors and the relevance of the themes to the wider community it is therefore important to look at individual cases in detail.

Chapter 9: Case Studies

Introduction

The previous chapter discussed students' perceptions of the major contributing factors to their playing-related discomfort/pain. These included the learning environment, Orchestra, practice, technique, and other influencing factors. A number of overarching, primary, secondary and subthemes were identified and selected examples given in order to highlight the wide range of perceived experiences. These examples suggested that there were many complexities involved in the experiences of each student.

The purpose of this section is to further highlight the relevance of the identified themes by exploring the complexity and inconsistencies within and between individual cases. This will be done through the analysis of six specific case studies: Mary, Tom, Robert, Anna, Steve, and Caitlin. (Summaries of the experiences of all 40 students who participated in this research project are contained in Appendix B if the reader wishes to explore a wider range of cases.) The six selected cases all reportedly suffered from severe playing-related discomfort/pain at some stage of their Bachelor of Music program. However, there were many revealing differences in their individual journeys and perceived outcomes.

Three of the case studies – cellist Mary, cellist Tom, and violist Anna – all opted to conclude their studies within the Bachelor of Music program at the three-year exit point. All three acknowledged that their decision not to complete a fourth year was at least in part due to their experiences of playing-related discomfort/pain. The other three case studies – violist Robert, violinist Steve, and violinist Caitlin – continued through to

finish their four-year Bachelor of Music program. Some of the six students reached their exit point with improvement in and at least acceptance of their playing-related discomfort/pain. Others perceived that they had no option but to exit their program due to ongoing injury and an apparent unwillingness to modify identified contributing behaviours. These six case studies represent the cross section of approaches to dealing with playing-related discomfort/pain reported within this research project.

Mary

Introduction/rationale

Mary's journey particularly highlights the potential impact of *Cultural beliefs*, *Self-efficacy*, *Stress/anxiety* and individual *Priorities* on the development of playing-related discomfort/pain. A cellist, she reportedly suffered from increasing pain as she progressed through her Bachelor of Music program. Unfortunately, by the conclusion of her three-year program she was experiencing constant and disabling pain at the base of the left side of her neck, running into the left shoulder. Mary subsequently decided to exit the Bachelor of Music program at this point and do a Graduate Diploma in Education (Instrumental Music).

One of the most fascinating aspects of Mary's case was her seemingly dismissive attitude towards her playing-related discomfort/pain. Due to underlying *Cultural beliefs*, for the duration of her program she maintained that pain was a normal part of playing an instrument. She regularly downplayed and voiced uncritical acceptance of her pain, assumed that fellow musicians were also experiencing pain, and projected her own attitudes onto others. As a result of her *fear* and underlying *insecurity* she also laughed frequently when recounting her experiences of pain.

Mary's responses showed a clear progression from what was perceived by her as being relatively minor discomfort towards severe pain over the course of her Bachelor of Music program. Yet, despite the perceived severity of her pain she only admitted to experiencing *Stress/anxiety* about it when it was constant, affecting other activities, and she had a large and clearly visible lump growing at the base of her neck. Even at this point, due to her individual *Priorities* she appeared to maintain her focus on relatively short-term playing-related goals rather than the long-term outlook in terms of her health and well-being.

Despite some awareness of her pain, Mary demonstrated poor *Self-efficacy* in managing symptoms/adapting behaviours to improve her situation. Mary was highly *motivated* to continue practicing and achieving in her cello playing, displaying a *perfectionistic*, obsessive, and compulsive approach to her practice. However she was unable to steer that *motivation* towards looking after her health through being proactive, and to use *mindfulness* skills such as adaptability, self-awareness, and reflection whilst practicing to address her increasing pain.

In retrospect, Mary's eventual outcome seemed predictable based on her responses to, and attitude towards, her playing-related discomfort/pain. It was possible to clearly see the potential negative impact of contributing factors identifiable in her early stages, including her seemingly obsessive tendencies and compulsive approach to practice. Unfortunately, from early on she avoided dealing with the possible consequences of her pain, and appeared to trying to downplay her experiences. As with many of the cases in this research, there were many complexities and *Inconsistencies* among her responses.

On the surface Mary's experiences suggest that, had she sought help and had a more open attitude towards dealing with the issues, her journey may have been different. However, through looking in more detail at all of the case studies discussed in this chapter, this assumption is challenged. Their various experiences demonstrate that seeking treatment and acknowledging a problem may not necessarily result in a significantly improved outcome in terms of health, well-being, and career prospects.

Table 18

Reported Pain Experience for Student 11: Mary

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	2	Previous week	Front of both shoulders and neck, middle of back, as well as the outside of both wrists	2	1-2 hours	N/A
2	1	3	Yesterday	Left side of neck	3	5-6 hours	N/A
3	1	3	Yesterday	Back of neck	3	5-6 hours	Up to 9 hours
4	1	2	Last practice (previous week)	Back of neck	2	4 hours	8-9 hours
5	4	4	Present at time, 1	Right thumb and left fingers	2	4-5 hours	9 hours
6	4	4	Present at time, 3	Back of left shoulder	5	5 hours	5 hours

Orientation week

Upon arrival at the institution, Mary claimed to have experienced playing-related discomfort/pain in her left fingers, hand, wrist, and shoulder; the left side of her neck; the left side of her back; and her lower body. The discomfort/pain in her left shoulder/neck recurred “every couple of days”.

Semester 2

Mary initially said that her discomfort/pain was much the same but later admitted that her neck pain actually occurred every time she practised (that is, every day). She said that she was more likely to experience discomfort/pain when practising for long hours, including during Orchestra commitments. She had reportedly greatly increased her practice to five to six hours a day on top of any rehearsals.

Semester 3

Mary reiterated that her pain levels had not changed although she had noticed that her fingers on the right-hand were beginning to “go crooked”. As was also the case of musicians in Rickert et al. (2012, p. 71) and Nawrocka et al. (2014, p. 64), Mary perceived that she was more likely to experience discomfort/pain during orchestral rehearsals or when playing for longer periods of time. She nonetheless continued to practise five to six hours a day.

Semester 4

Mary said that her pain was worse and that she noticed it was increasing at the beginning of the previous semester. Although her neck was “cracking a lot”, in her opinion this was not related to cello playing or practice, and was more likely to be related to the way she slept. She revealed that she was also experiencing discomfort/pain when teaching the cello. However she maintained that she was unconcerned as she reiterated that it was normal to experience pain when playing and continued practising up to six hours a day.

Semester 5

Mary was now openly acknowledging that her pain was getting worse and affecting more parts of the body. This was reflected in her pain scores which jumped to

Grade 4 and present at time of questionnaire completion. The focus of her pain remained the neck, which still “cracked a lot”, however her shoulders, arms, hands, and fingers were also affected. She reported that her pain could be aggravated by carrying the instrument and teaching and perceived that it was worse after she stopped playing. She continued to maintain that she was unconcerned about her experiences of discomfort/pain.

Semester 6

Mary now said that her pain was constant and disabling, and affecting many everyday activities. She had developed a lump at the base of her neck on the left-hand side which was clearly visible to the observer, though she was yet to consult a medical practitioner. Her reluctance to consult a health professional is in line with the findings of Hagglund (1996, p. 103).

Mary reported further that the lump had been present for a couple of months and was growing fast. Orchestra and teaching were proving particularly challenging and she was finally admitting to being concerned about her experiences of pain. She had decided to exit the Bachelor of Music program at the three-year point and do a Graduate Diploma in Education.

Discussion

With Mary, like several of the other case studies mentioned in this section, it was challenging to arrange interviews. Throughout her participation in this research she did not show up to several scheduled meetings and she was not particularly apologetic after doing so. Given that she was highly *motivated* to practice and consistently claimed to practise a minimum of five hours per day, it is not surprising that she may have *Prioritised* her practice above other activities.

When looking at the pain scores contained in the Table 18 only, it would be easy to assume that she experienced a significant and sudden increase in pain in her final year. Yet these basic pain scores do not reveal the full story of her journey, including the complexity and ongoing *Inconsistencies* within her answers. On the one hand, Mary insisted that her pain remained the same for the first few semesters of her program and this is reflected in her chosen pain scores. Yet at the same time, her qualitative responses also showed her increasing awareness that:

- Her discomfort/pain was occurring more frequently;
- Her discomfort/pain was more severe when it recurred;
- Her discomfort/pain was more severe once she stopped playing her instrument;
- Her discomfort/pain was beginning to affect other activities, such as sleeping, carrying her instrument, and teaching; and
- Her discomfort/pain was being aggravated by playing long hours.

As was also the case for injured musicians in Rickert et al. (2014b, p. 128), Mary's injury began subtly but gradually increased to the point where she was unable to play the instrument. Her responses suggested that, at some level she was clearly *mindful* of that fact. Yet she was reluctant to discuss her experiences with others, and continued playing through significant pain and physical dysfunction.

Mary was able to recognise warning signs of pain and/or injury and to link them to certain activities such as practice and teaching, so there was a certain amount of self-awareness and reflection. However she was unable to be proactive and adaptable in order to minimise her pain and decided to continue with those activities without

changing her approach to them. When considered in the context of her underlying *Cultural beliefs* and her *Inconsistent* statements, this is relatively unsurprising.

There were many other times where Mary was *Inconsistent* in her perception of the severity of her pain during her participation in this research project. One of the best examples of this is present in this interaction from her Semester 5 interview. Mary was asked how often her pain was occurring and responded with the following. This should be read in the context of her repeated claims that she rarely took any breaks during her practice. (She would occasionally take a break to have a drink or go to the bathroom but never to prevent or minimise her pain.)

Not every time... I mean if... [I] practise five minutes... have a break half an hour then it doesn't really hurt but... if I practise, for three hours and have a lesson for an hour and then have chamber group for an hour and then my neck will just be, dying. But if I, did, all that time in just my own practice, it wouldn't hurt as much because I wouldn't be, as concentrated and I would have had, breaks and stuff... I could probably play for five hours... I mean, just play through... without breaks then I could do it for five hours, but, or three hours possibly I don't know, it depends really. (Mary, SEM 5)

Her apparent indecisive responses and demeanour throughout this interaction suggested that she was attempting to downplay her experiences of discomfort/pain due to underlying *Cultural beliefs*. They also suggested that, due to a lack of self-awareness, she was unsure how long she could actually play before it appeared. This was not surprising given her perceived apparent lack of concern and *mindfulness* regarding her playing-related discomfort/pain, as well as her seemingly dismissive attitude of it in interview interactions.

Significantly, in the response above Mary also appeared to be saying that she perceived that she wouldn't have experienced as much discomfort/pain during her own practice because she would have been taking breaks. However, as noted above, she consistently reiterated throughout her program that she rarely took breaks during her practice. Due to underlying *Cultural beliefs* she maintained this position even when her pain reportedly became constant and disabling, thus suggesting that the practice scenarios she described were unrealistic.

I perceived that some of our interactions in interview situations were also confusing and contained *Inconsistencies*. Mary initially presented as quite dismissive of the research in general. However this dismissive attitude did not seem as apparent when I was later listening to the recordings of the interviews. Upon consideration I concluded that this impression was more a result of our interactions when going through the motions of setting up interviews, as well as non-verbal cues such as rolling her eyes within interviews, and frequently laughing before responding to questions.

During the final two semesters of her program, Mary finally began to openly acknowledge to me that her pain was worsening significantly. At this time she started to open up during her interviews, talking about the perceived impact of the pain on her life and her growing *Stress/anxiety*. At this time it became clear that she was experiencing an increase in *fear, suffering, insecurity, and anger/frustration*. Although she continued to laugh frequently throughout her interviews, the target of the humour seemed to change. Early on it appeared as though she was not taking the research questions seriously and that she was downplaying her experiences, but in the later stages it appeared that she was using laughter as a method of coping with her pain and her *fear* and *insecurity* regarding the perceived implications for her future. Similar underlying

themes of *fear* and avoidance were also present in focus group research by Wilson et al. (2014, pp. 682-683). “I am going to see a physician... after my exam... I just... hope this lump, goes away soon because it looks really ugly [laughs]... it's downhill from here!” (Mary, SEM 6).

Nonetheless, right up to her final interview and in line with her underlying *Cultural beliefs*, Mary continued to claim that she remained unconcerned about her experiences of playing-related discomfort/pain. When asked on reflection at what stage of her discomfort/pain finally became concerning she responded with the following. “This one does worry me because... it's there all the time... whatever I do... if it was just when I played the cello then I'd go ‘Yes it probably doesn't matter, it will go away’” (Mary, SEM 6).

She appeared to be reinforcing once again that she was unconcerned about her playing-related discomfort/pain for the majority of her program. Yet in an earlier interview (Semester 4) she had shown remarkable foresight. “I'm not really worried about it, because I know it's normal, but then again I don't want to end up when I'm older, to have like a huge bump on my neck or something, you know what I mean?” (Mary, SEM 4).

Her words certainly suggested that on some level she was *mindful* of her future and the possible consequences of her pain. Perhaps it was this perceived undercurrent of concern that influenced her decision, in the later stages of her program, to volunteer to participate in another research project on musculoskeletal pain in cellists. This participation involved an examination by a physician. The fact that she was willing to participate also suggests that there was some interest and openness to learning about her discomfort/pain and possibly improving the situation. However her actions after this

examination were again *Inconsistent* with this. She claimed that the physician informed her that she had a problem with her back and shoulders and recommended that she make some general changes to her practice, posture, and exercise choices. However she was not *motivated* to follow through on any of the recommendations.

Other responses given throughout this research also suggested that Mary lacked the *motivation* to change any playing habits which may have been impacting on her pain levels. She consistently linked the pain to what seemed to be an obsessive, compulsive habit of playing long hours without breaks. However for the majority of the time she refused to even slightly adapt her practice habits. Although at various times Mary said she was willing to stop practising if she was tired, she also specified on more than one occasion that she would not stop practising if she was experiencing pain. “Sometimes I’m just tired, and then I alter it [my practice], but if it just, like if my neck just hurts, then usually not” (Mary, SEM 3).

Significantly, during her final interview Mary claimed that she had greatly reduced her practice because of the pain. However she went on to reveal that she was still doing five hours practice a day, five days a week without breaks or warm-ups. The only change was that she now took two days of rest in the week. The fact that she perceived that it was a huge concession for her to have modified her practice this small amount suggested she had a very *perfectionistic* personality and very high *motivation* to continue playing. Mary's reported experiences align with Andersen et al. (2013), who similarly found that some musicians will ignore pain and potential damage in the quest for perfection (p. 124).

I have a huge lump growing on my neck... I think it is a bone spur or something... I think it's from the cello... It just hurts to put my hand up or, anything like that... so I haven't been able to practise much at all. (Mary, SEM 6)

Given her awareness that her pain was linked to hours of playing and could be aggravated by increased *Stress/anxiety*, it is unsurprising that Mary also repeatedly identified Orchestra as being problematic for her in terms of playing-related discomfort/pain experienced. As noted in *Chapter 5: Orchestra*, during her final interview she admitted that she found the Orchestra course at the institution very difficult as she perceived the conductor was blaming her personally for any mistakes in the cello section.

It's been painful... I'm so glad I don't have to do it again... the rehearsals and, having to concentrate a lot... He [Teacher C] does [have a go at me]... I think he's a very scary person... I led the, section this semester and it's been the most awful experience that I've ever had, with [Teacher C] so I'm like, "Oh I'm never doing this again". (Mary, SEM 6)

From second year onwards she also claimed to be aware that teaching was greatly aggravating her pain but continued to increase the hours that she was undertaking the activity. At the time she believed this pain was largely linked to her playing on her students' (much smaller) cellos. When questioned as to why she didn't play on her own instrument, she stated that her *Priority* was to ensure that she looked after it well, and if she used it for teaching it may get damaged. As with her practice habits, Mary seemed unwilling to further reflect on and adapt her behaviour even though there was the potential to decrease her pain and subsequently her *Stress/anxiety* levels as well.

I find it really hurts to teach because... the kids [are] smaller than you are and you have to... bend over... to fix the fingering all the time... I find that after, the first two students, it just hurts so much that, I lose my concentration and get really frustrated with the other[s] because it just hurts. (Mary, SEM 6)

Mary's experiences on the whole led me to wonder how much her perceived pain and level of *Stress/anxiety* had to increase before she would take action. By the end of her program, Mary was claiming to be near that stage and said she was going to go and see a health professional for treatment and diagnosis after her final exams. Yet astonishingly, when asked if she would do anything different if she could do the program again, despite all her experiences of pain, she responded by saying "No, I don't think so. I'd, probably do the same thing" (Mary, SEM 6).

In conclusion, Mary's experiences suggest that an individual's journey may be greatly influenced by his/her underlying *Cultural beliefs*, aspects of *Self-efficacy*, *Stress/anxiety* and individual *Priorities*. Mary uncritically accepted that pain was an unavoidable part of playing a stringed instrument and assumed that her Major Study teacher and peers shared the same opinions and attitudes as her. She showed poor *Self-efficacy* in managing symptoms/addressing underlying behaviours; lacked the *motivation* to improve her pain; was unable to use *mindfulness* skills to address contributing behaviours earlier on; and failed to seek medical attention before her pain reached the stage where she was growing a lump. As a result she experienced increasing pain throughout her time in this research project.

Tom

Introduction/rationale

Tom's journey particularly shows the extent to which elements of *Self-efficacy* such as *perfectionism* may impact on playing-related discomfort/pain. A cellist, he experienced playing-related discomfort/pain in his left hand throughout his Bachelor of Music program. He consulted a General Practitioner (GP) about this pain in the first year of his studies, and went through phases of trying different alternative treatments, including glucosamine and acupuncture. Despite this, by the third year of his program his pain had become constant and was affecting many other activities. Unfortunately, it reportedly also eventually effected his ability to continue his cello studies in the Bachelor of Music program.

Over the course of the research (based on his reported experiences and behaviour in interviews) Tom came across as being *perfectionistic*, obsessive, and compulsive in his approaches to cello practice, physical exercise, and diet. Tom acknowledged the impact of behaviours that he perceived as contributing to his discomfort/pain such as practicing and exercising for hours a day from early on. He sought treatment and attempted to modify these behaviours in the short-term more than once throughout his program. However, due to his seemingly obsessive nature and poor *time management* skills, he unfortunately appeared to be stuck in a cycle where he repeatedly returned to them, and experienced corresponding increases in pain.

Tom was *Inconsistent* from the outset about his level of *Stress/anxiety* regarding his pain. At some stages he claimed to be concerned, and this seemed to be apparent in his *motivation* to seek different treatments over the period of years. Yet he stated at other times that he would simply avoid dealing with or acknowledging his

discomfort/pain as he had other *Priorities*. This *Inconsistency* was also apparent when looking at his perceived contributing behaviours. He was able to link his discomfort/pain to general overuse of the hand due to his seemingly obsessive habits of practising long hours with limited breaks and physical exercise, particularly weight lifting and kickboxing. Yet, despite this reported self-awareness about his experiences for the majority of his time in this research, he continued to practise long hours each day and exercise in what seemed to be a compulsive manner.

There are clearly some differences between the journeys of Tom and Mary, most notably in the latter's willingness to acknowledge his injury and proactively seek treatment. Tom also utilised skills such as adaptability, self-awareness, and reflection more efficiently and attempted to make short-term modifications to perceived contributing behaviours. However both students appeared to have had obsessive traits and, as a result of poor *Self-efficacy* in managing symptoms in the long term and their individual *Priorities* their reported outcomes at the conclusion of their participation in this research project were quite similar. Both were experiencing constant pain and were ultimately unable to continue and do a fourth year in the Bachelor of Music program.

Table 19

Reported Pain Experience for Student 7: Tom

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	3	A few days ago	Left fingers	3	More than 3 hours	N/A
2	4	5	Present at time, 1	Left fingers	2	More than 3 hours	N/A
3	3	4	Today	Left fingers	2	3-5 hours	7 hours
4	1	2.5	Present at time, 1	Left hand	3	4 hours	5 hours
5	1	3	Present at time, 1	Left hand	2	4 hours	6 hours
6	4	3.5	Present at time, 1	Left hand	2	At least 4 hours	7 hours practice plus Orchestra

Orientation week

Prior to his studies at the institution Tom claimed that he experienced playing-related discomfort/pain in his left fingers “occasionally”. His most recent experience took place “a few days ago”.

Semester 2

Tom said that he had noticed a lot more pain in the left fingers due to increased playing. He reported that at one stage it became so bad that he was unable to move the hand at all and he then consulted a medical practitioner. As was also the case of some

injured musicians in Guptill (2011b, p. 277) and Stanek et al. (2017, p. 23), Tom did not find the advice received beneficial. However he had since discovered that glucosamine helped to decrease his pain and had started taking it regularly in conjunction with more regular breaks during his practice.

Semester 3

Tom said that he had a break from practising over Christmas due to severe hand pain. He went to see a hand specialist and the pain had since decreased as he was stretching, warming-up before and taking breaks during practice, as well as using glucosamine and ice. (Similar strategies for dealing with PRMDs were also reported by tertiary music students in Hagglund, 1996, p. 102; Ioannou & Altenmüller, 2015, pp. 140-141; Lopez & Martinez, 2013, pp. 103-104; and Stanek et al., 2017, p. 23.) Tom had noticed that his pain was being aggravated by physical exercise and claimed to be very concerned about his experiences.

Semester 4

Tom started the interview by stating decisively that going to the gym made his pain worse. He no longer believed that taking glucosamine was beneficial: he had since consulted another health practitioner and, as a result, now believed acupuncture was more effective in treating severe pain. However he acknowledged that the most effective strategies for preventing playing-related discomfort/pain were practising in small sections, warming-up, and stretching, and claimed that he was making an effort to do these things. A tendency for tertiary music students to seek advice/treatment from numerous different health professionals was also evident in Hagglund (1996, p. 102).

Semester 5

Tom said that his pain was now always present as tightness/restriction of movement. He perceived that his pain had decreased in severity, as a result of having a total break from physical gym work for a period of time. However he was planning to increase his physical exercise substantially over the following weeks and months. Tom also mentioned that he was putting a higher bridge back on his cello, despite now claiming that he believed it previously contributed to increased pain in his left hand.

Semester 6

Tom perceived that his pain was now at its most severe, affecting both hands and his ability to perform other activities. Tom said that he was able to link his increased pain to playing very long hours with limited breaks, not doing any stretching/warming-up, and going back to the gym. He claimed to have learned from this severe experience and planned to modify these contributing behaviours. However the following semester he did not return to the institution and revealed through email that he had to take time out from study “due to my hand problems”. This was my last contact with him. Records at the institution showed that he did not return to complete his fourth year.

Discussion

Tom missed many scheduled interview appointments throughout his participation in this research. Given that at times he reported compulsively practising up to seven hours per day and obsessively exercising up to 20 hours per week, this is unsurprising. Tom usually remembered and apologised for missing these appointments in hindsight, when our paths crossed at the institution. However he often seemed distracted in our interactions, as though his thoughts were elsewhere, or as if it was the

first time he had ever considered what we were talking about. He also spoke with frequent pauses, and, perhaps due to *insecurity*, laughed when recounting many of his experiences of playing-related discomfort/pain.

At times, Tom's demeanour during our interactions seemed *Inconsistent* with his recounted approach to some aspects of his life. His manner of speaking initially suggested that he had a laid-back and easy-going nature, and was relatively unconcerned about any experiences of playing-related discomfort/pain. Yet as we talked more, it seemed very clear to me from his recounted approach to his practice, exercise, and diet that he also had obsessive tendencies and could be *perfectionistic*. In addition, his repetitive highlighting and short-term modifications of behaviours perceived as contributing suggested to me that, on some level, he was acutely *mindful* of his experiences and what he could do to address them.

Some of the pain scores contained in the pain summary Table 19 suggest that Tom perceived an increase in playing-related discomfort/pain in the early stages of his Bachelor of Music program. They also imply that this was followed by a decrease and stabilisation in pain levels from the third to fifth semesters, before another increase in the final semester. However, through the detailed qualitative data collected, it became clear to me that Tom's pain levels and corresponding behaviours through the semesters were cyclic in nature. The timing of the interviews throughout the different semesters, meant that these pain scores did not always necessarily reflect the true extent of his experiences of discomfort/pain since we last spoke. Therefore, in order to gain a better understanding, it is necessary to look in more detail at these pain scores alongside the qualitative data collected each semester.

The pain scores collected during Tom's first interview accurately show that he had perceived an increase in playing-related discomfort/pain since Orientation Week. He reportedly acted fairly quickly to address this pain. He was *motivated* to consult a General Practitioner, discovered an alternative treatment in the form of glucosamine tablets, and proactively started to warm-up, stretch, and take breaks during practice. "Before I started taking the... glucosamine, I... found it really hard, sometimes, in Orchestra, because it was just so long... there was a point where I couldn't even move my hand" (Tom, SEM 2).

The pain scores selected at the time of his next interview suggest that Tom may have maintained these preventative strategies, thus accounting for the further reduction in his perceived discomfort/pain. However through the interview it became apparent that he had actually had another severe episode of pain since we last spoke. He attributed this to not taking the glucosamine tablets and easing back on his proactive preventative strategies as his pain decreased, as well as compulsively increasing his hours of physical exercise. Tom had consulted another medical practitioner, this time a hand physiotherapist. After reflecting on his experiences he had since resumed taking the glucosamine and was attempting to monitor his practice, thus accounting for the decrease in the pain scores. "My hands... they got really bad... basically over the Christmas period... I couldn't practise, much, until I saw the hand physio" (Tom, SEM 3).

On their own, the pain scores collected at the next meeting suggested that his discomfort/pain may have further stabilised since the previous interview. However, once again it quickly became clear that Tom had had another severe episode of discomfort/pain. He had reportedly sought treatment again, this time in the form of

acupuncture and had once more adapted behaviours he perceived as contributing to his pain. “Acupuncture really helped... when there, there was a lot of pain... [So]... if the pain gets back and gets really worse... I'll do that” (Tom, SEM 4).

The pain scores collected in the fifth semester also suggested a stabilisation of pain levels since the previous questionnaire. Through the interview Tom revealed that he perceived this was largely due to him inadvertently (not *mindfully!*) doing less physical exercise. Yet despite this, at the time of interview he revealed that he had recently started increasing his hours at the gym and was already noticing an increase in discomfort. Tom then went on to reveal that he believed that his episode of severe pain in the first year had been related to a bridge that he had on the cello that was relatively high. Yet despite his experiences, his *Priorities* had seen him recently put this bridge back on the cello as he believed his fingers were now stronger, and that the same thing would not happen again.

I changed my bridge back to the one I used to have in the first year... I had a, bridge which was really high, and... I think that was one of the main causes of my hand problems because... of the tension required but, but now my fingers are... stronger. (Tom, SEM 5)

Given his intentions in relation to these perceived contributing factors, it is unsurprising that his pain scores at the time of his final interview revealed an increase in discomfort/pain. At the time Tom claimed that his pain had reached its most severe point ever, and that it was now affecting both hands. He claimed to be experiencing high levels of *Stress/anxiety* about it, to the extent that he had reduced his practice for several days, and had thus noticed a corresponding decrease in discomfort/pain. “It’s the

worst it's been, ever... to the point where it was just burning... really concerning” (Tom, SEM 6).

Yet despite this he was already planning to resume his seemingly obsessive regime of at least four hours of practice a day, on top of Orchestra, exercise, and outside work; had recently taken on and planned to continue with a new job which involved lifting, despite perceiving that this was aggravating his pain; was continuing to increase his exercising at the gym; and maintained that he was going to keep the high bridge on his cello, all despite acknowledging that his discomfort/pain was now noticeably affecting his ability to perform other activities. In fact, once again he avoided acknowledging the severity of his condition, and identified that the worst thing was that it had started to affect his ability to do other activities.

[MW: “... Was it affecting... your ability to do other things?”]... Yeah, that was... probably the worst... thing ... I've reached the maximum [amount of practice] and I crashed and burned and now I'm, [laughs] building it up again. (Tom, SEM 6)

So, although at the time of this questionnaire completion his discomfort/pain had reportedly already decreased due to short-term adaptation of some perceived contributing behaviours, he was clearly planning to resume some of these behaviours as before, believing that he would be able to maintain his preventative strategies.

On reflection, it seems clear that Tom’s reported experiences were cyclic in nature. He would

1. Experience an ongoing episode of severe pain, perceived at that time as concerning;

2. Seek treatment and/or subsequently in the short term modify some behaviours perceived as contributing;
3. Notice a decrease in pain as a result of modifications, and therefore become less concerned;
4. Gradually resume behaviours identified as contributing, believing he would not go to previous extremes; before
5. Experiencing another ongoing episode of severe pain (therefore taking him back to the beginning of the process).

Tom's tendency to continue playing until he reached a crisis point is remarkably similar to the theme of "conceal and crash" identified in qualitative research of injured musicians by Rickert et al. (2014b, p. 128). There were other students in this research who also seemed to be following a similar cycle of behaviours, however no other case was as pronounced as Tom. I found it quite astonishing to hear him recount on successive occasions the perceived link between his compulsive behaviours and pain levels, yet already be planning to resume these behaviours as before.

Tom presented at successive interviews saying that the best ways to control his pain were through proactively monitoring practice, warming up, stretching, and limiting physical exercise. Yet after each severe experience, he presented similar strategies as though they were new to him. It really seemed to me as though each time his discomfort/pain started to decrease due to modifications in behaviour, he went straight back to old behaviours, and rationalised by thinking that he wouldn't allow it to get to that stage again.

Interestingly, the characteristics I observed in his approach to practice seemed mirrored in his behaviours regarding physical exercise. Numerous times he was clearly

able to identify that there was a link between the compulsive amount of physical exercise he was doing and the amount of pain he was experiencing. Yet, although he was reportedly at times experiencing high *Stress/anxiety* about his pain, as with his practice habits, he lacked the *motivation* to modify this behaviour in the long-term. In fact, as the following quotation shows, any decreases in physical exercise over the months were due to him not having enough time to exercise, it was not done *mindfully* to prevent discomfort/pain.

The gym... work, it... causes more pain... there was periods when I was, going and then there was another period when I stopped for weeks... [MW: "... And did you stop because it was hurting too much or?"]... No, I just stopped because I just had no time... I want to, but no time. (Tom, SEM 4)

Significantly, despite his conviction stated above and on numerous other occasions as to the impact of physical exercise, Tom's responses on the matter still contained *Inconsistencies*. This was particularly obvious in his final interview where he initially stated "I suppose it made it harder [gym]. It's obvious that it is affecting it" (Tom, SEM 6). Before going on to say "I think I got up to a good, you know [pause], good with practice, and gym... I should write it down and then I can see, like, what actually happens" (Tom, SEM 6).

This *Inconsistency*, which seemed at odds with his reported concern about his experiences, suggested to me that he was looking for other ways to justify this increase in pain so that he did not have to address these behaviours in the long-term. It also suggested to me that on some level there was still avoidance about the severity of his pain and the impact of perceived contributing behaviours.

In conclusion, Tom's reported experiences can leave no doubt that he was *mindful* of the contributing factors to his discomfort/pain from the early stages of his program. Unfortunately, it seems that this self-awareness made very little difference to the outcome at the end of his participation in this research project compared to Mary. As Tom was not *motivated* to make long-term modifications to his behaviours, most notably in regards to his practice and exercise, and seemed to have an obsessive tendency to overwork in various areas of his life, in his case medical intervention was similarly unsuccessful. He therefore spent the majority of his Bachelor of Music program stuck on this repetitive cycle of pain.

Robert

Introduction/rationale

Robert's case further demonstrates the impact of poor *Self-efficacy* in managing symptoms/modifying contributing behaviours, underlying *Cultural beliefs*, and individual *Priorities* on student outcomes. A male viola player, he experienced constant pain at the back of his right shoulder from the third year of his program. Although he maintained that the first two years of his program were relatively pain-free, like Tom he identified early on that he was more likely to experience discomfort/pain when playing long hours whilst sitting, including during orchestral rehearsals and when doing lots of physical exercise. Despite this, for the duration of his program Robert continued to increase his participation in ensembles, many of them optional and external to the institution, including rehearsing and busking regularly in a gypsy band. He also continued to practice and exercise in what seemed to be a compulsive manner, and eventually tore a tendon behind his right shoulder.

Robert's underlying *Cultural beliefs* and subsequent attitude towards his playing-related pain and injury were fascinating. For the majority of his program he voiced uncritical acceptance of his pain and openly admitted that his main preventative strategy was to continue playing through it. He consistently stated the belief that to take an extended or even short-term break from playing would be too detrimental to his progress as a musician. As was the case of injured musicians in Rickert et al. (2014b, p. 128), he said that he felt guilty at the thought of letting his peers down in ensemble situations. Robert's *Priorities* seemed to be portrayed accurately during his final interview where he started the discussion by talking in detail (and at length) about great improvements to his technique but later revealed that his pain was still "really bad".

Given the perceived severity of his discomfort/pain, it is unsurprising that Robert also reported experiencing *Stress/anxiety* about his pain. His concern *motivated* him to consult numerous medical professionals about his pain during the third year of his program. Unfortunately, as was also the case of injured tertiary music students in Ioannou and Altenmüller (2015, p. 140), medical intervention on its own was not enough to help him overcome his playing-related pain/injury.

From this point onwards during his interviews Robert seemed to have a remarkably good understanding and self-awareness as to why he was experiencing so much pain and the steps he needed to take in order to allow his injury to heal. In his opinion, these included having an extended break from playing; resuming playing slowly over a period of weeks and months; stretching/warming up properly; and taking breaks during practice.

Yet despite this apparent self-awareness and increasing *fear* about the long-term consequences of his pain, due to individual *Priorities* Robert remained *unmotivated* to

take these steps. He maintained his focus on his short-term playing goals as opposed to the long term effect on his playing and health. He continued to practice and exercise in a seemingly compulsive manner and appeared to have unrealistic expectations as to the amount of physical stress his body could handle. As a result of his poor *Self-efficacy* in managing symptoms/adapting behaviours and seemingly poor *time management* skills with regards to practice and exercise he ended up with ongoing severe pain due to further inflaming the tendon behind his right shoulder.

Clearly, there were similarities between the approaches and journeys of Mary, Tom, and Robert regarding their discomfort/pain. The three students demonstrated poor *Self-efficacy* in managing symptoms/modifying contributing behaviours and, as was also the case in Wood (2014, p. 42), perceived that their own personal *perfectionism* contributed to the development of their playing-related pain. The three appeared to have had obsessive/compulsive tendencies with regards to various aspects of their lives, such as practice, exercise, and/or diet; were highly *motivated* to practice long hours but unmotivated to look after their health by *mindfully* planning their practice time; lacked adaptability; and acknowledged a link between their *Stress/anxiety* and pain levels. They also seemed to struggle with *time management*, were unable or unwilling to modify identified contributing behaviours in the long-term and, due to underlying *Cultural beliefs* appeared reluctant to disclose the extent of their injuries to fellow musicians.

However there were also some marked differences between these cases. Robert was unique among the three in that he consistently spent so many hours a day in ensembles, during which there was a perceived *Lack of control* over rehearsal structure, and that he continued to opt to do more as his pain worsened. Robert's practice hours

were more sporadic, and he acknowledged in his final interview that it could range from nothing to eight hours the next day depending on his other commitments and how he felt on any given day. He also came across as being far less studious than the other two. He openly stated that he liked to have a good time “partying” and that he got limited hours of sleep.

Finally, Robert openly acknowledged in interview situations that, due to his individual *Priorities* he was making a conscious decision to continue with behaviours both in and out of the practice room that he admitted were contributing to his problems. This was a major point of difference from both the other students discussed already. Cellist Mary was *unmotivated* to even acknowledge her problem let alone what behaviours were contributing. On the other hand Tom attempted to be proactive in the short-term but struggled to maintain any behavioural changes, thus accounting for more the obvious cyclic nature of his experiences.

Table 20

Reported Pain Experience for Student 35: Robert

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	1	2 years ago during an orchestral performance	Right wrist	2	1-2 hours	N/A
2	2	1	Previous week while busking	Right wrist	4	Varies greatly	6 hours
3	2-3	2	Previous Saturday during rehearsal	Left shoulder	2	3 hours	9 hours
4	3-4	3	Previous Thursday during Orchestra	Both shoulders	6	3-4 hours	11 hours
5	2*	2	Present at time, 2	Upper back behind right shoulder	9	Up to 6 hours	13 hours
6	4	4	Present at time, 1	Upper back behind right shoulder	4	3 to 5 hours	12 hours
7	5	5	Present at time, 2	Upper back behind right shoulder	7	3 hours, (at least 7 hours playing each day)	10 hours
8	4	4	Present at time, 1	Upper back behind right shoulder	5	3-4 hours	9 hours

*Grade 5 after playing

Orientation week

Prior to his studies at the institution, Robert claimed to have experienced playing-related discomfort/pain in his right wrist on one occasion only. He said that this discomfort/pain did not recur.

Semester 2

Robert said that he had improved his posture and noticed a corresponding decrease in pain. However he later revealed that he experienced back pain whenever he was sitting playing for long periods of time, including during Orchestra, as well as pain in various body parts when busking. He revealed that he had started “working out” for one to two hours each evening, and at this stage believed that this may have been linked to a decrease in playing-related discomfort/pain.

Semester 3

Robert claimed again that he was experiencing less discomfort/pain as a result of improved posture. However he said that he still experienced pain during Orchestra, and that the pain was now focused in the left shoulder/upper back area. He reported that he was not doing as much exercise however he was doing more playing, mostly in ensembles and busking.

Semester 4

Robert had noticed an increase in general and playing-related discomfort/pain and believed that this may have been due to increasing his physical exercise, practice, and orchestral commitments. He commented that it was not unusual for him to play nine hours a day every day of the week for weeks at a time. He had had a particularly severe experience of pain where his whole body was sore: this lasted a couple of days and he had to temporarily reduce his practice as a result. At this time he revealed that his pain

was also being aggravated by his sleeping position, sitting at the computer, and travelling on the train.

Semester 5

Robert stated that he now had a lot more pain in his upper back, behind the right shoulder. He was able to pinpoint the increase as starting halfway through a national music camp (three to four months prior) when his back reportedly “cracked”. Since then his pain had steadily continued to worsen, in his opinion, because he had reportedly been unable to have even a few days off from playing. He now believed that his pain was related to playing the instrument too much, as well as a lack of sleep as a result of doing a lot of “partying”, and possibly physical exercise.

Semester 6

Robert said that his pain was still bad in his upper back, behind the right shoulder. It was now constantly present and continued to worsen throughout the day. He had apparently discussed his experiences with a medical doctor and a physiotherapist with experience with musicians, who both pinpointed an inflamed muscle/tendon as the cause of the problem. However the advice was to have a rest from playing before reintroducing practice slowly, something Robert claimed that he had been unable to do largely due to ensemble and other playing commitments. Robert said that he was trying to mix up the type of exercise he was doing, although he was still unclear as to whether it was aggravating his discomfort/pain.

Semester 7

Robert started his interview by saying that his back was “really bad again”. Pain was now severe after five to ten minutes of playing and he was reportedly getting very frustrated that it was restricting his practice. Although he hadn’t been back to see the

physiotherapist, he had seen the doctor again and the tendon (that Robert now said was originally torn) was even more inflamed. Despite his pain, Robert continued to participate in numerous optional ensembles, practise many hours a day, and function on very little sleep. He was also continuing to exercise but now claimed to have been advised by his GP that this may have been beneficial.

Semester 8

Robert said that his pain was still constant, affecting many other activities and “really bad” but that he had now accepted it as an unavoidable part of playing his instrument. He reported that he was able to have a limited break from playing for two weeks over the June holiday period. However, as he was unable to reintroduce playing slowly, he found that this actually aggravated his discomfort/pain. Since he had finished his participation in a recent national orchestral program he claimed to have tried to limit his playing a little and had noticed a slight decrease in pain (even though he had subsequently increased his physical exercise). At this time Robert was still insisting that he couldn’t take an extended break from playing as this would slow down his progress. However he was planning on auditioning for acting school the next year and believed he was more likely to inadvertently reduce his viola playing if his plans to further study acting eventuated.

Discussion

Robert was another of the more difficult students in this research project with whom to arrange meetings. He seemed to struggle with *time management* and frequently missed scheduled interviews and appointments, often failing to respond to email communications. I found his general manner to be easy-going, charming, and apologetic and he frequently made jokes and laughed at his own expense. However, over time I realised that Robert was very *motivated* when it came to certain activities including practising his instrument, exercising, and intriguingly, “partying”. I also came to understand from his detailed and thoughtful responses that in hindsight he was able to reflect on (and be self-aware) as to the nature and causes of his discomfort/pain.

For the first few semesters of his program, Robert’s verbal answers and corresponding pain scores clearly indicated that he was noticing a gradual increase in the perceived grade of his pain and its intensity at worst. However he was able to identify the major increase in his pain as occurring early in the third year of his program, after participation at a national music camp. Robert definitively linked this increase in discomfort/pain to months of consistent playing, reportedly up to nine hours per day, as a result of an intensive orchestral and chamber music rehearsal schedule over which he perceived a *Lack of control*, and sporadic practice. His subsequent increase in pain aligns with that reported by Kaneko et al. (2005), who found that musicians who placed excessive demands on themselves were more likely to suffer from pain (p. 171).

From this point on Robert displayed self-awareness in his interviews as to why he was experiencing so much pain, and what he needed to do in order to let his injury heal: most notably take an extended break from playing, reintroduce the instrument

slowly, stretch/warm-up properly, and take regular breaks during practice. Yet instead of making these changes, Robert avoided dealing with his pain and demonstrated poor *Self-efficacy* in managing symptoms/modifying behaviours that were contributing. He continued participating in numerous optional chamber and orchestral ensembles for the remainder of his program, including further seasons of national camps and orchestral programs. He was not *motivated* to regulate his practice schedule, and was unable to consistently and *mindfully* warm-up, stretch, and take breaks during his practice.

To me, the most fascinating aspect of his case became the impact of underlying *Cultural beliefs* on his behaviour. He openly acknowledged that he was choosing not to be proactive, as he perceived it would hinder his progress as a musician too much. His perceptions are contrary to Schafer-Crane (2006), who argues that delays in seeking treatment and appropriate care by continuing to practise will actually result in increased severity of injury and a longer rehabilitation period (p. 827). However they align with Stanek et al. (2017), who found that 57.3% of tertiary music students experiencing pain felt that it was holding them back as a musician (p.23).

“I need to take... apparently... three months break... to heal. [MW “So do you think you will ever be able to do that...?”]... Not really... that would be... really detrimental” (Robert, SEM 8).

It is striking that, throughout his time in this research project Robert didn't pretend or even go through the motions of trying to adjust his behaviours because he knew he wouldn't sustain it. He consistently stated for the majority of his program that his main strategy for dealing with his pain was avoidance, to continue playing and put it to the back of his mind, and that he subscribed to the *Cultural belief* of “no pain, no

gain”. His approach aligns with some of those recorded by Andersen et al. (2013, p. 127); McCready and Reid (2007, p. 143); and Park et al. (2007, p. 94).

Unsurprisingly perhaps, given his apparent lack of adaptability and uncritical acceptance of his pain, Robert initially persisted for some months before seeking medical treatment. However he did eventually consult his General Practitioner and then a specific physiotherapist that I recommended. Late in his third year he revealed to me that they had identified the problem as a strained muscle or tendon behind his right shoulder. I was therefore surprised when, in a successive interview in his fourth year, and almost as an afterthought, he revealed that the injury was far more severe and that he was in fact suffering from a division of nerves/tendons. According to Dawson (2007), musicians suffering such afflictions are likely to suffer very long term disability or incomplete recovery (p. 105).

I went to the doctor and he says that the tendon which, I had torn, under my shoulder blade had now gotten... even more... inflamed... [MW: “So when did you actually...?”] Um, well, last year when I went, after [participating in a national orchestral program]... [MW: “... Because you never told me last time that it had been torn”] Well... they told me like it was... really stuffed, and then when I went back like, they had another look at it and it was, yeah, all kind of... (Robert, SEM 7)

I did feel that Robert’s apparent offhand manner of referring to his discomfort/pain, (which may have been a way of effectively downplaying its severity in line with his *Cultural beliefs*), was very characteristic of him. Over the years I also noticed that Robert could be *Inconsistent* when talking about the severity of his pain. In addition, he seemed to be downplaying his experiences by comparing them to other

students with multiple problems, and openly admitted to me that he was reluctant to discuss his experiences with other musicians, his teachers, or family, due to *Stress/anxiety* about what they might think. “I only mentioned it, once [to my teacher] I didn't want to, keep coming into lessons... going, ‘Hey’ like before I say anything... ‘I'm feeling really... bad today’ ... it’s like I am making an excuse... to play badly or something” (Robert, SEM 6).

I felt as though his reluctance to discuss his experiences with others may have been because he placed a great deal of importance on other people’s perceptions of him as a musician and viola player and felt the need for *conformity*. His reluctance is unfortunate, as qualitative case study research by Schoeb and Zosso (2012) showed that interaction with people around them and learning from previous experiences of pain/injury were the key to injured musicians improving and maintaining their health (p. 133).

Robert’s words in his very first interview certainly suggested to me that the reason he was *Stressed/anxious* about his pain was because what other people were saying to/thinking about him. As was also the case in Rickert et al. (2014a, pp. 97-98), he may have concealed his injury from others for fear of judgement regarding his playing ability and technique. “The wrist thing used to bother me a bit... just because everyone attacked me saying that, because I'm a viola player I'm just gonna have, you know, my back broken by the time I'm 20” (Robert, SEM 2).

It did also seem as though Robert may have had unrealistic expectations as to the amount of physical stress/strain he could tolerate. Even towards the end of his program when he said that he perceived that culturally it was becoming more acceptable for people to talk about their discomfort/pain and to stretch as a preventative measure,

he went on to admit that, for various reasons, he still personally wouldn't do it. During that same interview Robert stated that he never ignored his pain, which was clearly *Inconsistent* with his reported behaviours over the four-year period, and even within that same interview.

One of the reasons why Robert perceived that he could not implement many of the preventative strategies he was aware of, was that he perceived a lot of pressure on him to achieve. However he admitted that some of this pressure was self-imposed due to his *perfectionistic* nature and that, when practising or performing he would run on pure adrenaline, unaware of everything else including physical pain. As in Schoeb and Zosso (2012, p. 132), Robert was prepared to go beyond his physical limits for the sake of his art. A striking example of this is when he was reportedly memorising a piece by Bach in his third year, and compulsively practiced it to the point that he was in so much pain he had no option but to stop and lean against the wall for 20 minutes.

I have been setting myself some hard goals, that even my teacher... like, he says "Okay play, Bach at workshop next week", and I say "Okay I'll play it and I'll play it from memory"... and he's like, "Oh... you don't have to do it from memory" and I'm like "Yeah but I'm going to do it from memory anyway".

(Robert, SEM 5)

Andersen et al. (2013) reported that injured musicians may marginalise their pain experiences and lack of influence in order to avoid frustration (p. 127). Robert may also have tried to marginalise his pain experiences. However, over time he admitted that he was feeling increasingly *angry* and *frustrated* at the limitations his pain was placing on his ability to practise. It also increased his *insecurity* about his playing ability, suggesting a marked psychological impact. "I have to... force it [pain] to the

back of my head... and, it [practising] just becomes a very negative experience... increases frustration... every now and then I get pretty angry” (Robert, SEM 5).

Like Tom, Robert’s observed *perfectionistic* characteristics with regards to practice also seemed evident in his approach to physical exercise. At various times he was exercising in what seemed to be a compulsive manner for up to two hours a day, mostly upper body building work, depending on the perceived availability in his schedule. Their respective GPs reportedly advised that the physical exercise would probably be beneficial in building up muscles and inadvertently decreasing pain. Yet both Tom and Robert went through stages of thinking their exercise routines were increasing their pain.

Robert was unique in this research with his openly self-proclaimed “hard-core” approach to enjoying life, or in his words, “partying”. In fact, when recounting his first severe experience of discomfort/pain in his fourth semester, he said that he believed it had been largely influenced by his frequent late nights which had resulted in him getting very little sleep over a sustained period. Although he remained convinced for the remainder of the program that going to such extremes was affecting his discomfort/pain, as with practice and exercise, he was not *motivated* modify these behaviours.

I don't think I helped did myself any favours... about a month ago I was, right into, partying pretty much every night... but... I wouldn't... allow it to overtake any practising... I figured... I was doing the perfect... balance of... working my arse off and partying hard at the same time. (Robert, SEM 5)

In conclusion, it seems clear that Robert experienced a severe injury throughout his time in the Bachelor of Music program. He perceived the most likely causes of his injury were too much playing, inconsistent playing times, and not enough breaks during

practice. Yet, despite the potential improvements to his pain levels in the long-term, due to his *Priorities* this student openly chose to continue with behaviours that were aggravating his injury. As with Mary and Tom he demonstrated poor *Self-efficacy* in managing symptoms/modifying contributing behaviours and a lack of adaptability.

Robert's tendency of going to extremes, which also seemed to be evident in his *obsessive* approach to exercise and "partying," suggests that these characteristics were deeply ingrained in his personality. It is striking that, despite his experiences of severe discomfort/pain and apparent knowledge of what contributed to them, on reflection he still said that he would have preferred to have done more playing of his instrument throughout his time at the institution.

I was always, like most musicians who come here... was... very bemused at the idea of a Performance Degree which... is based, majorly, around the academic... side of things... that has always been... [the] thorn in the side of, my progress to a certain extent... [MW: "So how do you think you would have gone if you'd had to play even more, than you already do?"] I think I would have loved it... I would probably have had more back problems, [laughs]... but... yeah. (Robert, SEM 8)

Anna

Introduction/rationale

Anna's case shows the complex inter-relationships between *Cultural beliefs*, *Lack of control*, *Self-efficacy*, and *Stress/anxiety*. A viola player, she suffered from increasing discomfort/pain and injury throughout her time in this project. Anna was initially able to link her discomfort/pain to an increase in playing hours, including during Orchestra, and twice had to defer her Major Study and Orchestra courses due to

pain and other issues. She subsequently took four years to complete her three-year program.

Anna's *Stress/anxiety* about her condition led her to consult numerous specialists about her jaw and neck pain with varied success from the second year of her program onwards. She was diagnosed with Temporal Mandibular Joint Dysfunction (TMJ), reportedly a pre-existing condition aggravated by playing, initially given a mouth splint, which was unsuccessful in improving the condition, and then a jaw orthotic. As the jaw orthotic was not a short-term solution for her pain, Anna was also advised by numerous health professionals to investigate and implement preventative strategies. However she struggled to *motivate* herself to make any changes.

Like the previous three case studies, Anna reported experiencing *fear* about how bad her pain might get in the future. She spoke of increased *suffering*, *insecurity*, and *anger* at not being able to practice as much as she would have liked to. She also reported suffering from significant *Stress/anxiety* in other areas of her life that she perceived impacted on her pain levels. Although it was unclear to me whether she had been officially diagnosed with any condition, in her final semester she was consulting a psychologist regularly and said that this had greatly helped her to improve her outlook.

One of the most striking aspects of this case is the way that, despite this reported concern, Anna still showed poor *Self-efficacy* in managing symptoms/modifying contributing behaviours. Even though she reportedly did not practice compulsively for hours each day like the other three students discussed she still struggled with *time management* during practice. Like Robert and Tom she was proactive enough to seek help from professionals after experiencing ongoing pain for some time but not *motivated* to make long-term changes. She seemed unprepared to take self-

responsibility for her pain and be proactive and lacked reflection except when in the interviews talking to me.

It must be noted that, more so than in the previous three case studies Anna's pain was aggravated by participation in the Orchestra course, where there was a perceived *Lack of control* over the content of *playing time*, including the number of breaks, rehearsal duration etc. She struggled to complete the *academic requirements* of the course and voiced frustrations about the teacher attitudes/behaviours directed towards her. Anna was only able to continue in her program when she purchased a smaller, lighter viola in her fourth year. The fact that she claimed that she was not advised to do this by her viola teacher at any stage is concerning.

However despite some differences between this case and the three discussed previously (e.g. Anna was not highly *motivated* to practice, was less technically proficient on her instrument, sought psychological treatment for *Stress/anxiety* and spoke at great length as to her fractured relationship with her viola teacher), the primary and overarching themes still come through strongly. All four students suffered increasing *Stress/anxiety* about their pain, struggled with a perceived *Lack of control* over aspects of their learning environment, and voiced some similar underlying *Cultural beliefs*. The four students also clearly demonstrated poor *Self-efficacy* in managing symptoms/adapting behaviours contributing to their pain/injury, strongly suggesting that this is an area where further education is required.

Table 21

Reported Pain Experience for Student 19: Anna

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	4	Present at time, 3	Both shoulders, left wrist, and neck	13	Less than 1 hour	N/A
2	4	3-4	Previous day	Left shoulder and both sides of the jaw	8	1-2 hours	N/A
3	4	4	Previous day	Left side of the jaw	4	1 hour	4 hours
4	5	5	Present at time, 1	Both sides of the jaw	4	Less than 1 hour	3 hours
5	4	4	Present at time, 2	Neck	2	1-2 hours	7-8 hours
6	1	4	Present at time, 1	Head, neck, and left shoulder	4	1-1.5 hours	6 hours
7	4	3	Present at time, 2	Head	4	1 hour	4 hours
8	2	4	Present at time, 1	Face and head	3	1 hour	1.5 hours

Orientation week

Prior to her studies at the institution Anna had experienced playing-related discomfort/pain in her wrists, shoulders, neck, and lower back. The pain in her left shoulder recurred every time she played, and the pain in her left wrist every time she was doing fast fingering.

Semester 2

Anna said that she was experiencing a lot more pain in her jaw and shoulders, and that it now persisted for a few hours after she stopped playing. She believed her pain had increased because she was playing her instrument more. However, her practice time was not consistent and total playing did not reach more than four hours per day, including Orchestra. She had discussed her experiences of playing-related pain with her teacher, however claimed to have found the advice given unhelpful.

Semester 3

Anna said that she had a lot more pain in her jaw, left shoulder, and back, as well as frequent migraine headaches. She particularly noticed her jaw pain over the holiday period as it was present even when she was not playing. She had consulted doctors and a dentist about her pain and had been given a splint to reduce the impact of grinding her teeth whilst sleeping. Unfortunately this had been unsuccessful in reducing pain and at the time of this interview she was waiting to see a jaw specialist.

Semester 4

Anna had deferred her Major Study and Orchestra courses apparently in order to address her pain and stress levels. The pain remained constant in her jaw and neck (particularly aggravated by playing the instrument and grinding her teeth while sleeping) however she was not always aware of it throughout the day. Her current treatments included painkillers, anti-inflammatories, and medications to clear sinus. Her doctor was also urging her to implement preventative strategies such as stretching, however she said that she usually forgot and took painkillers after playing. Ioannou and Altenmüller (2015) similarly found that some injured tertiary music students did not fully follow the recommendations of their medical practitioner (p. 140).

Semester 5

Anna had consulted a jaw specialist, been advised that her pain was also related in her sinuses, and had been fitted with a jaw orthotic to treat her diagnosed condition of TMJ. Although her jaw pain was not as strong, the focus of pain had switched to the neck and she suffered frequent ear aches and headaches. Anna had re-enrolled in her courses and resumed playing the viola as before, despite no immediate improvement in pain levels, and admitted that she was ignoring her pain. As was also the case of injured musicians in Andersen et al. (2013, p. 127), she appeared to be largely trusting that her pain would ease over time.

Semester 6

Anna said that her pain was much worse in her neck, shoulder, back, and left arm (but not her jaw). It was now affected by many other everyday activities such as carrying items, computer use, and sitting. She had once again had to drop out of her Orchestra and Major Study courses as during her participation in the Opera her pain reportedly became so severe that she was unable to hold her instrument. Unfortunately, since she had stopped playing it (one month prior to the interview), Anna perceived that the pain in her neck had not improved very much. She was currently seeing a physiotherapist and massage therapist regularly for treatment.

Semester 7

Anna had resumed playing her instrument in January, but was only able to continue for two weeks due to pain and other factors. After purchasing a smaller, lighter viola (one inch shorter), which she claimed had decreased her pain by about half, she was able to resume her music studies. However Anna said that she still had a constant tension headache, and that she experienced pain in her entire upper body during and

after playing that was aggravated by other everyday activities. She continued to consult the massage therapist and physiotherapist. However, as she had not sought out a music specialist, she still did not have any exercises specific to her instrument. In addition, she stated that she usually forgot or didn't have enough time to do the stretches that had been recommended by her current treatment team.

Semester 8

Anna no longer had a constant headache. However she did still have constant neck and shoulder pain, as well as pain in the arms, hands, and back that was aggravated by playing, sleeping, and other everyday activities. (She was *Inconsistent* as to the location and severity of her pain, as well as what activities were affected.) Anna attributed the perceived improvements in her pain to having consulted a psychologist as well as a physiotherapist who specialised in musician injuries. (She attended the physiotherapist at the instigation of her sister, a cellist who was also injured but not a participant in this research.) She also perceived that her reduction in pain was linked to less mental and physical stress as she no longer had to complete the Orchestra course. Anna admitted that she still didn't remember to implement preventative strategies until she was in considerable pain. However she now claimed to be feeling more positive about having attended the institution, and was looking forward to pursuing a Graduate Diploma in Education (Classroom Music) the following year.

Discussion

Anna was one of only a small handful of students in this research project who regularly attended the weekly workshop component of the Major Study course. This meant that arranging meetings with her was refreshingly easy as it did not involve much back and forth with regards to scheduled times and missed appointments. My initial

impressions of her were that she was gentle as well as being slowly and softly spoken. At times her laidback way of talking seemed at odds with her reported *Stress/anxiety* about the severity of her pain, a clear similarity to the previous three case studies discussed.

Over the years I found that Anna's diligence in attending the workshop, even when she had been forced to defer her Major Study and Orchestra courses, contrasted with the lack of *motivation* she reported. Over the years I also noticed many other *Inconsistencies* and complexities among her answers. These included the contrast between her reported practice habits and what she perceived were *perfectionistic* tendencies, her apparent lack of *motivation* to modify perceived contributing behaviours and/or attend injury prevention sessions scheduled at the institution despite claiming at times to be very concerned, and her reported *Discontent* with Orchestra staff when they appeared to have been trying to act in her best interest.

It became clear to me early on that many of the most fascinating aspects of this case would relate to the dynamics of Anna's perceived relationships with other staff and students at the institution and the *Cultural beliefs* underlying them. She consistently perceived that her Major Study teacher was unsympathetic, unsupportive of her ongoing issues of pain, and gave conflicting and unhelpful advice. "My teacher said it's [the pain] definitely a real worry... but... she... is like, 'You have to practise anyway'" (Anna, SEM 3).

However, as the research progressed, Anna admitted that there were issues aside from her playing-related pain that were affecting the dynamics within the relationship. Most notably, Anna assumed that the teacher did not think that she was advanced enough to have been accepted into the institution to begin with, and claimed to have

been told that directly by the teacher. If true, this was most unfortunate. “The reason why she talked to me... was... to do with... her not feeling... I was fit for The Con... It’s been really stressful in lessons with her because... it feels like she has just stopped caring so much” (Anna, SEM 4).

As already discussed in *Chapter 4: The learning Environment*, some of the major issues Anna experienced with her teacher were shared by Rachel, another injured female violist. Many of these issues related to a perceived *Lack of control* over the learning environment. They included dissatisfaction with sporadic lesson scheduling/timetabling, and dissatisfaction with teacher attitudes/behaviours towards them (for example, inconsistent/inappropriate advice given, the perception that teacher did not listen or care about their concerns). In addition, after their deferments, both students were only able to continue in the Major Study and Orchestra courses after they purchased a smaller instrument (reportedly without guidance or assistance from the Major Study teacher) and arranged certain exemptions from the Orchestra course.

Unlike Anna, shortly after sorting out her issues of the Orchestra course in her third semester, Rachel was able to find another teacher and seemed more satisfied in general from this point onwards. It is interesting to note that Rachel’s pain scores indicated there was really not that much of a decrease in her pain over the remainder of her program yet her level of *Discontent* was greatly improved. She also perceived that some of the Orchestra staff were relatively helpful in arranging exemption from certain Orchestra programs over the remainder of her time at the institution. “I withdrew from the, Encounters Orchestra, because... the... rehearsals schedule... was similar to the Opera Orchestra... I [just] emailed [Teacher P] and said, ‘Look I don’t want to, injure myself’” (Rachel, SEM 7).

On the other hand, Anna claimed on many occasions that she perceived that the staff at the institution were unhelpful and unwilling to modify *academic requirements* when it came to sorting out her various issues. Yet there was evidence that they had at least attempted to take her situation into account. When Anna was participating in the Opera Orchestra, in her sixth semester, her experiences reportedly became so severe that she was unable to hold her instrument up. She reported that her Major Study teacher went to department staff and conferred about her situation, and that they decided it was in her interest to withdraw her from the course at that time. However Anna was *Discontent* with this solution.

My viola teacher told... [Teacher A] and [Teacher P] that she was worried about me so... they just said to withdraw... I wanted to continue doing the Opera... I was telling them... "If I drop out now I'm still going to have to do it next year and it's causing me all these problems, I'd like to get it over and done with" but... I just wasn't given any options and... at the time didn't feel like they were... putting my best interests first. (Anna, SEM 6)

As was also the case of injured musicians in Andersen et al. (2013, p. 127), Anna preferred to rely on predictability about her current playing commitments to endure her pain. Her priority was clearly to complete the course that year. However, given that she was unable to hold her instrument, it would seem that the convenors had no option but to tell her to withdraw. On this occasion it seemed as though much of the dissatisfaction was related to misunderstandings and assumptions as to what would be required of her in the future with regards to this course (in addition to the challenges of communicating around these sensitive issues of pain).

In fact, there had been several instances already where Anna had alluded to a perceived lack of understanding resulting from indirect communication between herself and course convenors. Significantly, in the next semester Anna was able to talk directly to the Major Study convenor and was granted permission to participate only in one more Orchestra concert in order to pass the course. From this time she perceived that her levels of both *Stress/anxiety* and pain declined markedly.

At various times throughout her program Anna also claimed that she felt increasingly isolated from her fellow students at the institution. She spoke at length as to her perceived *suffering, insecurity, fear* and *anger/frustration* regarding the impact of the pain on her life. Her words here show that she identified as feeling depressed due to her lack of progress.

I would never... discuss it with other string players or other musicians... I feel like they wouldn't understand... a lot of my friends... have no history, practising hours on end and... I have just seen them grow over the years since being here... I guess that just sort of makes me feel quite depressed... I've stayed the same level, because... factors... prevented me from going that step further each time.
(Anna, SEM 7)

Unfortunately, as was the case for an injured musician in Zaza et al. (1998, p. 2018) and also the other three students discussed here, at times Anna voiced uncritical acceptance of her pain. However it is encouraging that, during the final semester of her Bachelor of Music program, Anna's demeanour and outlook seemed to improve. At this time she had finally sought help from a physiotherapist with experience in treating musicians and was regularly consulting a psychologist.

Guptill et al. (2000) found that college music students who were satisfied with (and felt better immediately after) their treatment from a specific health professional were more likely to feel better at the (later) time of the study (p. 86). From the point that she consulted these new health professionals onwards Anna similarly perceived that her pain was getting much better. However she couldn't verbalise any actual improvements to the pain or relate any specific advice from the physiotherapist, she was just feeling much more positive in general and no longer believed that she would always have pain. This suggested to me once again that her perceptions of her pain were very strongly linked to her emotional state and frame of mind. "He's [the physiotherapist's] exceptionally good... it's really helped a lot to... calm me down a bit... [there's been] probably a little bit of a change... I'm sure it helps a lot" (Anna, SEM 8).

I don't think I will always have pain... I know that what I'm getting treated... is going to help me in the long run. It's really hard at the moment 'cause... it takes a long time for muscles to change. (Anna, SEM 8)

Clearly Anna had many ongoing physical and emotional health issues, some of which she believed were independent from her playing. Her experiences align with Kreutz et al. (2008), who found that over 50% of tertiary music students suffered at least one non-musculoskeletal health issue such as headaches, sleep disturbance, sensitivity to the weather, or concentration problems (p. 6); Dawson (2002), who found multiple diagnoses in 37.7% of injured musicians (p. 135); Halleland, Harris, Sornes, Murison, and Ursin (2009), who found unusually high levels of some types of subjective health complaints among orchestral musicians (p. 58); Shoup (1995), who found that 48.9% of high school music students suffered from one or more non-musculoskeletal problems which negatively affected their playing (p. 100); and Spahn

et al. (2014), who found that there were high levels of both psychological and physical symptoms in a population of tertiary music students (p. 14).

At times Anna used these medical issues to explain away the pain and justify her lack of *motivation* to adapt any of the other perceived contributing behaviours. This approach to dealing with her pain was unique among the case studies discussed so far, who mostly admitted that they were not *mindfully* addressing these behaviours because they forgot and/or had other *Priorities* for their practice time.

I think... getting the orthotic in has stopped me thinking about it, it's almost made me think, "Oh, you know I've got something that will fix it now, I'm not going to stress about it". Even though the pain is still there. (Anna, SEM 5)

At the same time, like the other students, she did admit that there were other reasons that she was failing to modify contributing behaviours. These included a *perfectionistic* approach to practising where she needed to perfect a particular passage before moving on or taking a break, poor *time management* (for example not allowing enough time to take a break during her practice, perceiving that it took too much time to stretch beforehand) and most often simply forgetting to implement any of the strategies until after she was in considerable pain due to individual *Priorities*. In any event, her case demonstrates the complexity and interaction of contributing factors to playing-related discomfort/pain, including the possible influence of other factors relating to psychological and general health.

Steve

Introduction/rationale

Steve's case particularly shows the extent to which individual levels of *Stress/anxiety* and *Self-efficacy* may impact on data consistency. A violinist, he had

some severe experiences of playing-related discomfort/pain throughout his Bachelor of Music program. Over the years he was able to address his pre-existing back pain by working on his general posture and computer set-up, undertaking several Alexander Technique lessons, and maintaining regular stretching. However, the focus of his playing-related pain shifted to other areas in the upper body including his arms, hands, neck, and shoulders. Steve experienced discomfort/pain both originating with and carrying over to many everyday activities for the duration of his program.

There are some similarities between this case and that of Anna, discussed previously. Both students claimed that they experienced high levels of *Stress/anxiety* and, in his final semester, Steve said that he had been experiencing symptoms of Temporomandibular Joint Dysfunction (TMJ). At the time he said that he had been advised that the symptoms were most likely due to grinding his teeth while sleeping. (This was also what Anna was first advised when seeking treatment.) However Steve also thought that the clicking and grinding were being influenced by his selection of chin and shoulder rests.

The most fascinating aspect of this case is the complexity and *Inconsistency* present among the student's responses. These ranged from his recollection of the severity, nature, and location of his pain; to his recount of preventative strategies, attitudes towards this pain, his underlying *Cultural beliefs*, and just about every other aspect. More so than any other student in this research project, Steve was aware of and actually drew attention to these *Inconsistencies*. On numerous separate occasions he actually laughed about and apologised for them. He believed that the main reasons for the *Inconsistency* among his responses on various occasions were that his perceptions of his discomfort/pain were so interlinked with aspects of *Self-efficacy* such as *motivation*

and *mindfulness*, as well as his levels of *Stress/anxiety* at any given time. The openness and detail with which he discussed these factors set this case apart from the previous four discussed.

It is encouraging that, despite his reportedly severe experiences at times, at the end of his program Steve was still certain that he wanted to make playing his career. By this time he had already completed an internship with a professional symphony orchestra and was intending to do further study at a top level music academy the following year. He appeared to be more *proactive* in working towards minimising his pain than the previously discussed case studies through strategies such as warming-up and taking breaks during his practice. Yet at the same time there remained many *Inconsistencies* in regards to the severity of his pain, including the emergence of symptoms of TMJ in his final semester, which makes his case a fascinating one.

Table 22

Reported Pain Experience for Student 25: Steve

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	5	Present at time, 1-2	Middle of back and shoulders	3	More than 3 hours	N/A
2	4	5	Present at time, 2	Back	8	Less than 1 hour	N/A
3	2	2	Previous day	Back	5	Less than 1 hour	11 hours
4	4	4	Present at time, 2-3	Both sides of neck	11	1-3 hours	8 hours
5	3-4	3-4	Present at time, 2	Middle and left side of neck	6	1 hour	10 hours
6	4	4-5	Present at time, 1	Left side of neck and left shoulder	14	2.5 hours	8 hours
7	2	5	Present at time, 1	Left shoulder	6	1-2 hours	11.5 hours
8	2-3	2	Previous Friday	Neck and shoulders	10	1.5-2 hours (but up to 7)	7 hours

Orientation week

Prior to his studies at the institution Steve had experienced playing-related discomfort/pain in his hands, fingers, wrists, shoulders, neck, and back. His back pain was the most severe, especially when sitting down through long rehearsals.

Semester 2

Steve reported that the pain in his back, neck, and right arm was recurring more frequently due to increased playing hours. Although it reportedly got to the stage where it was unbearable in his back, he claimed that he didn't notice it until it was "pretty bad". Steve commented that he also experienced a significant amount of pain when working at the computer, and admitted that he used it when taking breaks from practice (which was reportedly sporadic depending on his *motivation* at the time).

Semester 3

Steve reported that he was now enjoying playing more and that he was also more *motivated* when it came to playing and practising. As a result he claimed that he was no longer thinking (or worrying so much) about any pain he may have been experiencing. His experiences align with Wilson et al. (2014), who similarly found that musicians tended to perceive musical experience as being more important than any side-effects such as pain (p. 682).

Steve was playing for long hours each day but very little of that time was spent on private practice. On consideration, he said that his back pain was still present every time he played, but not as severe, and that he still experienced pain in his right arm and left shoulder. (In his opinion this was related to changing his chin and shoulder rests.) He said that he was taking care to maintain good posture and take frequent breaks etc.

when sitting at the computer, had a new computer chair, and had noticed that his level of pain could be affected by his sleeping position.

Semester 4

Steve said that, although his total playing time had remained consistent, he had recently increased his private practice to up to three hours a day. He reported that he had correspondingly noticed a big increase in pain in his back, shoulders, and neck, and that he was now experiencing “strange” sensations in both arms. Interestingly, Steve now said that, on reflection, earlier in the year his pain was probably present but he just wasn’t thinking about it, and that he had noticed the amount of pain that he experienced could also be influenced by his mood.

Semester 5

At the time of questionnaire completion Steve said that he hadn’t played for several days due to neck pain caused by sleeping in an incorrect position. However he believed that generally he was experiencing less pain (including no longer experiencing the strange sensations in his arms) and attributed this to doing more stretching and continuing to work on his posture whilst at the computer. Although he still experienced playing-related pain in some body parts every time he played, he was *Inconsistent* as to the frequency, severity, and location of this pain (back, neck, shoulders, and left hand could be affected).

Semester 6

Steve said that his pain was now much worse in his neck and shoulders due to playing technically difficult repertoire and increasing his private practice. Although he initially said that he had to stop playing after 10 minutes due to pain, he later admitted that if he was really involved in his practising he would just keep going. Steve said that

he had noticed that his pain did tend to focus on one particular area at a time. His teacher had recommended Alexander Technique lessons, and Steve said that he was going to go “as a priority”.

Semester 7

At the time of this interview Steve had had six sessions of Alexander Technique. As was also the case of musicians in Andersen et al. (2013, p. 128); Hagglund (1996, p. 102); and Wood (2014, p. 41), he reportedly found them beneficial. Nonetheless, at the time of his interview his neck and shoulders were very sore, as he had just finished participating in a chamber music camp where there was 11 hours of playing each day. Steve said that he had noticed that he would wake up with a sore neck and that his pain was being aggravated by carrying items. He mentioned that he had had a session with music physiotherapist Bronwen Ackermann as part of an orchestral internship but that he did not discuss his neck and shoulder pain with her.

Semester 8

On consideration, Steve thought that his pain had decreased. However the left side of his neck and shoulders continued to get sore, and he had a constant tension and discomfort in his neck. He had recently noticed a lot of clicking and grinding in the jaw, which he was quite worried about, and believed these new symptoms may have been related to his changing his chin rest and not adjusting his shoulder rest correctly. He had been referred to and consulted a dentist about the symptoms, which he referred to as “TMJ issues”, and had been advised that he should purchase a dental splint. At the time of his final interview he was considering whether or not to outlay the money for this expensive device.

Discussion

Steve was undeniably one of the most difficult students in this research project to meet up with. Like Mary, Tom, and Robert, on numerous occasions Steve did not attend scheduled meetings and at times it was hard to get a response from him through email. However, more so than the previous students discussed in this chapter, he became very apologetic in hindsight. He said that he perceived that I would have better things to do than wait around for him and seemed to be quite *Stressed/anxious, insecure*, and embarrassed about his behaviour when we met.

The scores contained in Table 22 indicate that Steve clearly perceived his discomfort/pain as being severe and, at times, impacting on his ability to perform other activities. However, it became clear through the interviews that, on more than one occasion his pain had only recently increased, suggesting a cyclic element similar to that identified with Tom. Each of these times Steve also said he noticed this increase in line with changes to the make-up of his *playing time* such as including more private practice or playing longer hours, and decreased *mindfulness* during playing. This is a clear similarity to the previous case studies discussed, especially Tom and Robert.

It is also clear from the pain scores that Steve perceived decreases in the severity of his pain during his third and eighth semesters. These were the only two occasions where, in addition to scoring his pain as only a Grade 2 or 3, his pain was not present at time of questionnaire completion, and was only discomforting at its most severe. However, these pain scores do not adequately demonstrate the complexity and *Inconsistency* among his answers. In order to do this it is necessary to consider the scores in the context of the qualitative data collected, including the factors he believed were influencing his perceptions of his pain (such as his underlying *Cultural beliefs*,

varying levels of *Self-efficacy* depending on the playing situation, and high *Stress/anxiety*) and the acknowledged *Inconsistencies* in his recollections.

Steve talked in much detail over the years about how, if he was highly *motivated* to play (for example, if he was enjoying the repertoire or perceived being in an important position in the Orchestra), he was more likely to use good posture. He believed that this in turn would lead to decreased discomfort/pain. Yet he also acknowledged that at times this *motivation* to play had the opposite effect. He recalled instances where he was so *motivated* and involved with his music that, like Robert, he simply wasn't *mindful* of his pain until after he stopped playing. Steve's responses suggest this may have accounted for the perceived decrease in discomfort/pain in the third semester. "I think that was the thing earlier on in the year... it was more I just wasn't thinking so much about it... and therefore it wasn't a big issue" (Steve, SEM 4). Andersen et al. (2013) similarly found that injured musicians may temporarily forget their pain when they are involved in and enjoying the music (pp. 128-129).

Steve also acknowledged many times that he believed his responses and recollections of discomfort/pain were *Inconsistent*, in part due to these other influencing factors. His final interview gave an excellent picture of the extent of these *Inconsistencies*. Steve initially claimed that he hadn't had any severe experiences of pain since the previous questionnaire, and his pain scores clearly showed a decrease in perceived pain. However, almost as an afterthought, towards the end of his interview, he recalled having some very severe experiences in the most recent Opera.

Opera is bad, actually, [laughs] I should have mentioned that earlier... Oh man, my memory is terrible, so I'll probably make your results really *Inconsistent*... I think Opera was almost an all time, high for the level of discomfort... it wasn't

that bad actually, [pause] I'm so useless, I can't remember [laughs]. (Steve, SEM 8)

Interactions such as these understandably left me feeling a little confused (although also amused!). They also reinforced to me how important it was to understand each student's personal circumstances, including the perceived myriad of contributing factors, the context in which these recollections were taking place, and the potential influence of recall bias. As with all the students in the project, the qualitative data relied heavily on their memories which may have been more or less reliable, as well as their level of *mindfulness* at any given moment.

It also seemed that Steve's perceptions as to the cause of his pain, whether it be playing-related or not, could influence his responses. A good example of this comes from comparing his reported experiences during his fifth and sixth semesters. At the time of his fifth semester questionnaire/interview, Steve said that he hadn't been able to play his violin for several days due to neck pain. He attributed this pain to sleeping awkwardly and said that he was not experiencing any *Stress/anxiety* about it. "I haven't been playing for a few days because my neck [is] just, screwed up, but... I just slept on it strangely, so... I don't think it's related to, anything" (Steve, SEM 5).

At the following interview he perceived that his pain was much worse, in his neck and shoulders. On the second occasion he also presented with far more *Stress/anxiety* about his discomfort/pain. However there was not a huge difference in pain scores. "I've got a lot of... neck and, shoulder pain, just at the moment... because I am practising a really technically difficult piece and, I'm getting really tight in my shoulders... I'm worried about it" (Steve, SEM 6).

On these two occasions there was a vast variation in the amount of concern he felt about his experiences of discomfort/pain due to the perceived cause (playing-related versus sleeping position). However, generally speaking, at most of his interviews Steve presented as extremely concerned about his experiences. Such was the extent of his obvious concern about his pain at times that, on numerous occasions, I felt generally concerned for his well-being.

During his final interview, Steve opened up further about his struggles with *Stress/anxiety*. He claimed that the resulting *fear, suffering* and *insecurity* he experienced was so debilitating that it caused him to have panic attacks about things which, in hindsight, he perceived as being relatively minor.

I think there are some people who are much more in tune with, what is going on in their bodies than other people... I'm the kind of person who, even with getting you know a small sickness, turns anxiety on like that, [clicks fingers]... it's actually quite debilitating and, frustrating... I get panic attacks and stuff just from, stupid things. (Steve, SEM 8)

I felt that this tendency could have accounted for many of the discrepancies as to the nature, location, and severity of his pain, his as well as the *Inconsistencies* in his recollections of previous experiences. As noted in the section *Anxiety* in *Chapter 8: Other Influencing Factors*, there were many other students in this research who also perceived a link between their *Stress/anxiety* and their discomfort/pain.

From the early interviews I noticed that, at times Steve was *motivated* to use *mindfulness* skills such as self-awareness, reflection and adaptability to address contributing behaviours to his pain. Throughout his time in this research project there were reportedly sustained periods where he was proactively working to improve his

back pain through working on his posture at the computer, stretching, and taking Alexander Technique lessons. As a result of his *mindfulness*, he claimed that the pain in this area had greatly decreased by the end of his program.

In his final year, Steve had the opportunity to have a consultation with the leading Australian music physiotherapist Bronwen Ackermann. During his interviews at the time he was expressing high levels of *Stress/anxiety* about his neck and shoulder pain, and reporting that his back pain had virtually disappeared. I expected that he would have discussed his neck and shoulder pain with her, such was his expressed concern about it. Yet he chose instead to talk about his back pain, stating “What’s of, of bigger concern to me [than my neck and shoulder pain] is when I’m sitting down playing” (Steve, SEM 7).

At the time, this was surprising to me, in the context of his portrayed concern and responses on other occasions. It also left me questioning the reliability of his recollections as to the severity of this neck and shoulder pain as well as his level of *Stress/anxiety* about it.

Significantly, at the time Steve went on to say that Bronwen Ackermann advised him that his instrument set-up (chin rest, shoulder rest, etc.) was good. Despite this, after further consultation with fellow musicians, he went on to change his chin rest later in the year, and perceived that doing this had physical consequences.

I got a new, chin rest... it’s really tall... and then... not long after getting it, I started to have a lot of jaw problems because I didn’t adjust my shoulder rest right and it, was pushing my jaw to the right and I’ve still got TMJ issues... as a result of that... but... I am not sure how playing-related that is, because my dentist says it is just from... gritting your teeth in your sleep. (Steve, SEM 8)

Steve did perceive experiencing less severe playing-related pain at the time of this final questionnaire completion. However, the fact that he was experiencing these new symptoms, alongside his acknowledgement that he now had constant tension/discomfort in his neck, is striking. As with Anna, discussed previously, the emergence of similar symptoms was the beginning of a long journey which involved seeking medical treatment, dealing with her elevated *Stress/anxiety* levels through therapy, acknowledging some unhelpful *Cultural beliefs* and ultimately accepting a greatly reduced ability to play.

Caitlin

Introduction/rationale

Caitlin's case shows that higher *Self-efficacy* managing symptoms/modifying contributing behaviours to playing-related injury may impact positively on individual outcomes. A violinist, she had been experiencing ongoing playing-related discomfort/pain in her left shoulder and arm for some time when she started her studies at the institution. Like many of the students in this research, she noticed an increase in discomfort/pain in the initial stages of her Bachelor of Music program. However, even though the focus of her pain was constantly changing, at each successive interview Caitlin indicated that she was experiencing less discomfort. Encouragingly, by the end of her program, she claimed to be only experiencing occasional tension and discomfort.

As a result of her underlying *Cultural beliefs*, Caitlin seemed to place great importance on the opinions of her teachers and fellow musicians. Her tendency for initial uncritical acceptance of ideas and mimicry of playing techniques saw her frequently change opinion as to the cause of her discomfort/pain. Identified influencing factors included her posture, practice routine, the weight and quality of the instrument

and bow, her chin and shoulder rests, her general mood, diet, exercise routine, and sleeping position. Her opinions as to the influence of these factors seemed to change according to the musicians she had spoken to most recently.

It is encouraging that Caitlin seemed to be comfortable discussing her experiences of discomfort/pain in public. Yet despite proactively seeking out the advice of other musicians and teachers, Caitlin claimed to have suffered from *insecurity* as a result of *Stress/anxiety* in the past. One of the most fascinating aspects of her case was her belief that a large part of her overcoming her experiences of discomfort/pain involved addressing these issues and turning around a negative mindset. This was a clear similarity to Anna and Steve, who also talked in some detail about the effect of *Stress/anxiety* and their moods on their perceptions of their pain.

At the same time Caitlin did stand out from the other case studies discussed in this section. She displayed and maintained higher *Self-efficacy* in managing symptoms/modifying contributing behaviours to her pain and noticed decrease in discomfort/pain at each successive interview. In contrast to the previous five case studies, Caitlin proactively and *Consistently* looked for ways to minimise her pain and *mindfully* implemented any strategies learned. She constantly said that decreasing her discomfort/pain involved being open to change, seeking out as much advice as possible by discussing her experiences with other musicians and teachers, and continually adapting.

It is encouraging that Caitlin claimed to be able to participate in various national music camps and orchestral programs with minimal experiences of playing-related discomfort/pain. This is a marked contrast to Robert and Steve, who perceived that the playing hours required in the exact same seasons were a trigger for severe ongoing

episodes of pain. This different outcome seems most likely due to the differences in levels of *Self-efficacy*, most notably Caitlin's proactive use of preventative strategies, use of self-awareness and reflection, and better *time management* skills when scheduling and completing her practice.

Caitlin's outcome at the end of her participation in this research project was also positive. Her experiences had reportedly decreased from constant severe pain when playing her instrument at the start of her program to occasional tension and discomfort. Yet she had not had to greatly decrease her playing or modify her initial career goals in order to make this happen. In fact, once she stopped avoiding the relevant issues and proactively took steps to change identified contributing behaviours, she started to notice a gradual improvement. Over time, this added up to a marked decrease in pain.

Table 23

Reported Pain Experience for Student 5: Caitlin

Semester	Grade	At worst*	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	3	Present at time, 3	Back of both shoulders	10	1-2 hours	N/A
2	2	3	Last Friday	Left shoulder	5	1-2 hours	N/A
3	1	2	3 weeks ago during an Orchestra rehearsal	Back of both shoulders, upper left arm	4	2 hours	6 hours
4	1	2	Previous Friday during an Orchestra concert	Right hand	5	2 hours	8 hours
5	2	2	Previous day during Orchestra	Middle/ upper back	1	10 hours a week	8 hours
6	1	1-2	That morning	Left upper arm, back of right shoulder	3	2-3 hours	9 hours
7	1-3	2	2 weeks ago	Left arm	3	2-3 hours	9 hours
8	1	1-2	That morning during a rehearsal	In between shoulder and neck	3	At least 2 hours	9 hours

*On reflection, 4-5 at worst

Orientation Week

Prior to her studies at the institution Caitlin had experienced playing-related discomfort/pain in her left fingers, hand, wrist, shoulder, and forearm; her right hand, forearm, and shoulder; her neck; the left side of her back; and her lower body. The discomfort/pain in her left shoulder bothered her the most, recurring every time she played, and she believed it was due to having a “large collarbone that is in the way of my shoulder rest”.

Semester 2

Caitlin had recently noticed a decrease in discomfort/pain in her left shoulder as a result of strengthening and improving her posture. Although her pain was still always present when playing and was thereby affecting her ability to practise, it had gone from severe at the beginning of the year, to mild. After talking with visiting pedagogue Teacher S. Caitlin said that she now believed that her pain was also due to a lack of support in her lower back, not just from her collarbone and shoulder rest.

Semester 3

Caitlin claimed to be feeling very positive. Her playing-related discomfort/pain had reportedly continued to decrease, although she still experienced some playing-related discomfort in her neck, back, both shoulders, and upper left arm. She had noticed that the focus of her pain was changing as she worked on improving her posture. In addition to talking at length again about Teacher S, she claimed to have also found some Alexander Technique workshops beneficial.

Semester 4

Caitlin said that she had continued to notice improvements in her pain levels as a result of strengthening her back and left arm muscles, and that this was particularly

noticeable during her participation in the most recent Opera program. The focus of her playing-related pain was now tightness in the right thumb and discomfort in her back when playing for long periods of time. She claimed to be feeling extremely positive and continued to talk about Teacher S's influence. She was now using practice breaks as a preventative measure.

Semester 5

Caitlin now seemed to backtrack a little. She said that, although Teacher S's advice and working on posture was helpful, she had since discovered that modifying her instrument had been more beneficial. She had recently changed her shoulder and chin rests and tried a lighter instrument and said that she had noticed a corresponding decrease in discomfort/pain. Her back pain bothered her the most, mostly in Orchestra when playing slow passages, and her teacher had recommended more Alexander Technique. She was also experiencing some tightness in her right hand.

Semester 6

Caitlin said that she was no longer experiencing any pain when playing. However she continued to experience discomfort, mostly in the back of her shoulders, when raising them to support her instrument. She had purchased a new bow that was lighter and of better quality and she linked this to a decrease in discomfort in the right hand. She talked at great length about improvements to her playing technique and how satisfying it was to play free of pain.

Semester 7

Caitlin was not consistent about what parts of the body she was experiencing discomfort/pain in (neck, arms, and back) but said that the neck was the only one that bothered her, when playing for long periods of time. She was continuing to adjust her

shoulder rest, and had recently participated in a national music camp without any major problems. She was doing more stretching as a preventative measure, particularly in the morning if practising early, but also during and after playing.

Semester 8

Caitlin had recently been on a chamber music camp and claimed not to have experienced any pain. Nonetheless she could still experience some tightness between her neck and left shoulder when playing and, for the first time, mentioned that it could be aggravated by other activities such as sleeping and exercise. As a result of this, she had adjusted her exercise routine so that she did not do anything too strenuous when she had a long day of playing. Caitlin still claimed to be doing lots of stretching and had changed her shoulder rest and chin rest again.

Discussion

Caitlin was the first student I noticed in our group Orientation Week session due to her seemingly outgoing, confident, and talkative nature. Over the years, these characteristics worked in my favour, as her obliging personality made the interview process relatively easy. She regularly attended workshop, responded promptly to email communications, and went into great detail about her experiences on her own initiative, thereby requiring very little prompting during interviews. However she could revisit and discuss at length certain ideas and philosophies (whether playing-related or not) in consecutive interviews. This was something I had to be aware of when reflecting on her answers.

Caitlin consistently claimed that her playing-related discomfort/pain was decreasing over the time that she was participating in this research project. The scores contained in Table 23 clearly supported this perception, as did her statement on

reflection that her pain was at its most severe early in the first year of her program. In her opinion, Caitlin's decreasing discomfort/pain was due to her *motivated* efforts to seek advice from as many people as possible on how to decrease discomfort and improve technique. However it was undoubtedly also due to her willingness to proactively reflect on and adapt perceived contributing behaviours in a preventative manner.

Caitlin appeared to have some major changes in her thinking over the years. These changes seemed to be influenced by her tendency to uncritically accept and mimic the ideas and playing techniques of fellow musicians, in accordance with her underlying *Cultural beliefs*. For example, at the onset of her program she said that she believed that a lot of her pain was a result of her instrument's set-up, and a lack of support from her shoulder rest. This idea had largely come from her previous violin teacher, the only person she had discussed her experiences with at that time.

During her first year, after getting advice from visiting pedagogue Teacher S, she decided that her discomfort/pain was actually due to a lack of support in her lower back and poor posture. She then went on to talk about Teacher S's influence at great length for three consecutive interviews. "I had really bad posture in general life, [as well as] when I was playing... Teacher S... taught me how to sit properly... [he] really helped me get rid of... half of... [my pain] in one go" (Caitlin, SEM 3).

In her fifth semester she then backtracked towards her original position, after further consultation with her teachers and fellow musicians. Although such changes in thinking were relatively common among participants in this research, including Tom, discussed previously, few of the other students had talked about any one perceived influence to such extent. From this point on Caitlin did not mention Teacher S again, or

anything to do with lower back support. Instead, for the remainder of her time in the research she reverted back to her underlying *Cultural belief* that the origin of the discomfort/pain was due to *environmental conditions* such as her instrument set-up, size and weight. She resumed experimenting with different chin and shoulder rests and eventually purchased a new (lighter) violin and bow.

I have been trying out new instruments that are much lighter and... I've got a different shoulder and chinrest now... we realised that the problem really wasn't in my, shoulders as much as it was in my neck... [it's] solved a lot just, realising that a lot of it can be in my neck too. (Caitlin, SEM 5)

Caitlin seemed to be happy discussing her experiences in detail on an ongoing basis with her teacher and fellow musicians in terms of improving her instrument set-up and playing technique. Clearly she believed these factors were intrinsically linked to her discomfort/pain. Yet, as was also the case of some injured tertiary music students in Ioannou and Altenmüller (2015, p. 141), she did not seek advice from a medical professional. She did not even mention directly having heard renowned Australian music physiotherapist Bronwen Ackermann give any talks on preventing injuries and stretching at any of the national music camps or orchestral programs that she attended.

Naturally, other students in this research also talked with their teachers and fellow musicians about issues of playing technique and instrument set-up. However, due to what appeared to be underlying *anxiety, insecurity* and *fear* of judgement, many of those experiencing ongoing and severe pain would not discuss the pain itself. It was common for them to only be *motivated* to talk/seek appropriate medical advice about their actual pain with medical professionals once it became very severe, and they were seeking immediate treatment and relief. Some of those other students were then willing

to reflect on the advice given by these health professionals regarding preventative strategies. In fact, in many instances they had actually already been self-aware for some time of behaviours they could modify to potentially minimise their pain. However, Caitlin was one of the few students who were *motivated* enough to modify their habits or methods of thinking on more than a short-term basis, if at all.

Caitlin also appeared to have more realistic expectations as to what her body could handle, and better *time management* skills than the previously discussed five cases. She *mindfully* incorporated strategies such as taking breaks throughout her practice; keeping her practice time consistent (and not in excess of three hours per day); reducing her practice on days where she had orchestral rehearsals; stretching; modifying her exercise routine to minimise discomfort/pain; changing her work so that she no longer had to do activities that were aggravating her pain; and being aware of any tension whilst playing. As the following quotations show, Caitlin continued to use these preventatively even when her pain decreased, unlike many others who were *unmotivated* to make such changes in the first place.

I'll probably do no more than an hour and a half [practice]... within that hour and a half I'll... go for a little walk and have a little bit of a stretch after a half-hour of something... I'd rather, do that than... be interrupted [later] by the fact I might be sore. (Caitlin, SEM 7)

I've been doing more stretches... since, [attending a national music camp]... especially... when I'm finished playing so, that doesn't catch up with me later [laughs]. (Caitlin, SEM 7)

As she was more adaptable, Caitlin's experiences of pain during this research did not appear to be following the same counterproductive cycle discussed in detail with

cellist Tom. However, it is possible that they had in the past. On reflection, Caitlin claimed to have experienced many years of severe pain prior to (and early in) her studies at the institution. She even questioned whether she had been honest about the extent of her pain in the early stages of her program, and recounted some particularly severe experiences she had not mentioned in the past.

Around Grade, 10 when I started, having to play for long periods of time harder pieces that required me really to jump... I really noticed it [pain] then and I didn't really know what to do I just put up with it and it just kept getting worse.

(Caitlin, SEM 4)

Whilst I was in the first year, I did a concert... and... [afterwards]... I was, in so much pain I was actually crying, [laughs]. (Caitlin, SEM 8)

[On reflection my pain was] I'd say, four or five at least... I don't remember what I gave myself I think maybe, I could have even given myself a lower grade than it was... because, I, was in a little bit of denial [laughs]... as much as I talk about it I didn't really like to, fully admit to how bad it was I think it made me too sad.

(Caitlin, SEM 8)

This last quotation is particularly pertinent given that at no stage did she give her pain a score more than Grade 3. It underlines the complexity, unreliability and potential *Inconsistency* within such pain scores, when not considered in the context of the qualitative data. It also highlights the perceived psychological impact that Caitlin's pain was having on her mental health. She consistently stated throughout her participation in this research that she had *suffered* in the past from ongoing *Stress/anxiety*, negativity, and *insecurity* as a result of her pain. Thankfully in her case she perceived that she was able to overcome this negative mindset. She invested in a proactive stance towards her

pain, stopped avoiding dealing with the issue, and went on to comment on several occasions that she believed this shift in thinking was a large part of overcoming her problems. “It’s a positive... way of thinking too, because before I am like ‘this is never going to get fixed’, so I just persisted in doing it, not trying to do anything” (Caitlin, SEM 3).

Caitlin also claimed to experience significant *Stress/anxiety* about her experiences when they were only affecting her technique, and she was prepared to discuss them on an ongoing basis at this point. It is interesting to note that, in accordance with individual *Priorities* some of the other students claimed to only perceive that their pain was becoming concerning when it was affecting their ability to perform other activities in their everyday life. In Mary’s case this was due to the underlying *Cultural belief* that pain was a normal part of playing. On reflection, Caitlin also highlighted that she had initially had similar thoughts and that challenging these kinds of *Cultural beliefs* was the first step in turning her experiences around. “I was terribly concerned... it was really affecting... everything around my playing” (Caitlin, SEM 8).

When... I was younger... they [other people] thought that I would grow into being strong enough not to get that pain, so I just put up with it, and then I realised... I should take it a little more seriously. (Caitlin, SEM 4)

Zaza et al. (1998) found that the point at which playing-related pain became a PRMD and/or something of concern was determined subjectively by the individual musician (p. 2017). Caitlin was clearly very concerned about her experiences of pain at an earlier stage than some of the other students in this research. As was the case of some of the healthier musicians in the research by Schoeb and Zosso (2012, p. 133), she also

seemed to be more focused on talking to as many people as possible and getting different ideas as opposed to looking for a "solution". It is refreshing that she noticed a significant improvement in pain levels over her four year Bachelor of Music program.

Despite some similar underlying *Cultural beliefs* and experiences of *Stress/anxiety*, Caitlin also demonstrated higher *Self-efficacy* in managing symptoms/modifying behaviours contributing to her pain than the previously discussed five case studies. As a result of her *Priorities* she was *motivated* to modify contributing behaviours and her positive attitude and *mindful* embracing of preventative strategies were a refreshing change. In many ways her approach to dealing with her playing-related discomfort/pain appeared to be a reflection of her unique personality. However, it was undoubtedly also a reflection of her ongoing experiences of playing-related discomfort/pain prior to her studies at the institution, and her particular journey.

Conclusion

The six case studies discussed in this section have shown a range of approaches to dealing with playing-related discomfort/pain. The four primary and three overarching themes have featured strongly. In particular, poor *Self-efficacy* in managing symptoms/modifying contributing behaviours has emerged as a key factor in determining student outcomes at the conclusion of this research. Caitlin offered an example of an approach that could address and overcome significant pain by using proactivity and *mindfulness* strategies. Her journey over the four year period is encouraging and shows that positive improvement is possible.

Unfortunately many others in this research were unable to fully adopt such an approach so successfully. The other five case studies considered here selectively adopted elements of Caitlin's *motivated* and *mindful* approach to varying degrees. In

some instances they had short-term or selective success. Tom, for example, went through stages where he was able to proactively utilise preventative strategies and noticed a decrease in pain. Similarly, Steve used reflection and self-awareness to modify contributing factors and ultimately minimise his back pain whilst sitting. However, one of the major differences between Caitlin and these other case studies is that they were unable to maintain any (or adapt other) changes over the years of their program.

Another common feature in many of the case studies was the strong presence of the secondary theme *perfectionism*. Mary, Tom and Robert obsessively practiced for hours on end with limited breaks and little use of preventative strategies and reportedly experienced severe pain/injury. Despite self-awareness that this method of practicing was aggravating their issues, they were evidently unable to adapt their behaviours. In addition to their highly *perfectionistic* traits, these three students also appeared to have poor *time management* skills. They struggled to plan their practice in a manner that allowed for preventative strategies such as warm-ups, breaks and days off and avoided dealing with their pain. The similarities between Robert and Tom's compulsive approaches to practice, exercise, and diet are striking.

The discussion also highlighted the emergence of cycles of pain similar to those identified in Rickert et al. (2014b, p. 18), where students experiencing severe pain were *motivated* to seek medical attention, and temporarily adapt perceived contributing behaviours. After noticing a corresponding decrease in pain they would then resume the habits that were perceived to have aggravated severe pain in the first place. As a result of this, the cycle of recurring pain continued. All of the case studies considered in this section may have been experiencing such a cycle at some point during their period of instrumental learning. Tom is the most obvious example. However even Caitlin, who at

the conclusion was in a refreshingly positive place, admitted to having been stuck in the past. In her case her situation only began to improve when she stopped avoiding the relevant issues, acknowledged her *Stress/anxiety*, began discussing her pain openly with others, and was prepared to *mindfully* change contributing behaviours.

The experiences of pain reported in this research should not be taken entirely at face value. There are many *Inconsistencies* throughout the data. Factors such as the inevitable subjectivity of perceptions, the questionable reliability of memory, recall bias and the individual's willingness or reluctance to disclose openly the extent of his or her pain must be taken into account. Caitlin, for example, admitted on reflection that she may not have always been honest about the extent of her pain due to *Stress/anxiety*, underlying *insecurity*, and *fear*. Similarly Steve suggested that his high levels of *Stress/anxiety* may have led him to believe that his experiences were more severe than they actually were.

On the other hand Mary's underlying *Cultural beliefs* regarding the acceptability of pain and Robert's belief that pain was a sign of weakness and/or bad technique may have led to them downplaying their experiences. Similarly, Anna and Tom's hope that medical intervention would be sufficient in resolving their pain issues without any long term changes behavioural changes may have led to them perceiving a short-term decreases in pain levels. In any event, these six case studies reveal a great deal about the complexity involved in each individual's experience and give insight into the difficulty of researching and reporting in this area. They also highlight the importance of further education for all musicians regarding the potential impacts of *Self-efficacy* (*motivation, mindfulness, perfectionism, and time management skills*) on pain and injury outcomes.

Chapter 10: Conclusion

Introduction and Research Questions

This research project set out to address the questions identified in the introductory chapter of the thesis. The main purpose of these questions was to further explore the individual circumstances that may lead to playing-related discomfort/pain. However, during the course of data collection and analysis the extent to which the questions were interrelated and difficult to consider in isolation became evident.

Question 1 asked:

1. How, if at all, do string students perceive the nature and causes of their own playing-related discomfort/pain as they progress through a Bachelor of Music program?

One answer would be that they perceived that it is changeable, and in most cases an issue of concern. Generalisations that can be made include:

- A high number of students in this research were experiencing playing-related discomfort/pain for the duration of their Bachelor of Music program.
- All of the students except one claimed to have experienced playing-related discomfort/pain prior to their studies at the institution.
- A high proportion of students perceived higher grades of pain/injury during the third year of their study. During this year a larger percentage of students were also experiencing discomfort/pain away from the instrument.
- Six of the students in this research confirmed their experiences of discomfort/pain affected their decision not to continue and do an optional fourth-year in the Bachelor of Music program.

The data suggested that individual circumstances and perceptions of pain are very subjective and that they vary greatly according to a number of complex and overlapping risk factors. In this research, any two individuals in what may have seemed to be a similar amount of discomfort/pain may have come away with completely different perceptions of its severity and causes. The individuality and subjectivity involved in qualitative data has been alluded to in research of musicians by Guptill (2011a, 2011b); Rickert et al. (2013, 2014a, 2014b, 2015); Schoeb and Zosso (2012); and Wood (2014). However, the in-depth and longitudinal nature of this research further highlighted this point.

Question 2, 3, and 4 went on to then ask:

2. What are students' perceptions as to the individual circumstances (both past and present) that may be contributing to the development of playing-related discomfort/pain?
3. What behaviours do string students perceive to be influencing their playing-related discomfort/pain? And
4. What factors within the current learning environment at the institution do string students perceive to be influencing their playing-related discomfort/pain?

Again, there were a great range of perceptions among different individuals as to what specific circumstances, individual behaviours, and factors within the learning environments at the institution may be contributing to the development of playing-related discomfort/pain. However, the thematic analysis revealed a number of themes that could be applied over the cohort and that bear striking similarity to other recent research in the area including that by Araújo et al. (2017) and Perkins et al. (2017). In

order to demonstrate this, it is useful to consider again the categories of contributing factors and the various themes that emerged from students' responses.

Major contributing factors

Many of the major themes to come from this research were pronounced clearly in relation to the first contributing factor, the learning environment. The following section will discuss them all in that context before the summaries of the other four contributing focus on more specific themes applicable to them.

The learning environment

Students in this research commonly perceived that aspects of the learning environments they were in at the institution (most notably the Major Study and Orchestra courses) were impacting on their perceptions of playing-related discomfort/pain. Aspects identified within the Major Study course as influencing playing-related discomfort/pain included exam requirements, frequency and content of lessons, repertoire, and numerous factors related to students interactions with individual staff members. These findings align with available literature including recent research of similar populations by Ioannou and Altenmüller (2015, p. 138); Perkins et al. (2017, p. 5 of 15); and Wood (2014, pp. 41-42).

A tendency for students to primarily seek advice on health matters from their teachers, as per underlying *Cultural beliefs*, has been well documented in the literature on musicians' health (Perkins et al., 2017, p. 6 of 15; Stanek et al., 2017, p. 20; Williamon and Thompson, 2006, p. 411). Students in this research were similarly looking to their *teacher/conductor as authority figure* and support for all matters, including playing-related including injury. As was also found to be the case in Ioannou and Altenmüller (2015, p. 137); Perkins et al. (2017, pp. 6-8 of 15); and Wood (2014, p.

42), there was a perception that particular teachers were more helpful to students suffering discomfort/pain, encouraged more preventative practices among their students than other teachers, and were generally more flexible.

Unfortunately many students in this research also perceived that they did not get adequate support from their teachers or other staff at the institution. There was a subsequent reported general lack of knowledge of the available support services at the institution and beyond among some staff and students, which heightened the difficulties suffered. Although disappointing, this does align with other research in the field.

Perkins et al. (2017) found that inadequate support services were perceived as one of the main barriers to optimal health among 20 UK conservatoire music students (p. 5 of 15); in a study of 98 Malaysian tertiary music students Lonsdale and Boon (2016) reported that over half felt they did not receive enough education about prevention (p. 151); and in a qualitative study of ten injured professional musicians Guptill (2011b) found some participants perceived that teachers lacked information about how to prevent/deal with injuries (p. 276).

Biggs (1989) suggests that perceptions of the learning environment can directly influence learning outcomes (p. 20) and Lizzio, Wilson, and Simons (2002) found that positive perceptions of the teaching environment directly influenced academic achievement and qualitative learning outcomes among undergraduate students (p. 27).

The same also appeared to apply to students in this research. Those who were *Discontent* with their instrumental teachers and orchestral learning environmental seemed to transfer that *Discontent* to other areas of study and interactions with other staff.

In this discussion chapter on the learning environment the primary theme of *Self-efficacy* was also introduced. Generally speaking, *Self-efficacy* has been identified as a critical risk/protective factor for patients experiencing chronic pain (Jackson, Wang, Wang, & Fu, 2014, p. 800). It has also been identified as affecting injury outcomes in research involving musicians. In a study comparing 198 music students from UK conservatoires and 65 health students, Ginsborg, Kreutz, Thomas, and Williamon (2009) found that music students perceived their health was worse, with more negative effects (p. 255). Healthy lifestyles correlated with positive affect, *Self-efficacy* and self-regulation. *Self-efficacy* also correlated with musculoskeletal and non-musculoskeletal symptoms.

The different degrees of proactivity in dealing with any issues, *motivation* to change and *mindfulness* were clearly illustrated in the experiences of Anna and Rachel and the different reactions to Teacher D. Jørgensen (2000) asserts that skills such as independence and responsibility should be institutional responsibilities (p. 75). The results of this research suggests that further education for students in this area is vital, so that they feel that they do have the power to look elsewhere for answers if they do not receive them initially, and also make choices that are beneficial to their health.

To a lesser extent the themes of *Lack of control* and *Stress/anxiety* were also evident in this discussion chapter. Students perceived a *Lack of control* over certain elements of their Major Study course, including academic requirements and teacher selection. It became evident in the subsequent chapters that they were transferring that *Lack of control* to situations where they did actually have control, however lacked the *Self-efficacy* skills required to be proactive and make change. Students also expressed *Stress/anxiety* in the form of *insecurity* about their own abilities due to *Cultural beliefs*

and poor *Self-efficacy*; *fear* and *frustration* at a perceived *Lack of control*; as well as general *Discontent* with their learning environments.

Orchestra

The findings of this research concur with those of a number of studies previously identified in the literature review that similarly have shown orchestral playing to be a major risk factor for PRMDs. Risk factors for playing-related discomfort/pain identified by students in this research relating to the Orchestra course at the institution were broad ranging. However they largely revolved around a perceived *Lack of control* over aspects of the learning environment including *playing time* (rest breaks, rehearsal duration, rehearsal techniques, and repertoire selection), *academic requirements* (scheduling/timetabling, teacher/conductor attitudes and behaviours), and *environmental conditions* (equipment provided).

The *Lack of control* perceived by students in this study is also evident in other studies. For example it has been shown to be a stressor and correlated with decreased job satisfaction and mental health in working populations (Bond & Bunce, 2003, p.1064; Elliott, Rodwell, & Martin, 2017, p. 558). Qualitative studies researching professional orchestral musicians have also reported a perceived *Lack of control* as affecting health outcomes. Rickert et al. (2013) found that musicians perceived that *Lack of control* over scheduling, repertoire, venue choice, and rehearsal technique was both a stressor and potential modifier of injury (p. 219). Guptill (2011b) also found that injured musicians believed that more control over their work environment would help them to avoid and deal with injuries (p. 279).

Holst et al. (2012) found that Danish musicians reported a demanding psychosocial work environment due to high work demands, *Lack of control* and low

social support, and that this increased levels of *Stress/anxiety* (p. 639). Students in this research also reported experiencing increased *Stress/anxiety* due to *fear* in the orchestral learning environment and a perceived *Lack of control* over outcomes. They perceived that this, in turn, increased their playing-related pain and general *Discontent*. The students' experiences align with Karasek (1979), who found that high psychological demands and low decision authority increased the risk of ill health among workers from Sweden and the United States (p. 288); and van der Windt et al. (2000) who, in a review of the literature, reported that many studies that assessed psychosocial risk such as poor control at work or job dissatisfaction reported at least one positive association with shoulder pain (p. 433).

Some students said they believed that professional orchestral musicians had more control over their workplaces than they did, due to guidelines and players unions, and believed that this would reflect positively on their health. However, recent Australian research suggests that, despite any such guidelines/unions, professional stage and pit orchestra musicians may still face similar issues to those identified by students in this study. Rickert et al. (2014a) confirmed that musicians often play down pain, and try and hide injury from colleagues and management for fear that it will be seen as a sign of weakness, failure, and poor technique (p. 94) due to underlying *Cultural beliefs*. Kenny et al. (2016) also reported that 25% of Australian orchestral players had been bullied at work, most commonly by orchestra management (p. 5). Notably, pit orchestra musicians (who mostly perform lengthy operas and ballets, similar to the Opera at the institution) reported more workplace bullying and lower job satisfaction than stage musicians (p. 1).

Several of the students who were most vocal about their *Discontent* with the Orchestra course were also *Discontent* with many other elements of their program. They generally struggled to suggest workable solutions to their issues yet remained unable to accept their current circumstances. In this research, those who accepted the learning environment and its restrictions seemed to fair better psychologically than those who struggled against it. This aligns with (among others), the research by Bond and Bunce (2003), who found that higher acceptance was associated with better job satisfaction and mental health among 412 customer service centre workers in the UK (p. 1057).

Practice

Students in this research perceived that factors related to practice including the accumulation/total amount of playing time, the consistency of individual practice, the content (warm-ups, practice breaks, and repertoire), and other factors were influencing their perceptions of playing-related discomfort/pain. Again, this is in line with other recent research of similar tertiary populations which has also continued to confirm that some of the perceived contributing factors to PRMDs are linked to practice and playing time (Ioannou & Altenmüller, 2015, p. 135; Ioannou et al., 2018, p. 26; Lopez & Martinez, 2013, p. 102; Rodríguez-Romero et al. 2016, p. 193; Wood, 2014, p. 42). However the extent to which experiences of participants in this research varied and their perceived impact on pain levels over time was still striking.

Throughout the discussion of practice the primary theme of *Self-efficacy* and secondary themes *motivation*, *mindfulness*, *perfectionism*, and *time management* featured prominently. *Self-efficacy* has been found to be a predictor of academic achievement and the most important predictor of a musician's success in performance examinations (McCormick & McPherson, 2003, p. 37; 2006, p. 322). The students in

this research, to have attained the level of proficiency required for tertiary study, all must have displayed a degree of *Self-efficacy* in relation to some aspects of their practicing. However it was common for participants to display low *Self-efficacy* in regards to improving their general and playing-related health. This aligns with other studies that have similarly found that tertiary music students often display low self-responsibility for their own performance health (Ginsborg et al., 2009, p. 242; Kreutz et al., 2008, p. 7; Lee, Carey, Dubey, & Matz, 2012, p. 85; Rickert et al., 2015, p. 426; Stanek et al., 2017, p. 20; Wijsman & Ackermann, 2018, p. 3).

Generally speaking, most participants listed similar strategies for preventing pain during practice: taking regular breaks, warm-ups, and keeping their playing time consistent. However, as was the case in Ioannou and Altenmüller (2015, p. 141), many also reported that there were some circumstances in which they would continue to practise/play, regardless of the amount of pain. This was particularly the case when *motivation* to play/practice was high. This finding aligns with Verhoeven et al. (2010), who showed that distraction worked better as a method of coping with chronic pain when *motivation* was high (p. 229); and van Ryckegehm, Crombez, Eccleston, Legrain, and van Damme (2012), who found that distraction is more effective if the task is removed from the pain (p. 402).

The secondary themes of *mindfulness* and subthemes of self/body awareness, adaptability, and reflection also recurred strongly in this section. *Mindfulness* in itself is a treatment approach for chronic pain (Kaiser, Mooreville, & Kannan, 2015, p. 3 of 8). Along with self-awareness of one's own body, it has been classified as a lifestyle enabler to optimal health among music students (Perkins et al., 2017, p. 5 of 15). Students in this research who were aware of their body and pain during practice were

able to adjust behaviours in order to minimise that pain and used reflection as a tool to manage their health, reported a better outcome in terms of pain and injury.

Perfectionism, a personality trait defined by the desire to perform at an exceptionally high level while simultaneously being excessively critical of one's efforts (Hewitt & Flett, 1990; in Diaz, 2018, p. 151), also featured prominently in this discussion chapter. *Perfectionism* has been linked with *Stress/anxiety* (Stoeber & Eismann, 2007, p. 2183; Kenny et al., 2004, pp. 772-773), as well as lower health responsibility and lower stress management among higher education music students (Araújo et al., 2017, p. 1 of 19.)

As was also the case in Stoeber and Eismann (2007, p. 2182) and Koboria, Yoshieb, Kudob, and Ohtsukib (2011, p. 674), students in this study who displayed *perfectionistic* traits experienced positive and negative consequences, depending on their individual *Priorities*. As a result of their seemingly obsessive or compulsive approach to practice, many students were able to maintain rigorous practice schedules throughout their programs, and claimed to notice beneficial effects in terms of their musical progress. However some were unable to modify those practice routines at all when they experienced pain, and thus worsened their injuries.

Araújo et al. (2017) found that lifestyle challengers such as irregular schedules and workload in relation to practice were barriers to optimal health among music students (p. 5 of 19) and Ranelli et al. (2015) that pattern of practice was linked with PRMD in child instrumentalists (p. 390). Students in this research similarly perceived that poor *time management* in the form of irregular and extended practice schedules, overwork, insufficient days off, and “panic practicing” affected their playing-related discomfort/pain. Many students also seemed to have unrealistic expectations regarding

recovery and continued to push themselves to physical and psychological extremes, thus worsening their pain/injury. Similar factors have been shown to impact significantly on the development of and recovery from musculoskeletal pain and injury in other adult populations (Trinkoff, Le, Geiger-Brown, Lipscomb, & Lang, 2006, p. 964; Booth-Kewley et al., 2014, p. 287; Laisné, Lecomte, & Corbière, 2012, p. 372).

Technique

Technique has been perceived as a top priority by conservatoire teachers and students (Mills & Smith, 2003, p. 13; Zhukov, 2008, p. 159). Not surprisingly, technique was similarly perceived as a priority as well as a key contributing factor to playing-related discomfort/pain among participants in this research. As noted in the discussion chapter, all students linked the words technique, posture, and/or instrument set-up to playing-related discomfort/pain during at least one of their questionnaire/interviews. These figures align with recent available literature which continues to confirm their perceived importance (Ioannou & Altenmüller, 2015, p. 139; Robitaille et al., 2018, p. 10; Stanek et al., 2017, p. 23; Wilson et al., 2014, pp. 684-685; Wood, 2014, p. 42).

Participants in this research believed that technique was something that was unique to the individual, and could not be generalised over the population. Despite this, the majority admitted that they were largely mimicking the techniques of their teachers and other musicians. This cultural practice may allow the perpetuation of incorrect playing techniques and places unnecessary pressure on teachers. It can also can lead to dependency and encourage low *Self-efficacy* (Carey, 2010; in Carey & Grant, 2015, p. 6) which can be a key factor in determining injury outcomes (Busch, Göransson, & Melin, 2007, p. 234, Rickert et al., 2015, p. 436).

The *Cultural belief* of “no pain, no gain” and the notion that pain was a sign of poor technique recurred strongly in this discussion chapter. Similar beliefs have been identified as widely prevalent among musicians of all ages (Andersen et al., 2013, p. 128; Brandfonbrener, 2003, p. 231; Britsch, 2005, pp. 41-32; Fry and Rowley, 1989, pp. 1001-1002; Ioannou et al., 2018, p. 31; Rickert et al., 2015, p. 426; Robitaille et al., 2018, p. 11). As was also the case in Rickert et al. (2015, pp. 432-433), students in this research wanted more assistance from their teachers to learn playing techniques that would minimise pain. However there was also a marked tendency for students to have unrealistic expectations of their teachers, and to rely on them for diagnoses/etiology of injury.

Many participants in this research assumed that, if they copied the techniques of their teachers, they would be safeguarded from future injury. Unfortunately, this type of dependency further encourages low *Self-efficacy* and ultimately may increase *Stress/anxiety*. Students *fear* judgement from teachers and other musicians when they experience pain and injury, due to the belief that pain is a sign of bad technique and that they have done something wrong. This in turn increases *suffering* and *insecurity* and may lead to stigma, which can influence help seeking behaviour and the likelihood of reaching out for support (Kaiser et al., 2015, p. 3 of 8).

Other influencing factors

Many other factors were also perceived by students in this research as influencing their playing-related discomfort/pain. Those mentioned included (but were not limited to) exercise and diet, sports injuries, outside work, computer use and writing, day-to-day activities (e.g. sleeping position, carrying and lifting items, travelling, and housework), pre-existing medical conditions, and psychological health.

Again, the large number of different contributing factors were not unexpected in the context of the available literature, where the complexity and overlapping nature of multiple risk factors for musician injury is highlighted (Brandfonbrener, 2010, p. 5; Horvath, 2010, pp. 23-26). Despite this, the number of students in this research who perceived experiencing pain as a normal part of their daily lives was revealing.

The primary theme of *Self-efficacy* and secondary themes *motivation*, *mindfulness*, *perfectionism*, and *time management* featured most prominently throughout this discussion chapter. Intrinsic *motivation* has been identified as a characteristic of those who pursue a career in music (Burland & Davidson, 2002, pp. 129-130; Diaz, 2010, p. 23; Evans & Bonneville-Roussy, 2016, p. 1095; Hallam et al., 2016, pp. 531-532; McCormick & McPherson, 2006, p. 322; Schmidt, Zdzinski, & Ballam, 2006, p. 149). It has also been established as a determining factor in exercise *Self-efficacy* (Chung & Lui, 2013, p. 243; Liu & Chung, 2016, p. 410; Neace, Hicks, Salmon, & DeCaro, 2018, p. 314; Pauline, 2013, pp. 65-66; Sullum, Clark, & King, 2000, p. 175; Vallerand, Koestner, & Pelletier, 2008, p. 259), diet *Self-efficacy* (Cuadrado et al., 2018, p. 12; Furia, Lee, Strother, & Huang, 2009, p. 256; Guertin, Rocchi, Pelletier, Émond, & Lalande, 2015, p. 543; Pelletier & Dion, 2007, p. 303; Pelletier, Dion, Slovenic-D'Ángelo, & Reid, 2004, p. 245), and work *Self-efficacy* (Ayupp & Kong, 2010, p. 123; Cetin & Askul, 2018, p. 186; Prat-Sala & Redford, 2010, p. 283; Van Vianen, 1999, pp. 641-642).

Many students in this research who displayed high *Self-efficacy* through their *motivation* to reach goals and work hard at their music also displayed similar tendencies in other areas of their lives including other academic study, exercise, diet, and work. As was the case in Perkins et al. (2017, p. 7 of 15), students perceived that maintaining a

healthy lifestyle (including exercise and diet and limiting alcohol) was important, but difficult due to hectic scheduling and financial strain.

In this research those who were proactive in dealing with any issues that arose also appeared to have had more favourable outcome in terms of pain and psychological health. Their experiences and different outcomes align with Ioannou et al. (2018), who found that active treatments may increase *Self-efficacy* skills as they are goal directed and encourage positive rather than negative emotions (p. 33); Landsman-Dijkstraa, Wijck, Groothoff, and Rispen (2004), who found that participation in a body awareness program increased self-efficacy and improved self-management (p. 155); and van der Mass et al. (2016), who found that *Self-efficacy* increases with increased body awareness (p. 660).

Perfectionism among college students has been found to be higher in certain domains including university/work and physical activity (Stoeber & Stoeber, 2009, p. 530; Haase, Prapavessis, & Owens, 2013, p. 711). Selected students in this research displayed a similar obsessive approach to their exercise and work as was evident in their punishing practice regimes, as well as unrealistic expectations as to how much their bodies could handle. As has been noted in the wider literature, strength sports and physical work involving lifting were associated with pain (Guddal et al., 2017, p.1; Heneweer, Staes, Aufdemkampe, & van Rijn, 2011, p. 826). Participants also perceived inconsistency of physical activity as having a significant impact on the severity of pain, both during instrumental playing and in other domains.

The other prominent primary theme in this discussion chapter was *Stress/anxiety*. A reciprocal relationship between anxiety and pain has frequently been reported in the wider literature (Asmundson & Katz, 2009, p. 889; Csupaka, Sommer,

Jacobson, & El-Gabalawy, 2018, p. 74; Dominick, Blyth, & Nicholas, 2012, p. 299; Knaster, Karlsson, Estlander, & Kalso, 2012, p. 46; McWilliams, Cox, & Enns, 2003, p. 127; Vancampfort, Koyanagi, Hallgren, Probst, & Stubbs, 2017, p. 1; Williams, Pasco, Jacka, Dodd, & Berk, 2012, p. 452) as well as that specific to musicians (Ioannou et al., 2018, p. 26; Jabusch, Müller, & Altenmüller et al., 2004, p. 1169; Kaneko et al., 2005, p. 171; Kenny & Ackermann, 2015, p. 43; Lamontagne & Belanger, 2015, p. 1; Vaag, Bjørngaard, & Bjerkeset, 2016, p. 234; Wristen & Fountain, 2013, p. 152). It has been shown that those with high levels of catastrophizing report more pain (Granot & Ferber, 2005, p. 439; Hood, Pulvers, Carillo, Merchant, & Thomas, 2012, p. 403; Keefe, Brown, Wallston, & Caldwell, 1989, p. 54; Ogunlana, Odole, Adejumo, & Odunaiya, 2015, p. 73; Scott, Kroenke, Wu, & Yu, 2016, p. 219; Sullivan, Stanish, Waite, Sullivan, & Tripp, 1998, p. 253) and that, if they are *motivated* during the distracting task they report less intense pain (Verhoeven et al., 2010, p. 229). The same was true of students in this research.

A specific link between poorer mental health and pain in tertiary music students has also been well documented (Evans & Bonneville-Roussy, 2016, p. 1105; Rodriguez-Romero et al, 2016, p. 193; Wristen & Fountain, 2013, p. 157). In this research project secondary themes of *fear*, *suffering*, *insecurity*, and *anger/frustration*, similar to those identified in qualitative research of musicians by Wilson et al. (2014, p. 682) and Zaza et al. (1998, p. 2013) were widely prevalent. It is encouraging that the small number of students who received help with psychological issues reported a decrease in pain and a more positive outlook. As recommended in the literature, education on how to look after psychological health and its effect on physical health may be beneficial in improving outcomes for affected students (Araújo et al., 2017, p. 1

of 19; Ginsborg et al., 2009, p. 257; Guptill, 2011b, p. 279; Ioannou et al., 2018, p. 36; Lonsdale & Boon, 2016, p. 158; Perkins et al., 2017, p. 11-15; Rodríguez-Romero et al., 2016, p. 193).

Conclusion

This research has highlighted the individuality and complexity surrounding students' perceptions as to the nature and causes of playing-related discomfort/pain. The analysis has also revealed a number of key themes (discussed above) that recur among the broader literature. It is clear that students in this research particularly struggled with aspects of *Self-efficacy* that could have allowed them to achieve more positive outcomes. Such students may urgently need to develop more skills in regards to *time management* of practice, work, and leisure activities such as exercise in ways that don't hinder their physical and psychological health.

It is encouraging that participants in this research expressed a willingness to be educated further about the nature and causes of playing-related pain. At the same time it must be pointed out that there were several voluntary sessions held throughout Project Weeks over the five-year period of data collection that looked at various issues to do with playing-related pain and injury and, as was also the case in Park et al. (2007, p. 94) and Perkins et al. (2017, p. 9 of 15), very few of the students in this research actually attended.

One way of ensuring higher attendance rates at workshops and information sessions regarding musician health is to make them components of a compulsory course or subject. A number of institutions abroad and in Australia have taken steps in this direction in recent years. These include the University of Friedberg in Germany; the High Conservatory of Music in Salamanca, Spain; the Conservatory in Trondheim,

Norway; Ohio University of Music; Eastman School of Music/University of Rochester; and the University of Western Australia (<http://www.health.music.uwa.edu.au/project>).

López and Martínez (2013) found that participation in a course on health and the prevention of musculoskeletal injuries had a positive effect in reducing frequency of injury and increasing body awareness among tertiary music students (p. 100). Some positive effect was also noted in studies by Árnason et al. (2018, p. 131); Spahn, Hildebrandt, and Seidenglanz (2001, p. 24); Spahn, Walther, and Nusseck (2016, p. 893); and Zander, Voltmer, and Spahn (2010, p. 54). However, recent research has shown that participation in health education courses and an increase in reported preventative behaviours does not necessarily result in a decreased incidence of playing-related health problems (Spahn et al., 2017, p. 227). These mixed results align with the wider literature regarding the effectiveness of occupational health and safety training (Brewer et al., 2006, pp. 325-326; Burke et al., 2006, p. 315; Kennedy et al., 2010, p. 127; Robson et al., 2012, p. 193; Smith, Purewal, Macpherson, & Pike, 2018, p. 191).

Smith et al. (2018) recommended that in order to obtain the best results injury prevention programs for young workers span the educational, environmental, and enforcement domains (p. 198). In order to enable this process within tertiary music institutions it is vital that any messages regarding PRMDs are consistent across different areas, reflected accurately in policies, modelled by staff, and openly encouraged. For example, rather than just advising students at the beginning of the year of the benefits of stretching before rehearsals, it would be beneficial to organise group warm-up exercises 10 minutes before each rehearsal. This would ideally be scheduled into the timetable to ensure that this is consistent regardless of whether there are different conductors, and different scheduling of rehearsals.

Reinforcing the point made by Spahn et al. (2014, pp. 14-15), educational information should also be tailored to the musician's individual circumstances. It would ideally be given in multiple contexts including through preventative courses; discussions in lessons, workshops and orchestral situations; visiting practitioners; and in different formats (e.g. written and aural). It is important that there is sufficient flexibility within the framework of courses and programs to accommodate personal circumstances, as many of the participants in this research perceived this process was unsatisfactory and contributed to their perceived *Lack of control* over outcomes.

Finally, it should be continually reinforced to students that pain should not be considered a normal part of playing and that it can be greatly aggravated by other activities in their lives such as computer use, work, exercise, general health concerns, and so on. Ultimately, they should understand that resolution of any playing-related problems may not be possible without changes to their lifestyle and/or playing in practising habits, and that consulting a health professional is unlikely to be a "quick fix". They must also understand the impact of the general health on their overall well-being and form a better understanding of general health matters. However at every stage it must be clear to students that it is possible for them to pursue their goals if they are prepared to be patient and make the necessary changes.

Reference List

- Ackermann, B. (2010). Therapeutic management of the injured musician. In R. T. Sataloff, A. G. Brandfonbrener, & R. J. Lederman (Eds.), *Performing arts medicine* (3rd ed., pp. 247-269). Narberth, PA: Science and Medicine.
- Ackermann, B., & Adams, R. (2003). Physical characteristics and pain patterns of skilled violinists. *Medical Problems of Performing Artists, 18*(2), 65-71.
- Ackermann, B., & Adams, R. (2004). Perceptions of causes of performance-related injuries by music health experts and injured violinists. *Perceptual and Motor Skills, 99*(2), 669-678.
- Ackermann, B., Adams, R., & Marshall, E. (2002). Strength or endurance training for undergraduate music majors at a university. *Medical Problems of Performing Artists, 17*(1), 33-41.
- Ackermann, B., Driscoll, T., & Kenny, D. (2012). Musculoskeletal pain and injury in professional orchestral musicians in Australia. *Medical Problems of Performing Artists, 27*(4), 181-187.
- Aki, E., & Yakut, Y. (2003). Overuse syndrome and related problems in professional and student string players. *The Pain Clinic, 15*(3), 327-331.
- Amorim, M. I. T., & Jorge, A. I. L. (2016). Association between temporomandibular disorders and music performance anxiety in violinists. *Occupational Medicine, 66*(7), 558-563. doi:10.1093/occmed/kqw080
- Andersen, L. N., Mann, S., Juul-Kristensen, B., & Sjøgaard, K. (2017). Comparing the impact of specific strength training vs general fitness training on professional

- symphony orchestra musicians: A feasibility study. *Medical Problems of Performing Artists*, 32(2), 94-100.
- Anderson, L. N., Roessler, K. K., & Eichberg, H. (2013). Pain among professional orchestral musicians: A case study in body culture and health psychology. *Medical Problems of Performing Artists*, 28(3), 124-130.
- Araújo, L. S., Wasley, D., Perkins, R., Atkins, L., Redding, E., Ginsborg, J., & Williamon, A. (2017). Fit to perform: An investigation of higher education music students' perceptions, attitudes, and behaviors toward health. *Frontiers in Psychology*, 8(1558). doi:10.3389/fpsyg.2017.01558
- Árnason, K., Árnason, A., & Briem, K. (2014). Playing-related musculoskeletal disorders among Icelandic music students: Differences between students playing classical versus rhythmic music. *Medical Problems of Performing Artists*, 29(2), 74-79.
- Árnason, K., Briem, K., & Árnason, Á. (2018). Effects of an education and prevention course for university music students on their body awareness and attitude toward health and prevention. *Medical Problems of Performing Artists*, 33(2), 131-136.
- Asmundson, G. J. G., & Katz, J. (2009). Understanding the co-occurrence of anxiety disorders and chronic pain: State-of-the-art. *Depression and Anxiety*, 26(10), 888-901. doi:10.1002/da.20600
- Ayupp, K., & Kong, W. (2010). The impact of task and outcome interdependence and self-efficacy on employees' work motivation: An analysis of the Malaysian retail industry. *Asia Pacific Business Review*, 16(1-2), 123-142.
doi:10.1080/13602380701517048

- Baadjou, V. A. E., Verbunt, J. A. M. C. F., van Eijsden-Besseling, M. D. F., Huysmans, S. M. D., & Smeets, R. J. E. M. (2015). The musician as (in) active athlete? Exploring the association between physical activity and musculoskeletal complaints in music students. *Medical Problems of Performing Artists, 30*(4), 231-237.
- Bartel, L. R., & Thompson, E. G. (1995). Coping with performance stress: A study of professional orchestral musicians in Canada. *The Quarterly Journal of Music Teaching and Learning, 5*(4), 70-78.
- Barton, R., & Feinberg, J. R. (2008). Effectiveness of an educational program in health promotion in injury prevention for freshman music majors. *Medical Problems of Performing Artists, 23*(2), 47-53.
- Barton, R., Killian, C., Bushee, M., Callan, J., Cupp, T., Ochs, B., . . . Tetrault, K. (2008). Occupational performance issues and predictors of dysfunction in college instrumentalists. *Medical Problems of Performing Artists, 23*(1), 72-78.
- Beese, A., & Morley, S. (1993). Memory for acute pain experience is specifically inaccurate but generally reliable. *Pain, 53*(2), 183-189.
- Berque, P., Gray, H., & McFadyen, A. (2016). Playing-related musculoskeletal problems among professional orchestra musicians in Scotland: A prevalent study using a validated instrument, the Musculoskeletal Pain Intensity and Interference Questionnaire for Musicians (MPIIQM). *Medical Problems of Performing Artists, 31*(2), 78-86.
- Biggs, J. B. (1989). Approaches to the enhancement of tertiary teaching. *Higher Education Research and Development, 8*(1), 7-25.

- Bird, H. A. (2013). Overuse syndrome in musicians. *Clinical Rheumatology*, 32(4), 475-479.
- Bond, F. W., & Bunce, D. (2003). The role of acceptance and job control in mental health, job satisfaction, and work performance. *Journal of Applied Psychology*, 88(6), 1057-1067.
- Booth-Kewley, S., Schmied, E. A., Highfill-McRoy, R. M., Sander, T. C., Blivin, S. J., & Garland, C. F. (2014). A prospective study of factors affecting recovery from musculoskeletal injuries. *Journal of Occupational Rehabilitation*, 24(2), 287-296.
- Brandfonbrener, A. G. (1987). Medical help for musicians: A new speciality. *The Instrumentalist*, 41(10), 28-31.
- Brandfonbrener, A. G. (2000). Joint laxity and arm pain in musicians. *Medical Problems of Performing Artists*, 15(2), 72-74.
- Brandfonbrener, A. G. (2003). Musculoskeletal problems of instrumental musicians. *Hand Clinics*, 19(2), 231-239.
- Brandfonbrener, A. G. (2006). Special issues in the medical assessment of musicians. *Physical Medicine and Rehabilitation Clinics of North America*, 17(4), 747-753.
- Brandfonbrener, A. G. (2009). History of playing-related pain in 330 university freshman music students. *Medical Problems of Performing Artists*, 24(1), 30-36.
- Brandfonbrener, A. G. (2010). Etiologies of medical problems in performing artists. In R. T. Sataloff, A. G. Brandfonbrener, & R. J. Lederman (Eds.), *Performing arts medicine* (3rd ed., pp. 25-49). Narberth, PA: Science and Medicine.
- Brandfonbrener, A. G., & Kjelland, J. M. (2002). Music medicine. In R. Parncutt & G. McPherson (Eds.), *The science and psychology of music performance: Creative*

- strategies for teaching and learning* (pp. 83-96). New York, NY: Oxford University Press.
- Brandfonbrener, A. G., & Robson, C. (2004). Review of 113 musicians with focal dystonia seen between 1985 and 2002 at a clinic for performing artists. *Advances in Neurology, 94*, 255-256.
- Brewer, S., Van Eerd, D., Amick III, B. C., Irvin, E., Daum, K. M., Gerr, F., . . . Rempel, D. (2006). Workplace interventions to prevent musculoskeletal and visual symptoms and disorders among computer users: A systematic review. *Journal of Occupational Rehabilitation, 16*(3), 317-350. doi:10.1007/s10926-006-9031-6
- Britsch, L. (2005). Investigating performance-related problems of young musicians. *Medical Problems of Performing Artists, 20*(1), 40-47.
- Brown, A. N. (1997). Musculoskeletal misuse among youth symphony string players. *Medical Problems of Performing Artists, 12*(1), 15-18.
- Burke, M. J., Sarpy, S. A., Smith-Crowe, K., Chan-Serafin, S., Salvador, R. O., & Islam, G. (2006). Relative effectiveness of worker safety and health training methods. *Research and Practice, 96*(2), 315-324.
doi:10.2105/AJPH.2004.059840
- Burkholder, K. R., & Brandfonbrener, A. G. (2004). Performance-related injuries among student musicians at a specialty clinic. *Medical Problems of Performing Artists, 19*(3), 116-122.
- Burland, K., & Davidson, J. W. (2002). Training the talented. *Music Education Research, 4*(1), 121-140. doi:10.1080/14613800220119813

- Burwell, K. (2017). Feeling and thinking about studio practices: Exploring dissonance in semi-structured interviews with students in higher education music. *British Journal of Music Education*, 34(2), 189-202.
- Busch, H., Göransson, S., & Melin, B. (2007). Self-efficacy beliefs predict sustained long-term sick absenteeism in individuals with chronic musculoskeletal pain. *Pain Practice*, 7(3), 234-240.
- Carey, G. (2010). *Too much performing, too little learning? Reflections on pedagogical practices within the Conservatoire*. Paper presented at the 78th International Seminar of the Commission for the Education of the Professional Musician (CEPROM), Nedlands, Western Australia.
- Carey, G., & Grant, C. (2015). Teacher and student perspectives on one-to-one pedagogy: Practices and possibilities. *British Journal of Music Education*, 32(1), 5-22.
- Cayea, D., & Manchester, R. A. (1998). Instrument-specific rates of upper-extremity injuries in music students. *Medical Problems of Performing Artists*, 13(1), 19-25.
- Çetin, F., & Aşkun, D. (2018). The effect of occupational self-efficacy on work performance through intrinsic work motivation. *Management Research Review*, 41(2), 186-201. doi:10.1108/MRR-03-2017-0062
- Chan, C., Driscoll, T., & Ackermann, B. (2013). The usefulness of on-site physical therapy-led triage services for professional orchestral musicians – a national cohort study. *BMC Musculoskeletal Disorders*, 14(1), 98. doi:10.1186/1471-2474-14-98

- Chan, C., Driscoll, T., & Ackermann, B. J. (2014). Effect of a musicians' exercise intervention on performance-related musculoskeletal disorders. *Medical Problems of Performing Artists, 29*(4), 181-188.
- Chesky, K. S., Dawson, W. J., & Manchester, R. (2006). Health promotion in schools of music: Initial recommendation for schools of music. *Medical Problems of Performing Artists, 21*(3), 142-144.
- Chung, P.-K., & Liu, J. D. (2013). Motivational regulations as predictors of exercise behavioral and affective consequences of Chinese university students. *Journal of Sport Behaviour, 36*(3), 243-256.
- Cooper, S. C., Hamann, D. L., & Frost, R. (2012). The effects of stretching exercises during rehearsals on string students' self-reported perceptions of discomfort. *Update - Applications of Research in Music Education, 30*(2), 71-76.
- Cousineau, T. M., & Shedler, J. (2006). Predicting physical health: Implicit mental health measures versus self-report scales. *The Journal of Nervous and Mental Disease, 194*(6), 427-432.
- Cox, W. J., & Kenardy, J. (1993). Performance anxiety, social phobia, and setting effects in instrumental music students. *Journal of Anxiety Disorders, 7*(1), 49-60.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.
- Csupaka, B., Sommer, J. L., Jacobsohn, E., & El-Gabalawy, R. (2018). A population-based examination of the co-occurrence and functional correlates of chronic pain and generalized anxiety disorder. *Journal of Anxiety Disorders, 56*, 74-80.
doi:10.1016/j.janxdis.2018.04.005

- Cuadrado, E., Gutiérrez-Domingo, T., Castillo-Mayen, R., Luque, B., Arenas, A., & Tabereroa, C. (2018). The self-efficacy scale for adherence to the mediterranean diet (SESAMeD): A scale construction and validation. *Appetite, 120*, 6-15. doi:10.1016/j.appet.2017.08.015
- Davidson, J. W. (1997). The social in music performance. In D. J. Hargreaves & A. C. North (Eds.), *The social psychology of music* (pp. 209- 228). New York, NY: Oxford University Press.
- Davies, J., & Mangion, S. (2002). Predictors of pain and other musculoskeletal symptoms among professional instrumental musicians: Elucidating specific effects. *Medical Problems of Performing Artists, 17*(1), 155-168.
- Dawson, W. J. (1995). Experience with hand and upper extremity problems in 1000 instrumentalists. *Medical Problems of Performing Artists, 10*(4), 128-133.
- Dawson, W. J. (1996). Hand and upper extremity trauma in high-level instrumentalists: Epidemiology and outcomes. *Work, 7*(2), 81-87.
- Dawson, W. J. (2001). Upper extremity overuse in instrumentalists. *Medical Problems of Performing Artists, 16*(2), 66-71.
- Dawson, W. J. (2002). Upper-extremity problems caused by playing specific instruments. *Medical Problems of Performing Artists, 17*(3), 135-140.
- Dawson, W. J. (2007). Trauma to the high-level instrumentalists hand and upper extremity: An epidemiologic and outcome study. *Medical Problems of Performing Artists, 22*(3), 105-109.
- Dawson, W. J. (2013). Performing arts medicine-a bibliographic retrospective of the early literature: An historical examination of bibliographic references pre-1975. *Medical Problems of Performing Artists, 28*(1), 47-53.

- Denzin, N. K., & Lincoln, Y. S. (2000). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 1-28). Thousand Oaks, CA: Sage Publications.
- Denzin, N. K., & Lincoln, Y. S. (2011). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (4th ed., pp. 1-20). Thousand Oaks, CA: Sage Publications.
- Diaz, F. M. (2010). Intrinsic and extrinsic motivation among collegiate instrumentalists. *Contributions to Music Education, 37*(1), 23-35.
- Diaz, F. M. (2018). Relationships among meditation, perfectionism, mindfulness, and performance anxiety among collegiate music students. *Journal of Research in Music Education, 66*(2), 150-167.
- Dick, R. W., Berning, J. R., Dawson, W. J., Ginsberg, R. D., Miller, C., & Shybut, G. T. (2013). Athletes and the arts-the role of sports medicine in the performing arts. *Current Sports Medicine Reports, 12*(6), 397-403.
- Dominick, C. H., Blyth, F. M., & Nicholas, M. K. (2012). Unpacking the burden: Understanding the relationships between chronic pain and comorbidity in the general population. *Pain, 153*(2), 293-304. doi:10.1016/j.pain.2011.09.018
- Dommerholt, J., & Norris, R. N. (1997). Physical therapy management of the instrumental musician. *Orthopaedic Physical Therapy Clinics of North America, 6*(2), 185-206.
- Eich, E., Graff-Radford, S. B., Jaeger, B., & Reeves, J. L. (1985). Memory for pain: Relation between past and present pain intensity. *Pain, 23*(4), 375-379.

- Elliott, K.-E. J., Rodwell, J., & Martin, A. J. (2017). Aged care nurses' job control influence satisfaction and mental health. *Journal of Nursing Management, 25*(7), 558-568. doi:10.1111/jonm.12493
- Erskine, A., Morley, S., & Pearce, S. (1990). Memory for pain: A review. *Pain, 41*(3), 255-265.
- Evans, P., & Bonneville-Roussy, A. (2016). Self-determined motivation for practice in university music students. *Psychology of Music, 44*(5), 1095-1110.
- Fehm, L., & Schmidt, K. (2006). Performance anxiety in gifted adolescent musicians. *Anxiety Disorders, 20*(1), 98-109. doi:10.1016/j.janxdis.2004.11.011
- Fishbein, M., Middlestadt, S., Ottati, V., Straus, S., & Ellis, A. (1988). Medical problems among ICOSM musicians: Overview of a national survey. *Medical Problems of Performing Artists, 3*(1), 1-8.
- Foxman, I., & Burgel, B. J. (2006). Musician health and safety: preventing playing-related musculoskeletal disorders. *American Association of Occupational Health Nurses Journal, 54*(7), 309-316.
- Frucht, S. J. (2004). Focal task specific dystonia in musicians. *Advances in Neurology, 94*, 225-230.
- Fry, H. J. H. (1986). Incidence of overuse syndrome in the symphony orchestra. *Medical Problems of Performing Artists, 1*(2), 51-55.
- Fry, H. J. H. (1986). Overuse syndrome in musicians-100 years ago: An historical review. *Medical Journal of Australia, 145*(11-12), 620-625.
- Fry, H. J. H. (1987). Prevalence of overuse (injury) syndrome in Australian music schools. *British Journal of Industrial Medicine, 44*(1), 35-40.
doi:10.1136/oem.44.1.35

- Fry, H. J. H. (1991). The effect of overuse on the musicians technique: A comparative and historical review. *International Journal of Arts Medicine*, 1(1), 46-55.
- Fry, H. J. H., Ross, P., & Rutherford, M. (1988). Music-related overuse in secondary schools. *Medical Problems of Performing Artists*, 3(4), 133-134.
- Fry, H. J. H., & Rowley, G. L. (1989). Music related upper limb pain in schoolchildren. *Annals of the Rheumatic Diseases*, 48(12), 998-1002. doi:10.1136/ard.48.12.998
- Furia, A. C., Lee, R. E., Strother, M. L., & Huang, T. T.-K. (2009). College students motivation to achieve and maintain a healthy weight. *American Journal of Health Behavior*, 33(3), 256-263. doi: 10.5993/AJHB.33.3.4
- Gallivan, K. H., & Sataloff, R. T. (2010). AIDS: Implications for the performing arts community. In R. T. Sataloff, A. G. Brandfonbrener, & R. J. Lederman (Eds.), *Performing arts medicine* (3rd ed., pp. 311-317). Narberth, PA: Science and Medicine.
- Gaunt, H. (2009). One-to-one tuition in a conservatoire: The perceptions of instrumental and vocal students. *Psychology of Music*, 38(2), 178-208.
doi:10.1177/0305735609339467
- Gaunt, H. (2011). Understanding the one-to-one relationship in instrumental/vocal tuition in Higher Education: comparing student and teacher perceptions. *British Journal of Music Education; Cambridge*, 28(2), 159-179.
- Ginsborg, J., Kreutz, G., Thomas, M., & Williamon, A. (2009). Healthy behaviours in music and non-music performance students. *Health Education*, 109(3), 242-258.
- Granot, M., & Ferber, S. G. (2005). The roles of pain catastrophizing and anxiety in the prediction of postoperative pain intensity: A prospective study. *The Clinical Journal of Pain*, 21(5), 439-445. doi:10.1097/01.ajp.0000135236.12705.2d

- Guddal, M. H., Stensland, S. Ø., Småstuen, M. C., Johnsen, M. B., Zwart, J., & Storheim, K. (2017). Physical activity level and sport participation in relation to musculoskeletal pain in a population-based study of adolescents: The young HUNT study. *The Orthopaedic Journal of Sports Medicine*, 5(1), 1-9. doi:10.1177/2325967116685543
- Guertin, C., Rocchi, M., G., P. L., Émond, C., & Lalande, G. (2015). The role of motivation and the regulation of eating on the physical and psychological health of patients with cardiovascular disease. *Journal of Health Psychology*, 20(5), 543-555. doi:10.1177/1359105315573471
- Guptill, C., Zaza, C., & Paul, S. (2000). An occupational study of physical playing-related injuries in college music students. *Medical Problems of Performing Artists*, 15(2), 86-90.
- Guptill, C. A. (2011). The lived experience of professional musicians with playing-related injuries. *Medical Problems of Performing Artists*, 26(2), 84-95.
- Guptill, C. A. (2011). The lived experience of working as a musician with an injury. *Work*, 40(3), 269-280. doi:10.3233/WOR-2011-1230
- Haase, A. M., Prapavessis, H., & Owens, G. (2013). Domain-specificity in perfectionism: Variations across domains of life. *Personality and Individual Differences*, 55(6), 711-715. doi:10.1016/j.paid.2013.05.025
- Hagberg, M., Thiringer, G., & Brandstrom, L. (2005). Incidence of tinnitus, impaired hearing and musculoskeletal disorders among students enrolled in academic music education: A retrospective cohort study. *International Archives of Occupational and Environmental Health*, 78(7), 575-583. doi:10.1007/s00420-005-0621-y

- Hagglund, K. L. (1996). A comparison of the physical and mental practices of music students from the New England Conservatory and Boston University Music School. *Medical Problems of Performing Artists, 11*(3), 99-107.
- Hallam, S. (1998). The predictors of achievement and dropout in instrumental practice. *Psychology of Music, 26*(2), 116-132.
- Hallam, S., Creech, A., Papageorgi, I., Gomes, T., Rinta, T., Varvarigou, M., & Lanipekum, J. (2016). Changes in motivation as expertise develops: Relationships with musical aspirations. *Psychology of Music, 20*(4), 528-550. doi:10.1177/1029864916634420
- Halleland, H. B., Harris, A., Sornes, S., Murison, R., & Ursin, H. (2009). Subjective health complaints, stress, and coping in orchestra musicians. *Medical Problems of Performing Artists, 24*(2), 58-62.
- Hargreaves, D. J., North, A. C., & Tarrant, M. (2002). Social psychology and music education. In R. Colwell & C. Richardson (Eds.), *The new handbook of research on music teaching and learning: A project of the Music Educators National Conference* (pp. 604-625). New York, NY: Oxford University Press.
- Harman, S. E. (2010). The evolution of performing arts medicine. In R. T. Sataloff, A. G. Brandfonbrener, & R. J. Lederman (Eds.), *Performing arts medicine* (3rd ed., pp. 1-23). Narberth, PA: Science and Medicine.
- Harrison, C., & Paull, B. (1997). *The athletic musician: A guide to playing without pain*. Lanham, MD: Scarecrow Press.
- Havlick, R., & Upton, J. (1996). Hand and upper limb problems in the pediatric musician. *Medical Problems of Performing Artists, 11*(2), 56-63.

- Heneweer, H., Staes, F., Aufdemkampe, G., van Rijn, M., & Vanhees, L. (2011). Physical activity and low back pain: A systematic review of recent literature. *European Spine Journal*, 20(6), 826-845. doi:10.1007/s00586-010-1680-7
- Hewitt, P. L., & Flett, G. L. (1990). Perfectionism and depression: A multi-dimensional analysis. *Journal of Social Behavior and Personality*, 5(5), 423-437.
- Hickey, L. (2005). To your health: Stretching is key to long life of string playing. *International Musician*, 103(7), 10.
- Hildebrandt, H., & Nubling, M. (2004). Providing further training in musicophysiology to instrumental teachers: Do their professional and preprofessional students derive any benefit? *Medical Problems of Performing Artists*, 19(2), 62-69.
- Hiner, S. L., Brandt, K. D., Katz, B. P., French, R. N., & Beczkiewicz, T. J. (1987). Performance-related medical problems among premier violinists. *Medical Problems of Performing Artists*, 2(2), 67-71.
- Hochberg, F. H., & Newmark, J. (1987). 'Doctor, it hurts when I play:' Painful disorders among instrumental musicians. *Medical Problems of Performing Artists*, 2(3), 93-97.
- Holst, G. J., Paarup, H. M., & Baelum, J. (2012). A cross-sectional study of psychosocial work environment and stress in the Danish symphony orchestras. *International Archives in Occupational and Environmental Health*, 85(6), 639-649. doi:10.1007/s00420-011-0710-z
- Hood, A., Pulvers, K., Carrillo, J., Merchant, G., & Thomas, M. D. (2012). Positive traits linked to less pain through lower pain catastrophizing. *Personality and Individual Differences*, 52(3), 401-405. doi:10.1016/j.paid.2011.10.040

- Hoppmann, R. A. (2010). Musculoskeletal problems of instrumental musicians. In R. T. Sataloff, A. G. Brandfonbrener, & R. J. Lederman (Eds.), *Performing arts medicine* (3rd ed., pp. 207-227). Narberth, PA: Science and Medicine
- Horvath, J. (2001). An orchestral musician's perspective on twenty years of performing arts medicine. *Medical Problems of Performing Artists, 16*(3), 102-108.
- Horvath, J. (2010). *Playing (less) hurt: An injury prevention guide for musicians*. New York, NY: Hal Leonard Books.
- Hunter, M., Philips, C., & Rachman, S. (1979). Memory for pain. *Pain, 6*(1), 35-46.
doi:10.1016/0304-3959(79)90138-6
- Ioannou, C., & Altenmüller, E. (2015). Approaches to and treatment strategies for playing-related pain problems among Czech instrumental music students. *Medical Problems of Performing Artists, 30*(3), 135-142.
- Ioannou, C. I., Hafer, J., Lee, A., & Altenmüller, E. (2018). Epidemiology, treatment efficacy, and anxiety aspects of music students affected by playing-related pain: A retrospective evaluation with follow-up. *Medical Problems of Performing Artists, 33*(1), 26-38.
- Jabusch, H.-C., Müller, S. V., & Altenmüller, E. (2004). Anxiety in musicians with focal dystonia and those with chronic pain. *Movement Disorders, 19*(10), 1169-1174.
- Jackson, T., Wang, Y., Wang, Y., & Fan, H. (2014). Self-efficacy and chronic pain outcomes: A meta-analytic review. *The Journal of Pain, 15*(8), 800-814.
- Johnson, B., & Turner, L. A. (2003). Data collection strategies in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioural research* (pp. 297-319). Thousand Oaks, CA: Sage.

- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26.
- Jørgensen, H. (2000). Student learning in higher instrumental education: Who is responsible? *British Journal of Music Education*, 17(1), 67-77.
doi:10.1017/S0265051700000164
- Kaiser, R. S., Mooreville, M., & Kannan, K. (2015). Psychological interventions for the management of chronic pain: A review of current evidence. *Current Pain and Headache Reports*, 19(43), 1-8. doi:10.1007/s11916-015-0517-9
- Kaneko, Y., Lianza, S., & Dawson, W. J. (2005). Pain as an incapacitating factor in symphony orchestra musicians in Sao Paulo, Brazil. *Medical Problems of Performing Artists*, 20(4), 168-174.
- Karasek, R. A. J. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 24(2), 285-308.
- Katz, J., & Melzack, R. (2011). The McGill pain questionnaire: Development, psychometric properties, and usefulness of the long form, short form, and short form-2. In D. C. Turk & R. Melzack (Eds.), *Handbook of pain assessment* (3rd ed., pp. 45-66). New York, NY: The Guilford Press.
- Kaufman-Cohen, Y., & Ratzon, N. Z. (2011). Correlation between risk factors and musculoskeletal disorders among classical musicians. *Occupational Medicine*, 61(2), 90-95.
- Keefe, F. J., Brown, G. K., Wallston, K. A., & Caldwell, D. S. (1989). Coping with rheumatoid arthritis pain: Catastrophizing as a maladaptive strategy. *Pain*, 37(1), 51-56. doi:10.1016/0304-3959(89)90152-8

- Kemp, A. E., & Mills, J. (2002). Musical potential. In R. Parncutt & G. McPherson (Eds.), *The science and psychology of music performance: Creative strategies for teaching and learning* (pp. 1-16). New York, NY: Oxford University Press.
- Kennedy, C. A., Amick III, B. C., Dennerlein, J. T., Brewer, S., Catli, S., Williams, R., . . . Rempel, D. (2010). Systematic review of the role of occupational health and safety interventions in the prevention of upper extremity musculoskeletal symptoms, signs, disorders, injuries, claims and lost time. *Journal of Occupational Rehabilitation, 20*(2), 127-162. doi:10.1007/s10926-009-9211-2
- Kennell, R. (2002). Systematic research in studio instruction in music. In R. Colwell & C. Richardson (Eds.), *The new handbook of research on music teaching and learning: A project of the Music Educators National Conference* (pp. 243-256). New York, NY: Oxford University Press.
- Kenny, D., & Ackermann, B. (2015). Performance-related musculoskeletal pain, depression and music performance anxiety in professional orchestral musicians: A population study. *Psychology of Music, 43*(1), 43-60.
doi:10.1177/0305735613493953
- Kenny, D., Driscoll, T., & Ackermann, B. J. (2012). Psychological well-being in professional orchestral musicians in Australia: A descriptive population study. *Psychology of Music, 12*(2), 210-232. doi:10.1177/0305735612463950
- Kenny, D. T. (2010). The role of negative emotions in performance anxiety. In N. J. Patrik & S. John (Eds.), *Handbook of music and emotion: theory, research, and applications* (pp. 425-451). New York, NY: Oxford University Press.
- Kenny, D. T. (2011). *The psychology of music performance anxiety*. Oxford, UK: Oxford University Press.

- Kenny, D. T., & Ackermann, B. (2009). Optimising physical and psychological health in performing musicians. In S. Hallam, I. Cross, & M. Thaut (Eds.), *Oxford Handbook of music psychology*. Oxford, UK: Oxford University press.
- Kenny, D. T., Driscoll, T., & Ackermann, B. J. (2016). Is playing in the pit really the pits? Pain, strength, music performance anxiety, and workplace satisfaction in professional musicians in stage, pit, and combined stage/pit orchestras. *Medical Problems of Performing Artists*, *31*(1), 1-7.
- Klepac, R. K., Dowling, J., Rokke, P., Dodge, L., & Schafer, L. (1981). Interview vs. paper-and-pencil administration of the McGill Pain Questionnaire. *Pain*, *11*(2), 241-246. doi:10.1016/0304-3959(81)90009-9
- Klickstein, G. (2003). Seven habits for healthy performance. *American String Teacher*, *53*(2), 48-50, 52-55.
- Knaster, P. M. D., Karlsson, H. M. D., Estlander, A.-M. P. D., & Kalso, E. M. D. (2012). Psychiatric disorders as assessed with SCID in chronic pain patients: The anxiety disorders precede the onset of pain. *General Hospital Psychiatry*, *34*(1), 46-52. doi:10.1016/j.genhosppsy.2011.09.004
- Koboria, O., Yoshieb, M., Kudob, K., & Ohtsukib, T. (2011). Traits and cognitions of perfectionism and their relation with coping style, effort, achievement, and performance anxiety in Japanese musicians. *Journal of Anxiety Disorders*, *25*(5), 674-679.
- Kochem, F. B., & Silva, J. G. (2017). Prevalence and associated factors of playing-related musculoskeletal disorders in Brazilian violin players. *Medical Problems of Performing Artists*, *32*(1), 27-32.

- Kok, L. M., Vliet Vlieland, T. P. M., Fiocco, M., Kaptein, A. A., & Nelissen, R. G. H. H. (2013). Musicians' illness perceptions of musculoskeletal complaints. *Clinical Rheumatology*, *32*(4), 487-492.
- Kreutz, G., Ginsborg, J., & Williamon, A. (2008). Student musicians' health problems and health-promoting behaviours. *Medical Problems of Performing Artists*, *23*(3), 3-11.
- Laisné, F., Lecomte, C., & Corbière, M. (2012). Biopsychosocial predictors of prognosis in musculoskeletal disorders: a systematic review of the literature. *Disability and Rehabilitation*, *34*(5), 355-382.
- Lamontagne, V., & Belanger, C. (2015). Pain-related and performance anxiety and their contribution to pain in music students: A pilot study. *Health Psychology Report*, *3*(1), 1-10.
- Landsman-Dijkstra, J. J. A., Wijck, R. v., Groothoff, J. W., & Rispen, P. (2004). The short-term effects of a body awareness program: Better self-management of health problems for individuals with chronic a-specific psychosomatic symptoms. *Patient Education and Counselling*, *55*(2), 155-167.
doi:10.1016/j.pec.2004.02.014
- Larsson, L.-G., Baum, J., Mudholkar, G. S., & Kollia, G. D. (1993). Benefits and disadvantages of joint hypermobility among musicians. *The New England Journal of Medicine*, *329*(15), 1079-1082.
- Leaver, R., Harris, C., & Palmer, K. (2011). Musculoskeletal pain in elite professional musicians from British symphony orchestras. *Occupational Medicine*, *61*(8), 549-555.

- Lederman, R. J., & Schuele, S. (2004). Long-term outcome of focal dystonia in string instrumentalists. *Movement Disorders, 19*(1), 43-48.
- Lee, S.-H., Carey, S., Dubey, R., & Matz, R. (2012). Intervention program in college instrumental musicians, with kinematics analysis of cello and flute playing: A combined program of yogic breathing and muscle strengthening-flexibility exercises. *Medical Problems of Performing Artists, 27*(2), 85-94.
- Lieberman, J. L. (1991). *You are your instrument: The definitive musician's guide to practice and performance* (2nd ed.). New York, NY: Huiksi Music.
- Ling, C.-Y., Loo, F.-C., & Hamedon, T. R. (2018). Playing-related musculoskeletal disorders among classical piano students at tertiary institutions in Malaysia: Proportion and associated risk factors. *Medical Problems of Performing Artists, 33*(2), 82-89.
- Lister-Sink, B. (2005). Essential skills for promoting a lifelong love of music and music making: Developing the fundamental skill: Healthful, injury-preventive technique. *American Music Teacher, 54*(5), 18-23.
- Liu, J. D., & Chung, P.-K. (2016). Students' perceived autonomy support and psychological needs satisfaction in physical education and exercise intrinsic motivation. *Journal of Sport Behaviour, 39*(4), 409-425.
- Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education, 27*(1), 27-53.
- Lockwood, A. H. (1988). Medical problems in secondary school-aged musicians. *Medical Problems of Performing Artists, 3*(4), 129-132.

- Lonsdale, K., Laasko, E.-L., & Tomlinson, V. (2014). Contributing factors, prevention, and management of playing-related musculoskeletal disorders among flute players internationally. *Medical Problems of Performing Artists, 29*(3), 155-162.
- Lopez, T. M., & Martinez, J. F. (2013). Strategies to promote health and prevent musculoskeletal injuries in students from the High Conservatory of Music in Salamanca, Spain. *Medical Problems of Performing Artists, 28*(2), 100-106.
- Lundborg, B., & Grooten, W. J. A. (2018). Resistance training for professional string musicians: A prospective intervention study. *Medical Problems of Performing Artists, 33*(2), 102-110.
- Macfarlane, J. D., & Rietveld, A. B. M. (2009). A rheumatologist let loose in a performing arts clinic: The spectrum of musicians complaints and their treatment. *Medical Problems of Performing Artists, 24*(4), 185-187.
- Manchester, R. A. (1988). The incidence of hand problems in music students. *Medical Problems of Performing Artists, 3*(1), 15-18.
- Manchester, R. A., & Park, S. (1996). A case-control study of performance hand-related problems in music students. *Medical Problems of Performing Artists, 11*(1), 20-23.
- Marchant-Haycox, S. E., & Wilson, G. D. (1992). Personality and stress in performing artists. *Personality and Individual Differences, 13*(10), 1061-1068.
doi:10.1016/0191-8869(92)90021-G
- Markison, R. E. (1990). Treatment of musical hands: Redesign of the interface. *Hand Clinics, 6*(3), 525-544.

- McCormick, J., & McPherson, G. E. (2003). The role of self-efficacy in a musical performance examination: An exploratory structural equation analysis. *Psychology of Music, 31*(1), 37-51. doi:10.1177/0305735603031001322
- McCormick, J., & McPherson, G. E. (2006). Self-efficacy and music performance. *Psychology of Music, 34*(3), 332-336. doi:10.1177/0305735606064841
- McCready, S., & Reid, D. (2007). The experience of occupational disruption among student musicians. *Medical Problems of Performing Artists, 22*(4), 140-146.
- McWilliams, L. A., Cox, B. J., & Enns, M. W. (2003). Mood and anxiety disorders associated with chronic pain: An examination in a nationally representative sample. *Pain, 106*(1), 127-133. doi:10.1016/S0304-3959(03)00301-4
- Melzack, R. (1975). The McGill pain questionnaire: Major properties and scoring methods. *Pain, 1*(3), 277-299. doi:10.1016/0304-3959(75)90044-5
- Melzack, R., & Katz, J. (2013). Pain measurement in adult patients. In S. B. McMahon (Ed.), *Wall and Melzack's textbook of pain* (pp. 301-314). Philadelphia, PA: Elsevier/Saunders.
- Melzack, R., & Torgenson, W. S. (1971). On the language of pain. *Anesthesiology, 34*(1), 50-59.
- Middlestadt, S. E., & Fishbein, M. (1988). Health and occupational correlates of perceived occupational stress in symphony orchestra musicians. *Journal of Occupational Medicine, 30*(9), 687-692.
- Miller, C., & Moa, G. (1998). Injury characteristics and outcomes at a performing arts school clinic. *Medical Problems of Performing Artists, 13*(3), 120-124.

- Miller, G., Peck, F., & Stewart Watson, J. (2002). Pain disorders and variations in upper limb morphology in music students. *Medical Problems of Performing Artists, 17*(4), 169-172.
- Mills, J., & Smith, J. (2003). Teachers' beliefs about effective instrumental teaching in schools and higher education. *British Journal of Music Education, 20*(1), 5-27.
doi:10.1017/S0265051702005260
- Nawrocka, A., Mynarski, W., Powerska-Didkowska, A., Grabara, M., & Garbaciak, W. (2014). Musculoskeletal pain among Polish music school students. *Medical Problems of Performing Artists, 29*(2), 64-69.
- Neace, S. M., Hicks, A., Salmon, P., & DeCaro, M. (2018). Mindfulness and intrinsic exercise motivation—The mediating role of exercise self-efficacy. 1321 board #129 may 31 9. *Medicine and Science in Sports and Exercise, 50*, 314.
doi:10.1249/01.mss.0000536115.50799.b3
- Norris, R. (1993). *The musician's survival manual: A guide to preventing and treating injuries in instrumentalists*. St Louis, MO: International Conference of Symphony and Opera Musicians.
- Osborne, M. S., & Kenny, D. T. (2005). Development and validation of a music performance anxiety inventory for gifted adolescent musicians. *Anxiety Disorders, 19*(7), 725-751.
- Owen, E. R. (1985). Instrumental musicians and repetition strain injuries. *The Journal of Occupational Health and Safety, Australia and New Zealand, 1*(2), 135-139.
- Paarup, H. M., Baelum, J., Holm, J. W., Manniche, C., & Wedderkopp, N. (2011). Prevalence and consequences of musculoskeletal symptoms in symphony

- orchestra musicians vary by gender: a cross-sectional study. *BMC Musculoskeletal Disorders*, 12(1), 223-237. doi:10.1186/1471-2474-12-223
- Palac, J. (2012). Forum: musical wellness: opportunities for string researchers. *String Research Journal*, 3(1), 5-19. doi:10.1177/194849921200300101
- Park, A., Guptill, C., & Sumsion, T. (2007). Why music majors pursue music despite the risk of playing-related injuries. *Medical Problems of Performing Artists*, 22(3), 89-96.
- Pascarella, E. F., & Hsu, Y.-P. (2001). Understanding work-related upper extremity disorders: Clinical findings in 485 computer users, musicians, and others. *Journal of Occupational Rehabilitation*, 11(1), 1-21.
- Pauline, J. S. (2013). Physical activity behaviours, motivation, and self-efficacy among college students. *College Student Journal*, 47(1), 64-74.
- Pelletier, L. G., & Dion, S. C. (2007). An examination of general and specific motivational mechanisms for the relations between body dissatisfaction and eating behaviors. *Journal of Social and Clinical Psychology*, 26(3), 303-333. doi:10.1521/jscp.2007.26.3.303
- Pelletier, L. G., Dion, S. C., Slovinec-D'Ángelo, M., & Reid, R. (2004). Why do you regulate what you eat? Relationships between forms of regulation, eating behaviors, sustained dietary behavior change, and psychological adjustment. *Motivation and Emotion*, 28(3), 245-277. doi:10.1023/B:MOEM.0000040154.40922.14
- Perkins, R., Reid, H., Araújo, L. S., Clark, T., & Williamon, A. (2017). Perceived enablers and barriers to optimal health among music students: A qualitative

- study in the music conservatoire setting. *Frontiers in Psychology*, 8, 968.
doi:10.3389/fpsyg.2017.00968
- Persson, R. (1996). Brilliant performers as teachers: A case study of common sense teaching in a conservatoire setting. *International Journal of Music Education*, 28(1), 25-36.
- Porter, M., Wilson, I. M., Doherty, L., & Magee, J. (2018). Extent of playing-related musculoskeletal problems in the Irish traditional music community: A survey. *Medical Problems of Performing Artists*, 33(1), 47-55.
- Prat-Sala, M., & Redford, P. (2010). The interplay between motivation, self-efficacy, and approaches to studying. *British Journal of Educational Psychology*, 80(2), 283-305. doi:10.1348/000709909X480563
- Pratt, R. R., Jessop, S. G., & Niemann, B. K. (1992). Performance-related disorders among music majors at Brigham Young University. *International Journal of Arts Medicine*, 1(2), 7-20.
- Quarrier, N. F. (1995). Survey of music teachers: Perceptions about music-related injuries. *Medical Problems of Performing Artists*, 10(3), 106-110.
- Raeburn, S. D., Hipple, J., Delaney, W., & Chesky, K. (2003). Surveying popular musicians' health status using convenience samples. *Medical Problems of Performing Artists*, 18(3), 113-119.
- Ranelli, S., Smith, A., & Straker, L. (2015). The association of music experience, pattern of practice and performance anxiety with playing-related musculoskeletal problems (PRMP) in children learning instrumental music. *International Journal of Music Education*, 33(4), 390-412.
doi:10.1177/0255761415597151

- Ranelli, S., Straker, L., & Smith, A. (2011). Playing-related musculoskeletal problems in children learning instrumental music: The association between problem location and gender, age, and music exposure factors. *Medical Problems of Performing Artists, 26*(3), 123-139.
- Raymond, D. M., Romeo, J. H., & Kumke, K. V. (2012). A pilot study of occupational injury and illness experienced by classical musicians. *Workplace Health and Safety, 60*(1), 19-24.
- Reel, J. (2009). College strings: Welcome to campus. Now get to work. *Strings, 24*(1), 63-64.
- Rickert, D. L. L., Barrett, M. S., & Ackermann, B. J. (2013). Injury in the orchestral environment: Part I. The role of work organisation and psychosocial factors in injury risk. *Medical Problems of Performing Artists, 28*(4), 219-229.
- Rickert, D. L. L., Barrett, M. S., & Ackermann, B. J. (2014). Injury in the orchestral environment: Part II. Organisational culture, behavioural norms, and attitudes to injury. *Medical Problems of Performing Artists, 29*(2), 94-101.
- Rickert, D. L. L., Barrett, M. S., & Ackermann, B. J. (2014). Injury in the orchestral environment: Part III. The role of psychosocial factors in the experience of musicians undertaking rehabilitation. *Medical Problems of Performing Artists, 29*(3), 125-135.
- Rickert, D. L. L., Barrett, M. S., Halaki, M., Driscoll, T., & Ackermann, B. J. (2012). A study of right shoulder injury in collegiate and professional orchestra cellists: An investigation using questionnaires and physical assessment. *Medical Problems of Performing Artists, 27*(2), 65-73.

- Roach, K. E., Martinez, M. A., & Anderson, N. (1994). Musculoskeletal pain in student instrumentalists: A comparison with the general student population. *Medical Problems of Performing Artists*, 9(4), 125-130.
- Robitaille, J., Tousignant-Laflamme, Y., & Guay, M. (2018). Impact of changes in playing time on playing-related musculoskeletal pain in string music students. *Medical Problems of Performing Artists*, 33(1), 6-13.
- Robson, L. S., Stephenson, C. M., Schulte, P. A., Amick, B. C., Irvin, E. L., Eggerth, D. E., . . . Grubb, P. L. (2012). A systematic review of the effectiveness of occupational health and safety training. *Scandinavian Journal of Work, Environment and Health*, 38(3), 193-208. doi:10.5271/sjweh.3259
- Rodríguez-Romero, B., Pérez-Valiño, C., Ageitos-Alonso, B., & Pértega-Díaz, S. (2016). Prevalence and associated factors for musculoskeletal pain and disability among Spanish music conservatory students. *Medical Problems of Performing Artists*, 31(4), 193-200.
- Rojas, J., & Springer, G. D. (2014). An exploratory study of musicians' self-efficacy to maintain practice schedules. *Bulletin of the Council for Research in Music Education*, 199(199), 39-52. doi:10.5406/bulcouresmusedu.199.0039
- Russell, J. A., & Benedetto, R. L. (2014). Perceived musculoskeletal discomfort among elementary, middle, and high school string players. *Journal of Research in Music Education*, 62(3), 259-276. doi:10.1177/0022429414543307
- Sasso, D. A. (2010). Psychiatric issues and performing artists. In R. Sataloff, A. Brandfonbrener, & R. Lederman (Eds.), *Performing arts medicine* (3rd ed., pp. 319-341). Narberth, PA: Science and Medicine.

- Schafer-Crane, G. A. (2006). Repetitive stress and strain injuries: Preventative exercises for the musician. *Physical Medicine and Rehabilitation Clinics of North America*, 17(4), 827-842.
- Schmidt, C. P., Zdzinski, S. F., & Ballard, D. L. (2006). Motivation orientations, academic achievement, and career goals of undergraduate music education majors. *Journal of Research in Music Education*, 54(2), 138-153.
- Schoeb, V., & Zosso, A. (2012). "You cannot perform music without taking care of your body": A qualitative study on musicians representation of body and health. *Medical Problems of Performing Artists*, 27(3), 129-136.
- Scott, E. L., Kroenke, K., Wu, J., & Yu, Z. (2016). Beneficial effects of improvement in depression, pain catastrophizing, and anxiety on pain outcomes: A 12-month longitudinal analysis. *Journal of Pain*, 17(2), 215-222.
doi:10.1016/j.jpain.2015.10.011
- Shoup, D. (1995). Survey of performance-related problems among high school and junior high school musicians. *Medical Problems of Performing Artists*, 10(3), 100-105.
- Silva, A. G., Filipa, M. B. L., & Afreixo, V. (2015). Pain prevalence in instrumental musicians: A systematic review. *Medical Problems of Performing Artists*, 30(1), 8-19.
- Smith, J., Purewal, B. P., Macpherson, A., & Pike, I. (2018). Metrics to assess injury prevention programs for young workers in high-risk occupations: A scoping review of the literature. *Health Promotion and Chronic Disease Prevention in Canada-Research Policy and Practice*, 38(5), 191-199.
doi:10.24095/hpcdp.38.5.01

- Sousa, C. M., Machado, J. P., Greten, H. J., & Coimbra, D. (2016). Occupational diseases of professional orchestra musicians from Northern Portugal: A descriptive study. *Medical Problems of Performing Artists, 31*(1), 8-12.
- Spahn, C., Ell, N., & Seidenglanz, K. (2001). Psychosomatic findings and musician patients at a department of hand surgery. *Medical Problems of Performing Artists, 16*(1), 144-151.
- Spahn, C., Hildebrandt, H., & Seidenglanz, K. (2001). Effectiveness of a prophylactic course to prevent playing-related health problems of music students. *Medical Problems of Performing Artists, 16*(1), 24-31.
- Spahn, C., Nusseck, M., & Zander, M. F. (2014). Long-term analysis of health status and preventative pain behaviour in music students across an entire university program. *Medical Problems of Performing Artists, 29*(1), 8-15.
- Spahn, C., Richter, B., & Zschocke, I. (2002). Health attitudes, preventive behaviour, and playing-related health problems among music students. *Medical Problems of Performing Artists, 17*(1), 22-28.
- Spahn, C., Strukely, S., & Lehmann, A. (2004). Health conditions, attitudes towards study and health at the beginning of university study: Music students in comparison with other student populations. *Medical Problems of Performing Artists, 19*(1), 26-33.
- Spahn, C., Voltmer, E., Mornell, A., & Nusseck, M. (2017). Health status and preventive health behavior of music students during university education: Merging prior results with new insights from a German multicenter study. *Musicae Scientiae, 21*(2), 213-229. doi:10.1177/1029864917698197

- Spahn, C., Walther, J.-C., & Nusseck, M. (2016). The effectiveness of a multimodal concept of audition training for music students in coping with music performance anxiety. *Psychology of Music, 44*(4), 893-909.
doi:10.1177/0305735615597484
- Stanek, J. L., Komes, K. D., & Murdoch, F. A. J. (2017). A cross-sectional study of pain among US college music students and faculty. *Medical Problems of Performing Artists, 32*(1), 20-26.
- Steinmetz, A., Moller, H., Seidel, W., & Rigotti, T. (2012). Playing-related musculoskeletal disorders in music students-associated musculoskeletal signs. *European Journal of Physical Rehabilitation Medicine, 48*(4), 625-633.
- Steinmetz, A., Scheffer, I., Esmer, E., Delank, K. S., & Peroz, I. (2015). Frequency, severity and predictors of playing-related musculoskeletal pain in professional orchestral musicians in Germany. *Clinical Rheumatology, 34*(5), 965-973.
doi:10.1007/s10067-013-2470-5
- Steinmetz, A., Seidel, W., & Muche, B. (2010). Impairment of postural stabilisation systems in musicians with playing-related musculoskeletal disorders. *Journal of Manipulative and Physiological Therapeutics, 33*(8), 603-611.
- Stephenson, H., & Quarrier, N. F. (2005). Anxiety sensitivity in performance anxiety in college music students. *Medical Problems of Performing Artists, 20*(1), 119-125.
- Stephoe, A., & Fidler, H. (1987). Stage fright in orchestral musicians: A study of cognitive and behavioural strategies in performance anxiety. *British Journal of Psychology, 78*(2), 241-250.

- Stoeber, J., & Eismann, U. (2007). Perfectionism in young musicians: Relations with motivation, effort, achievement, and distress. *Personality and Individual Differences, 43*(8), 2182-2192. doi:10.1016/j.paid.2007.06.036
- Stoeber, J., & Stoeber, F. S. (2009). Domains of perfectionism: Prevalence and relationships with perfectionism, gender, age, and satisfaction with life. *Personality and Individual Differences, 49*(4), 530-535. doi:10.1016/j.paid.2008.12.006
- Sullivan, M. J. L., Stanish, W., Waite, H., Sullivan, M., & Tripp, D. A. (1998). Catastrophizing, pain, and disability in patients with soft-tissue injuries. *Pain, 77*(3), 253-260. doi:10.1016/S0304-3959(98)00097-9
- Sullum, J., Clark, M. M., & King, T. K. (2005). Predictors of exercise relapse in a college population. *Journal of American College Health, 8*(4), 175-180. doi:10.1080/07448480009595693
- T., K. D., Driscoll, T., & Ackermann, B. J. (2016). Is playing in the pit really the pits? Pain, strength, music performance anxiety, and workplace satisfaction in professional musicians in stage, pit, and combined stage/pit orchestras. *Medical Problems of Performing Artists, 31*(1), 1-7.
- Thomas, P. J., & Nettlebeck, T. (2014). Performance anxiety in adolescent musicians. *Psychology of Music, 42*(4), 624-634. doi:10.1177/0305735613485151
- Topoğlu, O., Karagülle, D., Keskin, T. U., Abacıgil, F., & Okyay, P. (2018). General health status, music performance anxiety, and coping methods of musicians working in Turkish State Symphony Orchestras: A cross-sectional study. *Medical Problems of Performing Artists, 33*(2), 118-123.

- Trinkoff, A. M., Le, R., Geiger-Brown, J., Lipscomb, J., & Lang, G. (2006). Longitudinal relationship of work hours, mandatory overtime, and on-call to musculoskeletal problems in nurses. *American Journal of Industrial Medicine*, 49(11), 964-971. doi:10.1002/ajim.20330
- Tubiana, R., Chamagne, P., & Brockman, R. (1989). Fundamental positions for instrumental musicians. *Medical Problems of Performing Artists*, 4(2), 73-76.
- Vaag, J., Bjørngaard, J. H., & Bjerkeset, O. (2016). Symptoms of anxiety and depression among Norwegian musicians compared to the general workforce. *Psychology of Music*, 44(2), 234-248. doi:10.1177/0305735614564910
- Vallerand, R. J., Koestner, R., & Pelletier, L. G. (2008). Reflections on self-determination theory. *Canadian Psychology/Psychologie Canadienne*, 49(3), 257-262. doi:10.1037/a0012804
- van der Maas, L. C. C., Köke, A., Pont, M., Bosscher, R. J., Twisk, J. W. R., Janssen, T. W. J., & Peters, M. L. (2016). Improving the Multidisciplinary Treatment of Chronic Pain by Stimulating Body Awareness: A Cluster-randomized Trial. *Clinical Journal of Pain*, 31(7), 660-669. doi:10.1097/AJP.000000000000138
- van der Windt, D. A. W. M., Thomas, E., Pope, D. P., de Winter, A. F., MacFarlane, G. J., Bouter, L. M., & Silman, A. J. (2000). Occupational risk factors for shoulder pain: A systematic review. *Occupational and Environmental Medicine*, 57(7), 433-442. doi:10.1136/oem.57.7.433
- van Kemenade, J. F. L. M., van Son, M. J. M., & van Heesch, N. C. A. (1995). Performance anxiety among professional musicians in symphonic orchestras: A self-report study. *Psychological Reports*, 77(2), 555-562. doi:10.2466/pr0.1995.77.2.555

- van Ryckeghem, D. M. L., Crombez, G., Eccleston, C., Legrain, V., & van Damme, S. (2013). Keeping pain out of your mind: The role of attentional set in pain. *European Journal of Pain, 17*(3), 402-411. doi:10.1002/j.1532-2149.2012.00195.x
- van Viane, A. E. M. (1999). Managerial Self-Efficacy, outcome expectancies, and Work-Role salience as determinants of ambition for a managerial position. *Journal of Applied Social Psychology, 29*(3), 639-665. doi:10.1111/j.1559-1816.1999.tb01406.x
- Vancampfort, D., Koyanagi, A., Hallgren, M., Probst, M., & Stubbs, B. (2017). The relationship between chronic physical conditions, multimorbidity and anxiety in the general population: A global perspective across 42 countries. *General Hospital Psychiatry, 45*, 1-6. doi:10.1016/j.genhosppsych.2016.11.002
- Verhoeven, K., Crombeza, G., Eccleston, C., Van Ryckeghem, D. M. L., Morley, S., & Van Damme, S. (2010). The role of motivation in distracting attention away from pain: An experimental study. *Pain, 149*(2), 229-234. doi:10.1016/j.pain.2010.01.019
- Viljamaa, K., Liira, J., Kaakkola, S., & Savolainen, A. (2017). Musculoskeletal symptoms among Finnish professional orchestra musicians. *Medical Problems of Performing Artists, 32*(4), 195-200.
- Vinci, S., Smith, A., & Ranelli, S. (2015). Selected physical characteristics and playing-related musculoskeletal problems in adolescent string instrumentalists. *Medical Problems of Performing Artists, 30*(1), 143-151.

- Voltmer, E., Spahn, C., & Zander, M. F. (2010). Health promotion and prevention in higher music education: Results of a longitudinal study. *Medical Problems of Performing Artists, 25*(2), 54-65.
- von Korff, M. (2011). Assessment of chronic pain in epidemiological and health services research: Empirical bases and new directions. In D. C. Turk & R. Melzack (Eds.), *Handbook of pain assessment* (3rd ed., pp. 455-473). New York, NY: The Guilford Press.
- Warrington, J. (2003). Hand therapy for the musician: Instrument-focused rehabilitation. *Hand Clinics, 19*, 287-301.
- Waters, M. K. (2005). *Playing-related injury in violinists: Attitudes and priorities of South-East Queensland violin teachers toward beginner violinists aged 7-10*. (Bachelor of Music in Performance and Pedagogy (Hon 1)), Griffith University, Brisbane, Australia.
- Wesner, R. B., Noyes, R., & Davis, T. L. (1990). The occurrence of performance anxiety among musicians. *Journal of Affective Disorders, 18*(3), 177-185.
- Wijsman, S., & Ackermann, B. J. (Producer). (2018). Educating Australian musicians: Are we playing it safe? *Health Promotion International*, doi:10.1093/heapro/day030
- Wilke, C., Priebus, J., Biallas, B., & Frobose, I. (2011). Motor activity as a way of preventing musculoskeletal problems in string musicians. *Medical Problems of Performing Artists, 26*(1), 24-29.
- Williamon, A., & Thompson, S. (2006). Awareness and incidence of health problems among conservatoire students. *Psychology of Music, 34*(4), 411-430. doi:10.1177/030573560606067150

- Williams, L. J., Pasco, J. A., Jacka, F. N., Dodd, S., & Michael, B. (2012). Pain and the relationship with mood and anxiety disorders and psychological symptoms. *Journal of Psychosomatic Research, 72*(6), 452-456.
doi:10.1016/j.jpsychores.2012.03.001
- Wilson, G. D. (1994). *Psychology for performing artists*. London, UK: Jessica Kingsley.
- Wilson, I. M., Doherty, L., & McKeown, L. (2014). Perceptions of playing-related musculoskeletal disorders (PRMDs) in Irish traditional musicians: A focus group study. *Work, 49*(4), 679-688. doi:10.3233/WOR-131737
- Wilson, N. M. (2005). Hatha Yoga as a tool for the prevention of performance-related musculoskeletal problems in string players. *American String Teacher, 55*(1), 62-66.
- Wood, G. C. (2014). Prevalence, risk factors, and effects of performance-related medical disorders (PRMD) among tertiary-trained jazz pianists in Australia and the United States. *Medical Problems of Performing Artists, 29*(1), 37- 45.
- Wristen, B. G., & Fountain, S. E. (2013). Relationships between depression, anxiety and pain in a group of university music students. *Medical Problems of Performing Artists, 28*(3), 153-158.
- Wu, S. J. (2007). Occupational risk factors for musculoskeletal disorders in musicians: A systematic review. *Medical Problems of Performing Artists, 22*(2), 43-51.
- Wynn Parry, C. B. (2004). Managing the physical demands of musical performance. In A. Williamon (Ed.), *Musical excellence: Strategies and techniques to enhance performance* (pp. 41-60). New York, NY: Oxford University Press.

- Zander, M. F., Voltmer, E., & Spahn, C. (2010). Health promotion and prevention in higher music education: results of a longitudinal study. *Medical Problems of Performing Artists, 25*(2), 54-65.
- Zaza, C. (1992). Playing-related health problems at a Canadian music school. *Medical Problems of Performing Artists, 7*(2), 48-51.
- Zaza, C. (1993). Prevention of musicians' playing-related health problems: Rationale and recommendations for action. *Medical Problems of Performing Artists, 8*(4), 117-121.
- Zaza, C. (1998). Playing-related musculoskeletal disorders in musicians: A systematic review of incidence and prevalence. *Canadian Medical Association Journal, 158*(8), 1019-1025.
- Zaza, C., & Farewell, V. T. (1997). Musicians' playing-related musculoskeletal disorders: An examination of risk factors. *American Journal of Industrial Medicine, 32*(3), 292-300. doi: 10.1002/(SICI)1097-0274(199709)32:3<292::AID-AJIM16>3.0.CO;2-Q
- Zaza, C., Charles, C., & Muszynski, A. (1998). The meaning of playing-related musculoskeletal disorders to classical musicians. *Social Science and Medicine, 47*(12), 2013-2023. doi:10.1016/S0277-9536(98)00307-4
- Zetterberg, C., Backlund, H., Karlsson, J., Werner, H., & Olsson, L. (1998). Musculoskeletal problems among male and female music students. *Medical Problems of Performing Artists, 13*(4), 160-166.
- Zhukov, K. (2008). Exploring the content of instrumental lessons and gender relations in Australian higher education. *British Journal of Music Education, 25*(2), 159-176. doi:10.1017/S0265051708007900

Appendix A: Changes at the Institution since this Research Took Place

Although not a direct consequence of this research, in the years subsequent to data collection there have been some encouraging changes at the institution. Incoming Bachelor of Music students now receive information about taking care of their health endorsed by the National Council for Tertiary Music Schools (NACTMUS) and the British Association for Performing Arts Medicine (BAPAM). In Orientation Week incoming students must attend a 90-minute session on musician health. A portion of the compulsory 5 credit point course *My Life as a Musician*, taken by first-year students enrolled in the Bachelor of Music program, then follows on from this by focusing on various aspects of musicians' health. In addition, in 2016, a new 10 credit point elective was offered: *Musician Health 1*. It is hoped that, in the future there will also be establishment of further courses at the institution that deal with musician health and wellness.

Over time the requirements for the Major Study course for undergraduate string students at the institution have also reportedly become more flexible and some items, such as tenths, have been removed from the technique exam. There has reportedly been greater incorporation of preventative strategies into compulsory classes within this Major Study course with the aim of reinforcing these repeatedly, in multiple contexts over a period of time. Now, during at least one string workshop each semester a health professional such as a physiotherapist or practitioner of Alexander Technique gives a presentation with the aim of educating students how best to prevent/minimise playing-related discomfort/pain. In recent years Project Week has also featured classes and workshops on aspects of musician health and wellness.

With regards the Orchestra course, there have also been some changes, including a new convener. Modifications have subsequently been made to the way that rehearsals are scheduled: they are now held weekly across the semester with the aim of spreading the load so that it is not so concentrated. An individual student's workload across the semester is also considered when assigning them to particular programs. The majority of concerts are being conducted by guest conductors, with a stand-in conductor doing the preparation of rehearsals in the weeks prior. This means there is often a fresh outlook with each Orchestra program, and that the structure and rehearsal techniques may vary. In addition, the adjustable chairs that previously were only for use in the theatre are now used in other venues within the institution. Given that many of the concerns raised by students in this research related to the atmosphere of the rehearsals, the intensive rehearsal schedule, lack of flexibility, and the suitability of the available equipment within the course, this is very encouraging.

An existing auditory health and safety warning present at the time of this research has remained on the Orchestra course profile with limited changes. However, all course profiles for the institution now also contain information for students who may be suffering from a health concern or disability. It must be noted that the relevant form students are directed to fill may not be completely suitable for someone who was suffering from a playing-related injury. In addition, the wording and placement of the disclaimer in course profiles is not always particularly prevalent on the page, and there is the potential for it to be overlooked by students. Nonetheless this is an encouraging step in the right direction.

Finally, after becoming aware of the issues that some students in this research were having with regards to sessional Major Study teachers, more emphasis has also

been placed on making sure that both teachers and their students understand the course requirements and their responsibilities. A member of staff has changed but in some instances students have also been allocated different teachers after highlighting that issues regarding lesson frequency and scheduling were still occurring. In saying that, it must always be kept in mind that there are two sides to every story, and that this research dealt only with perceptions of various situations by the students themselves, which may or may not have accurately conveyed the full story.

Appendix B: Student Summaries

Student 1: Susie

Susie, a violinist, was one of the most complex and interesting cases in this research study. The perceived effect of her playing-related pain on her ability to perform everyday activities (and vice versa) was profound. She presented as precocious, perfectionist, and anxious, with very firm opinions on a range of issues related to playing-related discomfort/pain. Over the four-year period she participated in a total of seven interviews, each of which went for up to one hour.

Susie had already been experiencing severe pain in her elbows and wrists for some time prior to her studies at the institution. (She later revealed that her original injury came on after she withdrew from high school so that she could practise more in preparation for her A. Mus. A. exam.) As she progressed through the first year of her program her pain worsened to the point that she was having physiotherapy three times a week. From the outset Susie highlighted Orchestra (in particularly Opera), as having a devastating impact on her pain levels.

During the second year of her program Susie's pain became constant and she developed a playing-related lump (ganglion) in her left wrist. She consulted numerous doctors and specialists about the lump and the recommendation at the time was to have it surgically removed. However Susie was also advised she may have decreased ability on the violin as a result of the surgery. She really struggled with the magnitude and future implications of this decision.

It was during the third year of her program that Susie reached breaking point (she decided not to go ahead with the operation). By now her panic and anxiety regarding University and playing violin had reportedly become so bad that she was

unable to catch a bus and train to the university campus without having a panic attack. This was problematic as she resided some hours away and relied on public transport.

Although at this stage her pain was not as severe as it had been this was only because she had greatly reduced her practice due to pain and a general inability to cope. At the time she was also increasing her pain tolerance due to personal training (this could reportedly lead to having swollen joints and pain for up to four days following) and had changed jobs in order to minimise painful activities such as typing, writing, cleaning, carrying, and lifting.

Susie was subsequently diagnosed with depression and took a six-month break from study in order to focus on recovery. After much consideration she decided to change the focus of her study to Education, in particular Italian. In order to do this, she had to negotiate with the institution to change her program. In the end she went into a Bachelor of Music Education Preparation, Cross Institutional, in preparation for a Graduate Diploma in Education.

This was a very good solution for Susie, as she was able to complete some of the required credit at another tertiary institution closer to her (thus reducing the need for so much travel and associated stress). However, afterwards she commented that it was extremely difficult to organise everything due to what she perceived as being very limited assistance from the institution. On reflection, she felt the lack of support from this institution significantly contributed to the decline in her mental state. (At several stages Susie also wished to change violin teacher due to limited support, but in the end decided to against further changes.)

By the conclusion of her program Susie said that she was experiencing much less pain, both when playing and during her everyday life. In order to decrease her pain

and stress she had made significant changes to her life and future career including rarely playing the violin and decreasing work hours/changing duties required. However, she found that her attempts to adopt preventative measures, such as warm-ups and breaks, were limited in effectiveness and so she did not continue with them. Further complexities and inconsistencies in her case are apparent in the more detailed comments below.

In the end, Susie appeared to be looking forward to her future despite continuing to experience pain with many everyday activities as well as constant tension/pain in her neck. (She believed that this tension/pain was stress-related and greatly influenced by how she was feeling at any particular time.) She planned to continue teaching violin privately, but not to repeat perceived mistakes that were made in her education for example encouraging students to practise extremely long hours. On reflection she said that she believed the Orchestra course needed many changes in order to be more productive and physically safe for students. She also believed that there should have been a course for first-year students that taught them about the body and the effects of practising on it.

Table B1

Reported Pain Experience for Student 1: Susie

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	5	5	Present at time, 4	Elbows, left wrist	9	1-2 hours	N/A
2	3	4	2 days prior during lesson	Wrists, left forearm, right elbow	12	3 hours	N/A
3	3-4	3	Present at time, 1	Left shoulder blade and elbow	5	2.5 to 3 hours	N/A
4*	3-4	3-4	Present at time, 1	Right elbow	*	1 to 2 hours	3 hours
5	3	2	Previous Sunday during lesson	Left wrist, left pinkie	8	0.5 -1 hour a week	1.5 hours
6	3-4	4	Elbow pain previous evening when typing	Left elbow	7	1 hour a week	1 hour
7*	3-4	2	3 days ago during lesson	Left hand and wrist	5	1 hour	2 hours
8	1-2	4	That morning carrying books	Left elbow	6	1 hour 3 times a week	1.5 hours

*Note that data collection was not complete from this student due to technical difficulties with the recording equipment. As a result there are missing pain scores from Semester 4 and also no direct quotations from Semester 7.

Prior to her studies at the institution Susie had experienced playing-related discomfort/pain in her left fingers, wrist, and forearm; both her elbows; and the right side of her neck. The discomfort/pain in her elbows and wrists was constant when she was writing, lifting, typing, and playing violin. Susie had already consulted a doctor and had been diagnosed with epicondylitis (tennis elbow).

At the end of the first year of her program Susie said that she had been seeing a physiotherapist regularly for treatment of a pinched nerve. Despite this treatment she continued to experience constant pain in her elbows and wrists when playing the violin, lifting, writing, and typing (aggravated by her work as a receptionist). Susie had been struggling in Orchestra and found Opera extremely painful.

I had to go to a physio... I've got... exercises to control it... they... isolated it as a pinched nerve, so they have released that... it does still come back, but... not as bad... I went three times a week, for about four months. (Susie, SEM 2)

It's just when I'm playing at the moment, and lifting... actually... writing and typing, as well. [MW: "... Do you have to do that in your job?"] Yes, I am a... receptionist. (Susie, SEM 2)

Over the first Christmas break Susie increased her practice to four hours a day and noticed a significant increase in pain. In order to circumvent this she began taking breaks during her practice and joined a gym to build up her muscles. Susie was now experiencing constant pain in her wrist and elbows during everyday life and was beginning to adjust and adapt activities in order to minimise this pain.

It got worse, over the Christmas break because I was practising a lot more... but, I joined a gym... and I do... weights... to... build up the muscles, to help, and I do yoga and that sort of stuff too... I can play for longer now. (Susie, SEM 3)

I was practising up to four hours a day... that's when I started putting in the breaks, so that I could extend the time. (Susie, SEM 3)

[MW: "So is the pain there all the time, to some degree...?"] It is... I'm, very aware that it's there and I'm, having to change... things and make sure that, I do things to alleviate it or to work around the pain. (Susie, SEM 3)

At the end of her second year Susie was still experiencing constant tension/pain in various body parts during everyday life. However the focus of her discomfort/pain had shifted to a painful lump that had developed in her left wrist. Susie had consulted doctors who had advised that the lump needed to be removed surgically but also that there was a possibility that she would have decreased ability whilst playing violin as a result.

I don't... have the same problems... I have a, lump in my wrist, in the pivot point where my fourth finger is meant to extend... I have actually been told that I need to rest, and... that the only way to fix it was to remove, the lump... I've been told that I need to weigh up, the possibility of having... decreased ability like decreased movement and feeling... it's a big decision do I, keep playing and then not, be able to play because of, this lump, or do I get it done and then not, be able to play as well as, before so. (Susie, SEM 4)

At this stage Susie was reportedly experiencing lots of anxiety and panic attacks and was generally struggling to cope. Orchestra continued to be a problem for her, to the extent that she had to inform the conductor that she couldn't play during rehearsals due to pain. Susie had also changed to longer, fortnightly violin lessons so she was able to do more practice between however the longer lessons were very painful.

I actually have been told to take anti-anxiety pills... to calm myself down... I have... they're not panic attacks but I... get so stressed out that I... either go hysterical or comatose... I'm actually seeing someone at the moment who's helping me, take steps towards managing, everything. (Susie, SEM 4)

The Symphony concert with, [guest conductor]... he sent me home, one night because I was just in so much pain... the day before the concert. So, I went up and said "Look, I can't play, through, the whole rehearsal I'll sit there and then I'll play when I'm able to" and he said "No go home." ... I got to the point where I was resting my violin on my knee and... my back was so tense that, if I... slouched it would just stay there I couldn't, bring it back up. (Susie, SEM 4)

I've had to, go to fortnightly lessons, with my teacher, so that... I have two weeks to prepare, for the lesson and then I have a longer lesson and... that actually works out well because... I get a lot more done... when I start having... as [Teacher O] calls it "finger pains"... I know that it's time to stop. So that's usually 45 minutes, and that happens in my lesson too... [MW: "...What do you do in the lesson then when you get to that point...?"]... We have a five-minute break, and then I just stand there and... stretch and... put the violin down. [MW: "And does that help or?"] No not really... after 45 minutes the lesson just, goes downhill from there. (Susie, SEM 4)

The above quotation was an example of the frequent inconsistencies in her statements – here she was claiming that moving to fortnightly longer lessons was working well (as it enabled more practice between lessons) while in fact she was unable to maintain concentration past 45 minutes in these lessons due to severe pain.

At the beginning of her third year Susie was experiencing constant tension in her neck as well as pain in her shoulders, wrists, and elbows during various everyday activities. However, the lump in her left wrist had been changing and a surgeon had advised her that it was a fluctuating ganglion. Unfortunately, this meant in order for it to be removed she needed to play consistently to the point of severe pain. By now Susie was feeling angry that it was no longer enjoyable for her to play the violin and she had been diagnosed with (and was seeking treatment for) depression. Her treatment plan included taking a six-month break from University studies, during which she intended to resume playing for enjoyment and to sit for her A. Mus. A. exam once more.

It went away, and then I started practising again, for my lessons, and it's come back... it's like a fluctuating... ganglion... so... any excessive use or, in my case, normal use for playing, it will... flare back up... and so the only way to stop it from coming back is to actually just take it off... the... orthopaedic surgeon said that, I will just have to wait until it gets... really bad... so I need to play every day for hours and hours, and then... as it gets to the peak of not being able to get any bigger and any sorer, then they'll take it out... so I have to put myself through pain to get taken out. (Susie, SEM 5)

I actually have been diagnosed with depression so... I'm taking six months off to get on top of it and then come back... it's all boiled down to the fact that I don't enjoy the course as much as I thought I would... so that's getting me a bit down and... I'm going to do my A. Mus again... and start enjoying the playing side of it again because it's now just a chore... I'm not going to practise as much as... last time. (Susie, SEM 5)

I get angry because it does hurt... and I'm just sick of it, I just want to... be able to play for enjoyment and part of it is the fact that it does start hurting and I'm limited... whereas, you know, a couple of years ago I could just play and play and play and play and then I would get sick of playing, and then stop... rather than getting sick of being in pain and stopping so. [MW: "So are you worried about the pain before you start to play?"] Yeah, I take Panadol before I start... so I can extend the amount of time. (Susie, SEM 5)

However, at the next interview Susie revealed that she abandoned the idea of practising for her A. Mus. A. exam as she found that playing the violin significantly increased her anxiety. As a result of the long break from playing (and starting personal training in order to build up pain tolerance) she was not experiencing as much pain in general. However, she still had constant neck tension and pain with many everyday activities. Despite everything, Susie said that she was planning to come back and resume her studies at the institution. At the time of her interviews she was in the process of trying to change her program so she didn't have to complete the Orchestra course.

[My pain is] not as bad as before so I think that big break has meant that my body has healed everything that was wrong... and then, it's... only just the general fatigue of playing for long times [MW: "... Do you, no longer have... the pain all the time in your elbows...?"]... Only when I'm lifting... and when, I am, using... a keyboard... so with the computer if I'm leaning against it that's the only time I have pain... oh, I mean I get... writers cramps... when I am writing and stuff... it's sort of like a dull sort of, and then it... fades away, slowly... I'm doing a new job now, so I'm writing a lot. (Susie, SEM 6)

I do [have pain in my neck and shoulders], but at the moment I'm doing personal training, to strengthen... my back muscles so, a lot of that is, you know, do the personal training on a Monday and then Tuesday Wednesday, am a bit stiff... If I'm stressed, then yeah I have a lot of, knots and things, but at the moment I'm fine. (Susie, SEM 6)

I'll still teach... and... continue with my original plan of just doing session playing... I don't really want to go into orchestras and that, at the moment, seems like the only avenue I can take if I continue. (Susie, SEM 6)

Originally I thought no I don't want to [come back] but... I have come a long way... and even though I haven't played as much in the last six months as I, had originally I still haven't lost... the ability to play so, I'm thinking I will go back... I don't, want to do performance now so I'm not looking for someone who is going to absolutely drive me... I just want someone who's going to perfect my problems and, [Teacher O] does that, in a roundabout way. (Susie, SEM 6)

If I get the Cross Institutional, I will apply to do Winter, Semester and Summer Semester up there [at another institution].... obviously... I have to... fight, with the institution... because they only let you take 30 credit points somewhere else... and, my course requirements next year is 40, credit points for Education....be nice if it was just like “No you can do it if it's going to help you”. (Susie, SEM 6)

It was at the beginning of her fourth year that things began to look up for Susie. She was feeling much happier and had managed to change her program to a Bachelor of Music Education Preparation Cross Institutional. As a result she did not have to complete the Orchestra course and was able to do some credit points at another tertiary

institution much closer to where she lived. Susie still experienced pain in various body parts whilst playing, typing, and writing (and constant tension in her neck), however this did not bother her as much as she now had a higher pain tolerance due to personal training.

[As noted in the methodology chapter a problem with the recording meant that there were no direct quotes from this interview however, when I became aware – very soon after the interview was completed – that the recording equipment had not worked I wrote my recollections of the interview and forwarded them to her for approval which was granted.]

As she completed her fourth year Susie's pain continued to decrease as she hardly ever played the instrument and no longer had to type or write at work. However she was still experiencing constant neck tension and pain in various parts of the body whilst playing, typing, writing, and carrying items. Susie was studying six days a week at two different campuses however she had discovered and was angry that she still had one course to complete next year. (One she had already done apparently no longer counted towards total credit.) She was increasingly finding that her pain was linked to her stress levels.

I get really big knots, and they sit, just above my, shoulder blades and it is really painful... it depends on what has happened, during the day, and the day before that... and how I'm feeling if I'm having a really good day, I will be fine, if I'm stressed, I, don't, really play, because I know, that I just, won't be able to move properly. (Susie, SEM 8)

I don't have, time [to practise]... I'm at Uni six days a week... and... I didn't have the motivation, either, because I was... angry at the Uni that I, can't graduate, this

year... but... I'm tired already... if I've just gotten up, and... done nothing and then played the violin it's just that I'm tired... but if I've done other stuff during the day then... my elbows hurt. (Susie, SEM 8)

As she progressed through her Bachelor of Music program Susie experienced playing-related discomfort/pain in her hands, wrists, forearms, elbows, neck, shoulders, and back. For the first three semesters the focus of pain remained in her elbows and wrist. It then concentrated in her left wrist, followed by the right hand, before switching back to the left hand and finishing up in her elbows and left wrist. From the fourth semester onwards she also had constant tension between her shoulder blades at the base of her neck.

From the outset Susie experienced pain in many body parts during everyday activities. She was consistent in saying that she experienced pain in her neck and shoulder when lifting and carrying items, and pain in her elbows whilst cleaning, typing, writing, and lifting. At various times she also experienced discomfort/pain in her back, hands, fingers, and forearm during other activities such as driving.

I find, that I can't carry my violin case, I can sort of, cause sometimes I catch a bus and I can, I can't carry it, from the side handle but if I put it on my shoulder, I can walk about 10 steps and then I have to swap shoulders, and I have to keep swapping. (Susie, SEM 4)

I get it [pain] when I have to, carry my books, in my elbows... I'll walk from [train station] and I'm changing arms all the time because my elbows get really stiff... if I have to keep my arms bent... [MW: "... Do you carry things over your shoulder...?"] No, because then I get a sore shoulder... and my neck gets really tight so I tend, the only thing I carry, on my shoulders is, my handbag... I don't

even carry my violin anymore... and... I, went from a big handbag to a small one.

(Susie, SEM 8)

Susie openly acknowledged that one of the main influencing (and aggravating) factors for both her playing-related and everyday discomfort/pain was outside work. For the majority of her program she worked long hours in a variety of different jobs which involved typing, writing, lifting, and cleaning.

At the moment it [my pain] is only sometimes because I am not on the computer as much anymore because I don't work, in an office... I think, the only reason it's gone is because a lot of, the work that I was doing before, with playing and ... practice. (Susie, SEM 4)

From her third year onwards, Susie concentrated on working at McDonalds. In order to get around the lifting element (food boxes were reportedly a minimum of 10 kg and lifting them could aggravate pain) she arranged to be transferred into McCafe. However she found the long hours holding the milk jug were equally painful. She was then promoted to a higher position as supervisor and, instead of up to 40 hours a week, worked one eight-hour day. This involved blocks of writing and typing, which she says were painful but better than doing 40 hours spread over several days.

I work at McDonalds... in the morning... that involves heavy lifting... I'm about to go into cafe which means I won't, need to do that so that's all right... our minimum weight that we have to lift is ten kilos... [“... Do you think that's aggravating it as well?”] It is... at the moment... I've told them that I can't lift... [“... But it will be better once you're working in McCafe you think?”] Oh yeah cause you pretty much just make coffees. (Susie, SEM 4)

Once a week I have an eight-hour, office day, so that's a bit painful... sitting there for eight hours and just typing and writing and, doing all that sort of stuff but, it's been okay. I mean, being in the office for eight hours a week, rather than working 40 hours has meant I'm off the floor... so... no walking, no lifting.

(Susie, SEM 6)

Throughout her program Susie also taught a small number of violin students and adapted her teaching methods accordingly (limiting demonstrations and no longer playing the piano). "I'm not playing with them [my students] like I used to" (Susie, SEM 5).

As with many other students in this study, Susie found that the frequency and type of physical exercise she was undertaking could influence her pain levels. During her third year, she began personal training. She found this extremely painful, but nonetheless said at the time it was very helpful in increasing pain tolerance. Susie continued personal training until midway through her fourth year, when she instead took up running and walking. At this time she said that she felt the personal training was not such a good idea as it was helping to strengthen the wrong muscles and also causing her joints to be too stiff. Note that Susie said that she was hyper-mobile and that she had a history of Benign Joint Hyper Mobility Syndrome (B.J.H.S.) in her family.

Last week I had, a session and my... elbows were swollen for four days... but I always do that, when I exercise or do weights... I hold a lot of fluid in all my joints. [MW: "Is that painful?"] Yes... I can't straighten my arms out... I think it was just because, I have, lax ligaments... so I'm very, flexible and my muscles have, stiffened over time and like, contracted to stop my, joints from popping out... [MW: "Did you have... pain problems before... in everyday life, before

you, had all the problems with your violin playing?"] Yeah... when I played netball and stuff, I used to... twist my ankles all the time even just walking... my brother has, Benign Joint Hyper Mobility, Syndrome... B.J.H.S. (Susie, SEM 6)

I suppose, being with my P. T. [Personal Trainer] he's... said you know, you get your fatigue point, and you just push for one more, and that, increases your... [MW: "pain tolerance"] yeah. So your threshold. And I.. have, implemented that, when I'm playing. If I hit half an hour, and I start feeling a bit, tense, I push on for another 15 minutes. And then the next practice time I can actually go for 45... and then so I am just pushing that over and over I mean, I won't go to the point of absolute, excruciating pain... but... if it's only... niggling, I'll... just keep going. (Susie, SEM 6)

I, used to be in so much pain after P.T... your personal trainer wants you to build muscle or make it tone up, and it... stiffens all your, ligaments... and it, tightens them too much and I, naturally have short ligaments so, to shorten them anymore, that is just ridiculous... so, Body Balance... is helping, my posture, is getting better... cause... personal training... was strengthening, the muscle, behind my shoulder... but not the muscles in front of my shoulder so... it was shortened at the back so it was pulling it forward... which made it hard to play. (Susie, SEM 8)

As she progressed through her Bachelor of Music program Susie discussed her experiences of playing-related discomfort/pain with many health professionals including physiotherapists, doctors, and surgeons. Diagnoses included epicondylitis, a pinched nerve, and a fluctuating ganglion (lump). During the second year of her program an orthopaedic surgeon recommended surgery to remove the ganglion, which

came and went depending on how much Susie was practising. However, he highlighted that this would have to occur at a time when she was playing so much that the lump was extremely large and sore.

I noticed... there was this... pin-sized lump... sticking out, of my wrist and... I went to the doctors and they said “Oh, we don't know what it is”... and... they didn't know what to do cause... it could have been a ganglion, but... it was hard... so they sent me to the orthopaedic surgeon and they said “Nup you've got to remove it”. (Susie, SEM 4)

When I was originally having problems with my elbows they sent me, to have a bone scan... because they thought I might have... juvenile arthritis... and the... scan showed that I had mild, epicondylitis... or tennis elbow... in both my elbows so... I went back and saw the doctor... they said “Take it easy”, and... I did see an orthopaedic surgeon, and they said “Just take a break”, which you can't do. (Susie, SEM 4)

Given everything that she was going through, it is unsurprising that Susie was concerned by her experiences of playing-related pain. During the second year of her program she revealed during an interview that she had been suffering from ongoing anxiety and panic attacks. As she developed the ganglion and grappled with the decision of whether to remove it or not her concern grew. However, during the third year of her program she became more concerned that she no longer enjoyed playing violin. “It's my goal to play, for a living, and if I am, worried now at 18, about pain... and, it's affecting me, it's going to get worse if I don't manage it now” (Susie, SEM 3).

I worry more now because, I've gotta make that decision whether or not to get... the operation so, I worry that if it... gets so painful now, it's only going to get worse... unless I do something about it. (Susie, SEM 4)

Because the pain is not right there... it's not, every day, every moment like it used to, it's more the fact that I don't want to play any more... part of it could be because I'm scared that I'm going to be in pain but the other part of it is because I just hate it... I mean, if I liked it, I would play through the pain, I really would play through it if I really wanted to... I've done it before. (Susie, SEM 5)

I couldn't go near the bus stop without freaking out... last semester, that was, when it was really bad, and it was all because... I was so anxious about going to Uni... I'd be hysterical and, I wouldn't be able to calm down... part of it was public transport as well, I hate public transport... I've always been a really careful person around others that I don't know. (Susie, SEM 5)

I have a... 12 month health plan, that we've done to get... get me over... everything that is... dragging me down... every month, I have to go back and we do a review... of how I've gone... and everything that's troubled me... then we work out strategies and stuff to get over that... I was prescribed antidepressants but I found... [that they had] really horrible side-effects and, also, I didn't want to be on them... we are just doing... mind over matter... and different coping exercises. (Susie, SEM 5)

I'm talking to someone at the moment and, part of my recovery process is that I do pick up the violin, or even if I just sit it out of its case it's still a step... because originally, not, only was it the pain but it was, the stress of Uni and that sort of stuff... that made me not even want to pick up the violin. (Susie, SEM 6)

Susie subsequently was diagnosed with depression and decided to take a six-month break from her University studies to focus on recovery. After taking time off she came back to her studies feeling much better as she had decided to pursue teaching rather than playing. By the end of her program she said she had developed a more mature mindset and was better able to cope with her pain.

I think I've got a different mindset about it now... I can understand it better... and... how, I react to it now... so... it does worry me... but I think I'm more, mature in my, understanding of it, so that makes it a lot easier. (Susie, SEM 8)

Susie initially discussed her experiences with her violin teacher. However, over time she stopped doing this as her perception was that the teacher did not understand the magnitude of her problem (Susie thought that this may have been partly her own fault for not being assertive). At various times during her interviews she mentioned the desire to find a new teacher. However, after a six-month break Susie decided that she was happy to resume with her teacher, rather than try and deal with any further changes.

He's [Teacher O] had quite a few students with injuries so he's... understanding, but... I... say "I've got a sore wrist" so he says "We'll take it easy" but we still do it the same... I don't think, they really realise... the extent of it I suppose if I was more assertive and I turned around and said "No I have to stop", then maybe we'd stop. (Susie, SEM 4)

I only have fortnightly lessons... only an hour and a half... I've had five lessons with him this semester as opposed to what the 11 that we are meant to have had... we take it as it comes if I can go to my lesson I go... if not, we make it up... I do all right now, I think because I'm not playing as much and... I'm not sitting there now going "Oh, my arms are hurting..." probably focusing on other

things so... I do know that I do have a tense neck all the time... even just getting out of bed in the morning... but that could just be stress-related too. (Susie, SEM 5)

From the beginning of her program Susie found the Orchestra course very difficult due to the long rehearsals with limited breaks. After participation in the Opera, which she described as "excruciating" she had to go back to the physiotherapist as she was in so much pain. During her second year she also had to tell a visiting conductor that she couldn't play during rehearsals due to pain. By the end of her third year, Susie had decided to change her program so that she no longer had to do the Orchestra course. "[My pain was] excruciating... I was in Opera Orchestra, so that was... every day for three weeks, and... that killed me" (Susie, SEM 2).

I, was in a lot of pain when I did the Opera Orchestra last year... I was also in a lot of pain when I did Symphony this year and last year as well... I'd been in [another orchestra] so I was used to three-hour rehearsals but, the time of day that they, run them... some people have been working all day and they've come in so, four to seven is probably not a great time... the way its set up as well... a break isn't enough for three hours it's not enough break...and I think, leading up to concerts maybe if they... worked it out so that you didn't have three rehearsals before your concert. (Susie, SEM 4)

Well [my pain has] obviously... made my decision to leave Orchestra a lot easier... apart from me being bored and, just not enjoying it... sitting through the three hours of... pain... aching elbows and that sort of stuff... that was ultimately what, made me, make... the decision that I didn't want to do Orchestra. (Susie, SEM 6)

Susie's strategies for preventing and dealing with her playing-related discomfort/pain throughout her program were varied and included using anti-inflammatory gel and pills, stretching, taking breaks during practice, drinking water, pain relief medication, acupuncture, massage, applying ice and/or heat, exercise, building up pain tolerance, playing piano with “wings”, resting her elbows on the desk whilst typing, purchasing a lighter violin case, changing her shoulder rest, carrying items in the crook of her elbow rather than on her shoulders, and (by the end of her program) “trying not to think about it”. Her most consistent reaction when she experienced pain whilst playing was to stop and apply ice. “I changed the set-up of my violin... the shoulder rest... pretty much just taking breaks and making sure that, I... feel better before I start playing again” (Susie, SEM 3).

I used to play, 15 minutes and then ice, for five and then play another 15 ice for five now... I don't have to ice my elbows I ice my wrist after every practice... and also heat packs as well but more ice... my elbows and my wrists, they get swollen and then my fingers get swollen and I can't move them as well... I put the ice on them to reduce the swelling, bring back the movement. (Susie, SEM 4)

If I've got a chance, to put ice on I will... otherwise I have... an anti-inflammatory cream that I put on, before I play... I have a backpack now instead of the one shoulder thing... and I'm getting a new case for my violin... a lightweight case, and it has backpack straps on it, so I'll use that. (Susie, SEM 5)

I have a pillow, across the desk... it's made it very awkward to have my hands down... but, it stopped my elbows from hurting so, I'm thinking that maybe if I'm going to, type I won't have my arms resting on the table. (Susie, SEM 6)

I don't have Voltaren anymore... but ice, yes... and I... have massages in my fingers as well... in my right hand my, pinkie joints seizes up... so, that could be what is helping as well. (Susie, SEM 6)

Susie consistently linked the amount of discomfort/pain she was experiencing (both whilst playing and during everyday life) to the amount of violin practice she was doing. Put simply, the more she practised, the worse her pain became. At various times she experimented with increasing her practice but was unable to sustain it due to pain. Despite this, for the duration of her program she only took practice breaks as a means of dealing with pain once it was already present. Susie was not consistent with a warm-up either, although she experimented with scales and stretches in the early stages of her program. "I... get to about 45 minutes, then I've got to stop, and have a break, about half an hour, and then... have slow practice after then, because it [my pain]... comes back" (Susie, SEM 2).

At the moment, I'm stretching my fingers, and... warming-up my wrist... scales, not so much at the moment but I do take a hard passage, straight away... and then I break it down and do really really slow practice on it. (Susie, SEM 4)

I stretch my fingers... my wrist as well, and all the muscles in my forearm... and then... upper arm... so loosen up and everything and make sure I'm feeling... relaxed. (Susie, SEM 5)

I used to have to [do a warm-up]... but now, I don't... if I am planning on doing a lot more practice I will, start warming up. (Susie, SEM 6)

At various stages throughout her program, Susie spoke in detail about her early learning experiences and how she believed they contributed to her later problems with pain. She revealed that she was told never to move whilst playing, and that the first she

heard about posture was during the Pedagogy course she took in her second year at the institution. Despite this, she expressed much dissatisfaction with this Pedagogy course, saying that a lot of the teaching methods wouldn't have applied to her students learning styles. "The first time I heard about... posture and... feeling loose while you're playing, was when I took Pedagogy this year... cause, in my lessons my teacher tells me I am not allowed to move" (Susie, SEM 4).

I don't believe in having one method, to teach from... I did think that Pedagogy was going to give you a lot of, methods but I did find that a lot of them in there wouldn't have applied to the way, that my students learn. (Susie, SEM 4)

I wanted to do, Performance and Pedagogy... originally and then I took Pedagogy last year, and absolutely hated it... so then I changed to Performance, and then, decided that... I can't stand another two years of doing, Orchestra... I made the decision to go looking for something that didn't include, Orchestra... I suppose what I can do is... just get exemption from, Orchestra and do something else. (Susie, SEM 6)

Susie could also identify exactly when her problems with pain escalated. During the last year of school she started increasing her practice in preparation for her A. Mus. A. exam, enrolling in The School of Distance Education so that she would have more hours to practise. After three to four months of practising about six hours a day (with no breaks) she began experiencing elbow pain, but continued to practise as this pain worsened. It was only at the point that she had completed her audition for the institution, become unable to lift anything or drive that she went to the doctor.

The year I did A. Mus... I... hit the practice really really hard... mainly because I really really wanted to do well... that was when I started... dropping my

schoolwork and coming straight home and practising getting up at five o'clock in the morning and practising until seven, when I had to leave for school... and then taking my violin to school and practising during the day and then... coming home and practising until like 10 o'clock at night so. [MW: "Okay and you used to do that without breaks and stuff?"] Yes [laughs] [MW: "... And how long could you keep that up before you started to, get the pain?"]... It was about three or four months and then... my elbow just sort of locked one day and I went "Oh my goodness", it hurt, so then I had to start taking breaks I was still doing six hours and my breaks were only five minutes... so really I should have... [MW: "And how long was it before you... talked to someone about that?"]... I waited till I got in to [the institution]... and then it just got too much so I went and saw a doctor about it... because at that stage I wasn't actually able to lift anything and I was having trouble carrying my violin case and driving, as well because I have a manual car... I wasn't able to drive. (Susie, SEM 4)

On reflection, Susie said that she thought there were lots of students at the institution who were experiencing playing-related discomfort/pain but that people were not comfortable talking about it. For her, Orchestra was the catalyst for her most severe pain and it was only once she was able to stop that course that she noticed a real improvement in pain levels. In her opinion, within this course there should have been more breaks, shorter rehearsals, and less concentrated blocks of rehearsals prior to concerts.

My first year [was the worst in terms of pain], because I really wanted to impress [Teacher O]... that was when, I had all that problems... [MW: "And... you didn't notice... an improvement straightaway did you...?"]... Once I stopped

Orchestra... which was... last semester... Orchestra is the worst invention ever...

[MW: “So how do you think that could be, made better...?”]... I know the, policy is that for every hour, of study you do you have to take a 15 minute break and that's the same... with, Orchestra. I think maybe, shorter rehearsals, and more of them... would be better. 'Cause, I didn't get anything out of rehearsals... they need a shorter rehearsal time, even two hours, with a 15 minute break. (Susie, SEM 8)

[MW: “... Do you think that, many of the students here, are having problems?”] ... I think they are, and a lot of the time they're not saying something... I think, because it is so competitive, and... we have chosen, a very competitive field... they can't show any weakness, that whole, mentality “You've got to be better and stronger”. (Susie, SEM 8)

During her final interview Susie said that she was feeling positive and looking forward to a future working in Education. She was planning to do a Graduate Diploma in Education specialising in Italian, whilst maintaining some private violin teaching.

In conclusion, Susie's experiences of playing related discomfort/pain were particularly severe and impacted on many aspects of her daily life. It was impossible to gain a balanced understanding of her experiences without considering all of the many contributing factors. She had to modify many of her day-to-day tasks in order to minimise her pain. However she did not consistently implement preventative strategies such as warming-up before and taking breaks during practice at any stage. The various inconsistencies in her quotes above reflect the complexities of her case and situation.

Student 2: John

John was a violinist who struggled to remain motivated throughout his Bachelor of Music program. Although he was very easy-going and during interviews elaborated with prompting he was unreliable and did not consistently keep scheduled appointments with me. From the outset John experienced a relatively large amount of discomfort/pain both when playing his instrument and working. However he claimed to remain unconcerned about his experiences and made no attempts to prevent them from occurring.

During the fourth semester of his program, John injured his right shoulder badly. An x-ray revealed a shoulder impingement and John attributed his injury solely to lifting weights at the gym. However through interview he also revealed that, one week prior to the injury he had increased his personal practice from virtually nothing to five hours a week plus Orchestra. After the injury, he persisted with the rehearsals and performed in the concerts, despite being told by his physiotherapist not to continue playing. He was then unable to use the arm at all.

Ultimately John had to withdraw from the Bachelor of Music program. This was not entirely his choice; he was already on academic probation and the institution did not let him withdraw from all of his courses. As a result he was unable to return the following year.

Table B2

Reported Pain Experience for Student 2: John

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	2	Last month when busking	Lower back, front of left shoulder	7	Less than one hour	N/A
2	2	2-3	Previous Sunday whilst busking	Right hand	8	Very inconsistent, a few hours a week	N/A
3	2	2	Within the last month	Lower back	5	1-2 hours	6-7 hours

Prior to his studies at the institution John had experienced playing-related discomfort/pain in his hands, fingers, right wrist, left shoulder, and lower back. His back pain bothered him the most in terms of severity, however the discomfort/pain in his right wrist was ongoing and recurred whenever he played fast repetitive repertoire.

As John progressed through his program, the discomfort/pain in his lower back continued to bother him the most, recurring when he sat on certain chairs. John noticed that the adjustable chairs in the theatre were much better as he could angle them so that his hips were higher than his knees.

I think... my lower back pain... depends on... what I'm sitting on... I notice I didn't have that problem when I sit on the chairs in [the institution], the ones that you can turn the handles... so you can... angle it forward a bit. (John, SEM 2)

I notice it [pain in my back]... in rehearsals in an orchestra that I am in on Monday nights, because the chairs... are not designed to... sit forward on... so... my butt is... lower down in the chair... that's when I noticed it last, but I don't really notice it if... the chairs [are] pretty good. [MW: "... Are the chairs that you have to use here... any good?"] They are all right... not great... the ones onstage that you can, change the... the angles of... they are good. (John, SEM 3)

The discomfort/pain in John's right wrist also recurred, most frequently when he was busking (due to the fast and repetitive repertoire). This discomfort/pain was also influenced by his work as a waiter: he was left-handed so he stacked the plates on his right hand.

I was busking... doing fiddle, doing fast stuff, so that's why [I have pain]... maybe it's a bit of RSI. [MW: "Do you find that busking is a bit of a problem sometimes?"] Yeah. Because of the pieces that I play. [MW: "... Do you do it for hours and hours...?"]... A couple... but then I have lunch breaks... or... if my hand starts to hurt I just play some slower stuff. (John, SEM 2)

Carrying plates... I think that could have contributed to the pain in my right hand because... I'm left-handed, so... I grab the plates and then stack it all up on my right hand, so, probably not too good. (John, SEM 2)

By his second year John was also experiencing discomfort/pain in his right shoulder when working. He would sometimes notice more pain when playing after working but generally speaking claimed that he never thought about his experiences of discomfort/pain. "I don't lose sleep over them" (John, SEM 3).

John's practice/practice structure was not regular at any stage of his program and he admitted to struggling a great deal in terms of motivation. Early in his second year he

broke his foot and stopped practising completely. Around this time he also started going to the gym and doing weights and noticed a weakness in his right wrist. He believed this was related to playing the violin.

I'm at the gym now. [MW: "... What sort of stuff do you do?"]... Weights...
 ["And do you find that, helps at all or, have you noticed any change?"]... I notice more weakness in... this wrist [right] joint than this one... I will probably see someone about that soon... because it's quite noticeable... if I'm lifting up the bar... it does hurt here a bit more... and I think that has to do with violin. (John, SEM 3)

During his fourth semester John seriously injured his right shoulder and attributed this to doing weights at the gym. However, two weeks before his shoulder was injured, he increased his personal practice from virtually nothing to five hours a day in addition to Orchestra. After the initial injury he consulted a physiotherapist. The advice was to stop playing however John continued and played in the concert one week later. After this he said that he couldn't use his arm at all.

At a gym... I did something and it's called an Impingement Syndrome... so... the tissue... was all swollen, and when I moved my arm... it was going against like the shoulder bone... which was pretty bad... I can still play... but... it was... four or six weeks that I had to... not play and let it rest... the week before that's when I first started to do five hours and I hurt my shoulder and the next week I was doing five hours a day plus all the Orchestra rehearsals... and... I just really overdid it... I couldn't move it past here because it would just hurt so much... the more I used it, the more it... kept up but I have... done nothing with it and so it's healing now. [MW: "... So did you have to do anything else? Like put ice or heat

on it?"]. I was supposed to, but I didn't... the doctor has given me... anti-inflammatory... I'm taking them... [MW: "...So how did you injure it again?..."]. I was at the gym doing... a seated bench press... I did too much weight. (John, SEM 4)

It was... a week before the Orchestra concert... so I kept playing through it... the physio was like "no, don't, don't, don't." I was like "I really want to..." I... completely overdid it, I think. (John, SEM 4)

After consulting the physiotherapist for about five weeks with no improvement John went to the doctor. X-rays revealed a shoulder impingement. The recommendations were for total rest and anti-inflammatory pills. John stopped playing but he continued his work as a waiter even though this reportedly caused pain in the right shoulder, hand, and wrist.

Physio didn't help too much... she's the one that told me... go see a doctor and make sure it's all right. And that's... when I found out what was wrong... the physio wasn't too sure, she just thought it was inflamed or something... she gave me... some weight training to strengthen some muscles around it... rotator cuff muscles, but the doctor... recommended that I don't do any of that... and just let it settle down first... I only saw the doctor last week... I saw the physio for about four weeks, or five weeks. (John, SEM 4)

I'm just careful... that I'm not carrying too much weight, for too long... it's another reason why I... haven't been practising... I could probably do a bit of practice, but because I've been working a lot the last couple of weeks to save up... that is the only work I have been doing on my shoulders and my wrists.

[MW: "... So you have got a bit of pain then?"] Sometimes... but I think it is

more from the weight and the strain... when you're carrying ten kg just on your wrist it's... not good. (John, SEM 4)

Shortly after John withdrew from the institution. This was not entirely his choice; when he injured his shoulder he was already on academic probation. For this reason the institution did not let him withdraw from all of his courses despite letters from his doctor and physiotherapist. Unfortunately, without the marks from his Major Study and Orchestra courses he was not able to raise his grades enough to come back the next year.

I got a letter from the physio... so I applied to withdraw from my subjects... but the Uni... kicked it back... so... I've got a doctor... he's written a letter, so I've got [to] hand that in and see how that goes... [but] if they don't accept my...

application here to withdraw then they are going to kick me out. (John, SEM 4)

The doctor has given me a certificate now, saying that, he doesn't want me playing for the whole semester... I'm trying to get out of... my academic subjects as well though... because... Major Study and Orchestra are my best subjects. And I'm not confident that I'm going to get enough marks to get up from probation from last semester. (John, SEM 4)

In conclusion, John was an interesting but not entirely unusual case. His experiences of discomfort/pain throughout were relatively severe and impacted on him yet he remained unwilling to make any changes. Although he attributed his eventual injury to weightlifting, his case demonstrated the complex interaction of contributing factors.

Student 3: Tim

Tim was a violinist whose experiences of playing-related discomfort/pain throughout his program were minimal. He presented as very laid-back, laughed frequently, and gave many ambiguous responses throughout our conversations. One of the most interesting aspects of his case was the way that he seemed to regularly change his opinions regarding the causes of his playing-related discomfort/pain. It seemed quite clear to me that these changes were being influenced by his environment.

Early in his program Tim became quite certain that his pain was linked to his mood. His girlfriend, also in this study, was expressing a similar idea at the time. However, by his third year (once they had broken up), he was quite certain mood was irrelevant to his experiences and was very adamant that his pain was linked to exercise and diet. He also talked about the importance of breathing deeply and became quite philosophical.

After this particular interview Tim came up to me and revealed that he had a "cool" new group of friends that he was planning to move out of home with. He then stated that he had been smoking marijuana to help him deal with stress (this would explain his being particularly laid-back and philosophical during this interview). However in the final year of his program, Tim had stopped smoking marijuana, moved back home, and stopped exercising. At this time he had changed his thinking again and no longer believed that exercise had anything to do with the amount of discomfort/pain he experienced, a clear change of thinking from the previous few semesters.

Although Tim expressed dissatisfaction with the Orchestra course throughout his program, he was also inconsistent on this point. At the end of his third year he stated that he was not going to complete a fourth year because he disliked the Orchestra course

so much. (Even though just a few minutes earlier he had stated that he really didn't have a problem with Orchestra.) However Tim did come back into fourth year, claiming he realised he had always planned to.

At the conclusion of his program Tim said that he was hoping to do some further study overseas. On reflection he thought that he had experienced a gradual decrease in his playing-related discomfort/pain throughout his program.

Table B3

Reported Pain Experience for Student 3: Tim

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	2	Last November when preparing/performing in chamber group	Lower back	3	Less than 1 hour	N/A
2	2	2	2 weeks ago during an Orchestra rehearsal	Lower back	4	1 to 2 hours	N/A
3	1	2	Can't recall exactly	Back	N/A	Less than 1 hour	N/A
4	1	1	Earlier in the semester during Orchestra	Back	2	2 to 3 hours	6 hours
5	1	1	Previous week	Back	2	2 to 3 hours	5 hours
6	No Pain	N/A	N/A	N/A	N/A	2 to 3 hours	6 hours
7	1	1	Present at time, 1	Lower back	2	2 to 3 hours	6 hours
8	No Pain	N/A	N/A	N/A	N/A	1 hour	3 to 5 hours

Prior to his studies at the institution Tim had experienced playing-related discomfort/pain in his left shoulder, his neck, and his back. His back pain bothered him the most but was not ongoing.

At the end of the first year of his program, Tim said he had noticed a decrease in his playing-related discomfort/pain. He noted that he could be more likely to experience discomfort/pain when sitting down and playing for longer periods of time (i.e. during Orchestra). “[My pain is] probably better... I think, its, due to... my view of myself... and how I, adjust my posture based on what I think... I'm looking like” (Tim, SEM 2). “I wouldn't say Orchestra itself would be the problem, but... it can aggravate, problems [with pain]” (Tim, SEM 2).

By the beginning of his second year Tim was reportedly only experiencing pain after holiday periods. At this stage he said that he believed his pain was linked to his general mood. He explained that, if he was in a bad mood, he would issue a "grumpy" pose. As a result his posture would not be good and he would experience more tension. “It's something that, if I, haven't, done much of anything for a while, then yes, I do... feel... a bit of a pain, but that's something that's... after a couple of days rest” (Tim, SEM 3).

It's almost like the character which I take on myself as a person... translates into everything which I do during daytime including how I sit myself, how I walk around... my posture... if I am grumpy... I'm like, screwed, you know... if I just... take a completely different, more peaceful... fun loving kind of attitude and character I find that it's so easy to just, do things without, over complicating everything... including posture and tension. (Tim, SEM 3)

At the end of his second year Tim couldn't recall his most recent experience of playing-related discomfort/pain but said that he had noticed a lack of fatigue during the Opera rehearsals. At this stage Tim had increased both his violin practice and physical exercise. When asked he said this was the only link he could make towards less pain.

Non-existent... it only really struck me... when the Opera started... and we were practising about six hours a day, when I, realised I could get into this... state of mind as well as like... I dunno but, for some reason after all that time, I wasn't fatigued. (Tim, SEM 4)

Just being more active... understanding... I wouldn't say... it's too much affected by my moods... now... I just have to know how much I can apply myself during the day like if I'm sick... I might give myself... more time to relax... but... if I'm, healthy... I can push myself, and I have... a drive to push myself during the day now. (Tim, SEM 4)

At the beginning of the third year of his program, Tim said the only discomfort/pain he ever experienced during playing carried over from exercise. At this stage he had started doing weights every second day (as well as walking to and from the institution four days each week 45 to 50 minutes each way). He was also trying not to use the computer and to read more, breathe deeply etc.

Nothing at all... I mean if I, injured myself in, exercise or something... I can feel it... but... not, considerably... I have started doing weights... which means there is a, certain degree of... fatigue that you have during the week but, that hasn't really, negatively... influenced... violin... I think what I have to, work on at the moment with my violin is.... posture and keeping... all my, core muscles around the back... active, while I'm... playing instead of just... switching everything off. (Tim, SEM 5)

As of... very recently... I've, made it a plan to, not even turn on my computer anymore... so just... leave it off, for days on end, which is completely unusual for me because I used to just leave it on, whenever I'd go up to my room... I'd be

sucked into it hours and hours, but now without that there... I'm, much happier... practising to fill my time, and reading. (Tim, SEM 5)

By the end of this year Tim said he was experiencing no playing-related discomfort/pain at all. He stated that he could link his decrease in pain to changes in diet and exercise in particular drinking more water and eating less junk food. At the end of the interview Tim said that he was not going to continue into fourth year because he disliked the Orchestra course so much. In particular he did not like his perception that the students had no say in anything or any power to change the way things were run. (Although a few minutes previously he had said he didn't mind Orchestra.)

A lot better actually... I've got nothing to complain about with... I'm not, being nearly as tense as I used to be when I'm playing at least... I get more fatigue like walking round all day or standing up, during work [than when playing violin]. (Tim, SEM 6)

No... [I don't mind Orchestra] but what I do mind about it is how everybody else minds it so much... I, watched the chamber group earlier this year... and you look at these people and, it would be interesting to, see what they think, but, because... I know all these people as friends... I know that they... hold a certain distaste for this Orchestra as well as like, a, a love and dedication for it, you know it's... really interesting [laughs]. [MW: "...Do you have any idea why they don't like it?..."] I think there's a lot of... pressure which they are, inadvertently putting themselves on because... that's how life works... I mean everyone needs something to blame, something on. (Tim, SEM 6)

I do not want to, stay here because of the Orchestra, and it's, not because I don't, enjoy playing in it and it's not, because... I have, any troubles with, playing for

that period of time or, playing with the people in this... institution it's just, I have a problem with the... inferiority of just, sitting there, knowing what's going on, and then, the inability to, make a change or, somehow, power it in a different direction you know?... It's very, dis-empowering... you look in the professional world and a lot of orchestras even have, players unions, as a... collaborated effect... of, all the players sort of coming together and, voicing their opinions and healthily... communicating with the... hierarchy further up... but, not even that exists here... and it is just going to continue... I'd love to get into [an] opera, orchestra ... somewhere in the world, as long as it somewhere where I can be, be paid. (Tim, SEM 6)

After this interview Tim came up to me and revealed that he had been smoking marijuana (he said this was not a new thing but that he had increased the amount recently). He perceived that this had helped him to feel less tense particularly about Orchestra. This certainly went some way towards explaining his laid-back demeanour, particularly throughout his most recent interview. Note he said he was really happy to also have a new group of friends he was going to move out of home with.

I was therefore surprised to see Tim at the beginning of the fourth year. He sheepishly revealed that he didn't have enough credit points to graduate and also that he realised that he had always intended to do a fourth year. Although he was still not keen on the Orchestra course he said his main concerns were now to do with health and safety and organisation. "Looking at my credit points and, seeing how I, technically had planned, to come back in the first place [is why I came back]" (Tim, SEM 7).

I am still not keen on it [Orchestra] but... actually... especially with Mahler it's more of a health and safety issue... there are so many people playing music and

it's, really... loud... I have got issues with the way Orchestra's... run... but ... he [the conductor] is really doing what he thinks is his job. (Tim, SEM 7)

Note for the first time during one of our interviews Tim's discomfort/pain was actually present in his lower back whilst we were talking. He said this pain was aggravated more by everyday activities such as sitting in certain chairs (like whilst he was talking to me) than by playing his instrument. It was interesting to note some other changes: he was no longer smoking marijuana, had resumed working and using the computer, and had stopped exercising.

No [not smoking marijuana]... I... go into phases... I quit smoking... cigarettes... and that... they were, really contributing to a lot of... stress... because... if I didn't have money then I didn't have smokes and if I didn't have smokes I wasn't... too happy. (Tim, SEM 7)

By the conclusion of this year Tim said that he was experiencing no playing-related discomfort/pain. He said that he tried playing without a shoulder rest which helped but eventually he went back to it. On reflection, Tim said that, over his program he had noticed a gradual process of decreasing pain.

Just can't really remember much, pain at all... since the beginning of the year... I tried using it [my violin] without a shoulder rest for a while, and that kind of helped because it meant the instrument was sort of free and just sitting on my collarbone... but then I slowly went back to using it because, it does help with... shifting around. (Tim, SEM 8)

It's just been, gradually getting better and better as... years have... gone by... as I've learnt how to, hold it [my instrument], better I guess. (Tim, SEM 8)

As he progressed through his Bachelor of Music program, the focus of Tim's playing-related discomfort/pain remained his lower back. Other body parts affected included his shoulders and neck.

Like many students in this study, Tim perceived that his playing-related discomfort/pain could be aggravated by sitting down and playing for longer periods of time. As a result, initially he perceived that he was more prone to experiencing more pain during Orchestra. However, and as already noted, when it came to his opinions of Orchestra, Tim was inconsistent.

Tim was one of the few students in this study who said that he really enjoyed his participation in the Opera Orchestra. Late in his program he said that he had been in the Opera every year and that it became easier each time.

I really enjoyed my time in the Opera... it's actually something which I want to do now... first year it was a real struggle... second year... I was getting into it... this time... I had a lot of fun... we... went through a lot of the music... more in depth... thinking about... the melody and that. [MW: "So, do you think that, the fact that you don't, really experience any discomfort or pain any more may have helped you to, enjoy the Opera more...?"] Yes, definitely. [MW: "... So it was pretty painful for you the first year?"] Yes... but then at the same time... I used to be a very lazy kid... come holidays I would just... sit, in a chair like that, [slouches right back] in front of my computer... just wasting the days away.
(Tim, SEM 6)

At various times Tim also believed that his playing-related discomfort/pain could be influenced by factors such as his diet, exercising, stress, repetitive actions, too much practice, other activities, and using the computer. His strategies for preventing

playing-related discomfort/pain included taking breaks during practice, stretching/flexing his joints, awareness, adjusting his posture, watching his diet and exercise, smoking marijuana, getting a good night's sleep, limiting repetitive activities, and trying not to get stressed. "Just, haven't had, real pain... just been... analysing what I have been doing a lot more, and... understanding, how I have to do a lot more with my playing... thinking... differently about everything" (Tim, SEM 3).

Just taking it easy, you know not, stressing... about something... breathing is good... I mean like being conscious of it, if I'm, taking too many, sharp, shallow breaths just, stop and, take some deep ones. (Tim, SEM 5)

Probably, not doing the same thing over and over again that helps, [laughs]... lots of breaks, lots, especially when sitting at the computer. (Tim, SEM 8)

Tim's practice warm-up was not consistent and for the first two years of his program he did no warm-up at all. However, he incorporated scales from his third year and during his fourth year briefly tried stretching as well.

Tim also struggled to keep his practice consistent. At some points he said that he was practising for two to three hours per day however at others he was struggling to complete one hour. Tim said that he took breaks during his practice but he was unspecific. He never highlighted taking breaks because of pain, however late during his program he said that in the past he had to take them because of "a physical problem". "Not pain but, fatigue definitely... and just an inability to concentrate [is why I take breaks during practice]" (Tim, SEM 4).

I make, solid commitments, and then, I do that and it might... take five minutes and then I take a break, and then I... go back, but it's like short breaks. (Tim, SEM 5)

I don't even think about time... I just... go through methodically and look at what's going on and, time will pass and, if I need a break I will... take it. It seems to happen after about an hour and a half, two hours... after first starting... it's not really a, physical problem anymore. (Tim, SEM 6)

Throughout his program Tim discussed his experiences of playing-related discomfort/pain with his current girlfriend, his teacher, and generally with other students. During his fourth year he participated in various national music camps and orchestral programs and made special mention of Bronwen Ackermann giving a talk. “[I discussed my discomfort/pain] with my girlfriend... she is just happy that I don't have to deal with it... she's got her own mass of problems” (Tim, SEM 3).

[MW: “How did you find [the national orchestra]?...”]... It was great. [MW: “Do you think there were, many players there who were having problems with pain?”] Aha... they all talked about it, [laughs] and... when we were in China everyone went to get a back massage... [MW: “Did you get any kind of, pain when you were over there or?”] No. [MW: “Why do you think you didn't get any when they did? Any ideas?”]... No... it's tricky because even, looking at all the players, it was difficult to suss out that there was anything particularly wrong they were doing. [MW: “... Could it be maybe that you're a bit more laid back...? They are a bit more, uptight and tense?”] Yeah... or... it might be a compounded problem... I mean... give it rest or something... we had... Bronwen Ackermann... talk to us about stretching and all that, and... some of the other players started doing that. (Tim, SEM 8)

Some of them... do talk about it [their discomfort/pain], but, I don't, know quite how to... help them... with, those problems... I am thinking of one, player in

particular, a cellist... she talks... quite often about, tension and how... she has to... lose it somehow but, whenever she picks up her instrument, it's like, [makes grimacing sound]... clenching. (Tim, SEM 8)

Although Tim did not say he was concerned about his experiences of playing-related discomfort pain at any stage of his program, on reflection he claimed he was concerned in the first year. “Not at all, really... [MW: “Did they ever worry you?”] Yeah... I was... getting, to a point that I was back in first year” (Tim, SEM 8).

Tim began increasing his physical exercise during the second year of his program and maintained it in various forms until his fourth year. At various times he said he could link an increase in exercise to less playing-related discomfort/pain. However, on reflection he said he couldn't make any connection.

I am starting to incorporate... cardio work... usually I just go for a walk but sometimes I jog... I'm looking at my diet a lot, differently now, too... looking at , building muscle and then using that muscle to... use up that energy... I am... being a lot more alert, and... thinking about my life... and what I'm doing... making a conscious effort to change things. (Tim, SEM 3)

Well I have changed the type of exercise since the beginning of the year I've been walking to [the institution]... and that's about, 45 minutes, 50 minutes, each way... early this, semester I was coming here... four times a week so that was quite a considerable amount of walking... and... that, did help, mentally. (Tim, SEM 5)

It [exercise] has definitely helped me... I've, focused on, making more muscle... by eating more as well as doing the weights, and that in turn has kept my, metabolism up... I still fall into... periods where I just become really lazy... but,

at least my metabolism can, still... keep functioning at that level where I can still expend... worthwhile energy, practising, and walking places, things like that.

(Tim, SEM 6)

Tim did not work an outside job consistently throughout his program. However during his fourth year, (when experiencing discomfort/pain at time at of questionnaire completion), he was working as a delivery driver for 15 to 20 hours per week.

At the conclusion of his program Tim said that he was not sure what the future held. Although he said that he would like to go overseas and study he didn't currently have the money. In his opinion it had been very beneficial to be in the research project as it had increased his awareness of his own experiences of playing-related discomfort/pain. Tim claimed that he had always assumed that discomfort/pain was part of playing (he began playing in grade two in a school group situation). "I used to just block it out of my mind... and, when I started coming here and you, started asking me these questions, I actually, started to, notice these things... it's been very helpful" (Tim, SEM 6).

On reflection Tim said that he was quite happy with the structure of the Bachelor of Music program, although he remembered being unhappy with the Orchestra course. Initially he said that he was not exactly sure what could be done to make it better but went on to say that he thought the course was too repetitive (i. e. same conductor, same inefficient rehearsal practices).

It's been really nice to, come in every semester and... sit down and go through these kind of things because I don't usually take the time... in my day-to-day life to... sit down and assess... let alone... think back to, when I've been talking to you in past, years... it's been really, beneficial. [MW: "I think last time you

said... it had worried you a bit when you were in first year... was it quite a bit worse then or?"] Yes. I think it was how I was originally taught... the instrument also... not much... care was, particularly given to, how... comfort during... the playing of it... but at the same time I don't know... if it was just... an age thing... [MW: "... Did you have... discomfort or pain before you came to [the institution] ...?"]... It was sort of always there [from when I was a child]. (Tim, SEM 8)

I'm quite happy, I remember, [laughs]... complaining quite an awful lot about orchestral... program... quite... a lot of people believe that something has to change with it but, come to think about it I don't know quite what exactly... would fix that... [MW: "What exactly is your, issue with it?..."]... It's just the same thing over and over again... we have the... one conductor, oh... when we have had... conductors come in from, overseas it was great... have a breath of fresh air run through the Orchestra... apart from that it was, pretty much the same day over and over again. (Tim, SEM 8)

In conclusion, Tim's experiences of playing-related discomfort/pain throughout his program were minimal. However his ideas regarding pain were interesting.

Student 4: Jill

Jill was a violinist who experienced a relatively limited amount of playing-related discomfort/pain throughout her program. She was quiet, paused frequently in her responses, and for the most part, only gave brief answers to direct questions. Like many students in this study, Jill initially perceived that her playing-related discomfort/pain was more severe during rehearsals for the Orchestra course and she mentioned Opera specifically in relation to this. However, as she progressed through her program, Jill experienced fewer difficulties during rehearsals and attributed this to feeling more relaxed and improving her posture when sitting.

During the second year of her Bachelor of Music program, Jill participated in an Alexander Technique workshop organised by her violin teacher (Teacher A). She reportedly adopted strategies learned through this workshop such as supporting the upper body with the lower body and stretching before playing (although she struggled to get into a routine of doing this regularly). Around this time Jill also noticed that the types of shoes and clothing that she was wearing could have an influence on her playing-related discomfort/pain. She stopped wearing shoes that had no support such as open sandals and ballet flats as well as tight pants that pushed the pelvis forward. She perceived that all of these changes were beneficial in reducing her playing-related discomfort/pain.

For the majority of her program, Jill was not physically active but in her final semester she began working out at the gym five times a week. At this time she perceived that her stamina when playing violin had greatly increased and reported that she no longer noticed much playing-related discomfort/pain. However, she went on to

say that she now experienced a lot of muscle soreness as a result of exercise which could transfer to the instrument.

In her final year, Jill was diagnosed with depression. She went through a particularly traumatic break-up with a fellow student at the institution and felt she was the target of much gossip at the institution. As a result of this she reportedly began to experience psychological difficulties with coming in and re-evaluated her career options. Ultimately Jill decided to exit the program at the conclusion of her third year to study law.

Table B4

Reported Pain Experience for Student 4: Jill

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	3	4 months ago whilst practising thirds	Right shoulder, left hand	9	1-2 hours (2-3 during the previous year)	N/A
2	2	3	A few weeks ago during Orchestra	Lower back	3	2-3 hours	N/A
3	2	2	That morning when practising	Lower back (right side)	4	3 hours	N/A
4	2	1	Previous week during Opera, in the second half of the week	Shoulders	3	2.5 hours	7 hours
5	1	1	A few weeks ago	Right hand	1	Up to 3 hours	4-5 hours
6	2	3	Present at time, 2	Muscles under both arms	2	1 hour every second day	3 hours

Prior to her studies at the institution Jill had experienced playing-related discomfort/pain in her left hand, right shoulder, and back. The discomfort/pain in her right shoulder bothered her the most and occurred during periods of intense practice.

As she continued, Jill noticed that she was no longer experiencing much playing-related discomfort/pain. She believed this was because her posture and

technique had been adjusted. However, early in her second year, she commented that she was now experiencing a twisting pain in her lower back at all times when playing. Although it was not particularly severe, she found it annoying. “I started noticing... pain in my... lower back... and it's like twisting” (Jill, SEM 3).

Shortly after, Jill participated in an Alexander Technique workshop organised by her violin teacher. Topics covered included the importance of stretching and supporting the upper half of the body with the lower body. Jill found this very beneficial and she linked a subsequent perceived decrease in playing-related discomfort/pain to changes made to her warm-up and posture when playing. She also stopped wearing opened shoes and ballet flats with no support, and tight pants that pushed the pelvis forward. “Don't have that [pain] any more... [Teacher A] has, gotten us on to... Alexander Technique and stuff... we just have... one session and then we've just been conscious about standing properly and stuff” (Jill, SEM 4).

We did... some stretches and we learnt about... supporting, your... top half with your lower back and stuff. (Jill, SEM 4)

Been working on balance a lot... and, I haven't really felt anything... I've been wearing, proper shoes [laughs] and stuff so [MW: “Okay, so did you use to wear heels a lot, or?”] Yeah, and... little ballet shoes and stuff all the time. (Jill, SEM 5)

I think I'm more conscious now... of posture and stuff, cause I do... Balance class as well... and that's helped a lot... not wearing the tight pants anymore either, because they used to... push, your pelvis forward. (Jill, SEM 6)

As she progressed to the final stages of her program, the focus of Jill's playing-related discomfort/pain shifted several times, from the lower back, to shoulders, to her

right-hand fingers, and finally the left side of the neck. She commented that she usually only became aware of discomfort/pain when she stopped playing. "Sometimes I get... sore joints in, my fingers and stuff but I think that's just from, strengthening or something" (Jill, SEM 5).

Early in her program, Jill's playing-related discomfort/pain occurred more often during Orchestra rehearsals, particularly during the Opera. In the final stages of her program, Jill linked a decrease in the discomfort/pain experienced during Orchestra rehearsals to sitting with a more relaxed posture. "The only pain that I have had, recently, was just in Opera" (Jill, SEM 4). In regards to reduced pain during the Orchestra course, "I think... it's got a lot to do with the way that I'm sitting... just, a lot more relaxed" (Jill, SEM 5).

For the first half of her program Jill's warm-up consisted of technique work only. Although she talked of doing a physical warm-up when questioned further, like many of her fellow students, she admitted rarely doing it. This reportedly changed after she participated in the workshop held by an Alexander Technique teacher. From this time on she started doing a physical warm-up around 50% of the time but specified that she never did this before orchestral rehearsals. "Only when I remember to, or if... I know I'm going to be going for a while" (Jill, SEM 3). "Yeah I have, lots of stretches and stuff to do... just when I remember... about half the time" (Jill, SEM 6).

Jill's practice breaks throughout remained fairly consistent, approximately every half an hour for five minutes. Note however, that her initial increase in pain in the lower back coincided with a decrease of breaks from every half an hour to every hour. Generally speaking, her playing time was fairly consistent. The exception was during her final semester when she decreased her practice to one hour every second day. "I

play for longer sessions now... probably hour breaks instead of half-hour breaks” (Jill, SEM 3).

At the onset of her program Jill had discussed her experiences with a family member, doctor, violin teacher, and fellow students (general advice received was to take Panadol). As she continued through her program, Jill discussed her experiences with her new teacher, who recommended Alexander Technique. Generally speaking, Jill's experiences of playing-related discomfort/pain did not concern her because she perceived that they were not particularly severe. “I don't think it's going to have any long-term effects... but it is a bit of pain so I'm going to do something about it” (Jill, SEM 3).

Jill's physical exercise was limited to walking until the final semester of her program. At this time she started going to the gym regularly five times a week. She perceived that this greatly increased her stamina when playing violin and claimed that, as a result, she rarely experienced playing-related discomfort/pain any more.

I've, been going to the gym, regularly for about... two months, and that's about five times a week, so I'm a lot stronger and stuff. [MW: “... Have you seen... noticed anything different in your playing, since you've been doing that? Or?”]... Yes... more stamina and... not tiring or anything and... if I get pain it's just... neck pain from, violin being there. (Jill, SEM 6)

However, on further questioning Jill revealed that she now experienced muscle soreness throughout her body which did transfer over to playing her instrument. At the time of her final questionnaire, she was experiencing discomfort/pain in her arms.

Interestingly, she perceived that this was because she had a week off training last week and didn't reduce her weights accordingly. (Note the similarities to having a break of

playing and then assuming a full practice schedule.) “I get... sore from the gym... so maybe that's why I don't notice any... playing pain” (Jill, SEM 6). “It’s just like wake up in the morning and be sore thing... it’s just, because I had a week off last week, and then I didn't reduce my weights last night” (Jill, SEM 6).

During her final year, Jill reportedly went through a difficult period in her life. She was diagnosed with depression after a particularly traumatic relationship break-up with another student enrolled at the institution. At this time she felt that she was the target of a lot of malicious gossip and she started to re-evaluate her career options. She decreased her practice significantly and ultimately decided to go and study law instead.

Lots of stuff has been changing since then... I am graduating at the end of this year... and going to do law, so I haven't really been practising that much... just time for a change and, I think I'm still going to have lessons and stuff. (Jill, SEM 6)

I went through a really, shitty break-up, with... someone who goes here... and it kind of got, a bit much because everyone was talking about it and everything and, I couldn't even come here without like throwing up and crying... it was... bad because lots of people got involved and... I got diagnosed with... depression in, April, and... it’s, settling down now but it was... hard, because, that was... used against me... I got dragged off to hospital and, they tried to commit me, and stuff... he did in... the process of the break-up... they were just... “They should... leave you alone”. (Jill, SEM 6)

In conclusion, Jill's experiences of playing-related discomfort/pain were not particularly severe. However, she had many contributing factors in common with other students in this study whilst also having some unique contributing factors such as the

type of shoes and clothing worn. Her personal reasons for reducing her practice and ultimately discontinuing her study were interesting.

Student 5: Caitlin

Caitlin was a violinist who was already experiencing severe playing-related discomfort/pain at the onset of her studies at the institution. As a person she was instantly noticeable among a group due to her seemingly outgoing, confident, and talkative personality. Caitlin was also unique in that, unlike most students with severe playing-related pain in this study, she managed to mostly resolve her pain without dramatically cutting back her playing time. Despite this, her answers still contained many inconsistencies.

At the onset of her studies, Caitlin was adamant that her pain was a result of her large collarbone and lack of support from her shoulder rest. By the second semester she had come to the conclusion that her pain was caused by a lack of support in her lower back (and her posture in general). However as she progressed through the second year, she went back to thinking that her pain was related to her chin and shoulder rests and for the remainder of her program experimented with different set-ups.

The focus of Caitlin's pain changed many times however she consistently said that her pain was decreasing with each successive questionnaire (although it did continue to affect her every time she played her instrument). By the conclusion of her program Caitlin was also experiencing discomfort/pain from other activities such as sleeping and exercise that could transfer on to her violin playing. It is interesting to note that when her playing-related discomfort/pain was at its most severe she was also working long hours in cleaning and other non-music related work.

Caitlin was very open throughout in discussing her experiences of pain with other people and seemed to have considerable influence over the thinking of some other participants in this research project. Early on, her boyfriend at the time (Student 3, Tim)

was very adamant that his pain was related to his mood, and almost mirrored her words in his interview. Later on, another violinist in this research project with similar body type and pain issues to Caitlin (Student 26, Melissa) also went to her for advice and from that point on she too was adamant that her pain was a direct result of her chin and shoulder rests.

Caitlin presented as very confident and positive but, surprisingly, as time passed revealed that she felt very negative about her future and herself as a person because of her pain. She believed that having a more positive attitude was instrumental in overcoming and dealing with her pain.

By the conclusion of her program Caitlin was very actively thinking about her future and ways to ensure better health whilst playing. She was stretching as a preventative measure and taking regular breaks throughout her practice. She was also very aware of any tension but was viewing it as a positive thing that she could use to improve her playing. Caitlin's decreases in pain and growing certainty that she wished to be a professional player were a refreshing change from the trend evident among many other cases in this research.

Table B5

Reported Pain Experience for Student 5: Caitlin

Semester	Grade	At worst*	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	3	Present at time, 3	Back of both shoulders	10	1-2 hours	N/A
2	2	3	Last Friday	Left shoulder	5	1-2 hours	N/A
3	1	2	3 weeks ago during an Orchestra rehearsal	Back of both shoulders, upper left arm	4	2 hours	6 hours
4	1	2	Previous Friday during an Orchestra concert	Right hand	5	2 hours	8 hours
5	2	2	Previous day during Orchestra	Middle/ upper back	1	10 hours a week	8 hours
6	1	1-2	That morning	Left upper arm, back of right shoulder	3	2-3 hours	9 hours
7	1-3	2	2 weeks ago	Left arm	3	2-3 hours	9 hours
8	1	1-2	Rehearsal that morning	In between shoulder and neck	3	At least 2 hours	9 hours

*On reflection, 4/5 at worst

Prior to her studies at the institution Caitlin had experienced playing-related discomfort/pain in her left fingers and wrist, both hands, both forearms, both shoulders,

both sides of her neck, the left side of her back, and the right side of her lower body. The discomfort/pain in her left shoulder and arm recurred every time she practised and had been ongoing for more than 12 months. Caitlin believed that this pain was caused by a lack of support between her neck and shoulder.

At the end of the first year of her program, Caitlin said that she had realised that her pain was actually being caused by a lack of support in her lower back (visiting pedagogue Teacher S was reportedly instrumental in the shift of thinking). Although her pain was still present after 20 minutes of playing her instrument Caitlin said that it had decreased from severe to mild.

We've been working very much on my posture... it is much better... I wasn't supporting myself with my lower back... last time... I thought a lot of the problem was to do with my shoulder rest... whereas it was more to do with how I was not supporting myself properly. (Caitlin, SEM 2)

It's getting better... I do still, experience mild pain but... it's gone from severe to mild. (Caitlin, SEM 2)

It's [my pain] present after about 20 minutes... and then, after 45 I have well, had enough. (Caitlin, SEM 2)

As she continued through the second year of her program Caitlin perceived that her playing-related discomfort/pain was continuing to decrease. The focus of her pain changed several times but, by the end of this year, she was only experiencing discomfort in her right hand and back after playing for extended periods of time. At this stage Caitlin highlighted a more positive frame of mind as really changing the way she felt about her playing and her future in general.

I'm not getting pain... it's amazing... I'm so excited... it's been a gradual lead up to now... [Teacher S] really helped me get rid of... half of it in one go... I was... getting a lot of pain in my... left shoulder, and in my back I was getting really tired... for a while... the pain transferred though to my neck... [but] now I can lift my head up, and, it's good. (Caitlin, SEM 3)

I feel like I, can actually go forward now and I was, getting really disheartened last year I didn't, actually know, what was going to happen if it couldn't get fixed... but, the fact that it is fixed, I mean, I feel like if I can fix that I can do anything you know? (Caitlin, SEM 4)

At the beginning of her third year, Caitlin had again changed her opinion as to the cause of her pain. She now thought the problem was to do with her neck and her clamping down on the instrument with her chin. As a result Caitlin had changed her chin and shoulder rests and was considering purchasing a new instrument. (She had noticed that hers was quite heavy and thought it may have been affecting discomfort.) She was still experiencing some tension in her right hand but her most severe pain was in her back during slow playing in Orchestra.

I have been trying out new instruments that are much lighter and... I've got a different shoulder and chinrest now [laughs]... it's much better... we realised that the problem really wasn't in my, shoulders as much as it was in my neck... because I have a long neck... and, I clamped my head down, to, keep my instrument steady... but what we actually bought now, is a chinrest you can extend the height... and that seems to have really solved it I have also bought a shoulder rest you can bend to fit your body shape... and the instrument being lighter, obviously, makes it easier. (Caitlin, SEM 5)

That [my back] did have something to do with it... it's very important to, consider posture... but... that's solved a lot just, realising that a lot of it can be in my neck too. [MW "... Have you... actually got a new instrument now?..."] No, I'm still trying them out but I definitely notice a huge, difference in comfort between my old one and the new ones, because, my old one is quite heavy.

(Caitlin, SEM 5)

Sometimes still in my back a bit... I only notice it when, you are playing... really slow passages in Orchestra and you've got to hold long notes. (Caitlin, SEM 5)

By the end of this year Caitlin said she was no longer experiencing any pain when playing. She did still experience some form of discomfort every time she practised however she now viewed this discomfort as an opportunity for her to improve her playing. Caitlin had not been able to purchase a new instrument however she did have a new bow which she perceived had helped to decrease pain in her right hand.

I got a new bow... so... I got better weighting, in the stick now and... I can focus more on instead of moving my whole shoulder... moving my forearm and my wrist and my fingers and stuff... doing a lot less, but getting more as a result of it... I would never say that I am in pain any more... there are just times when, I'm... forced to ask you know is this really the easiest way? (Caitlin, SEM 6)

There is no real pain in location on playing, it's... a general discomfort, then I know that I'm doing something wrong, I just need to fix it. (Caitlin, SEM 6)

In terms of actually being discomfort in the sense that it's... pain I don't, get any hardly ever... discomfort in the sense maybe I'm trying to, figure something out and I know that it's not quite working, [laughs] I might get that every time I practise just cause I'm doing... a lot of G string stuff so... it's getting a lot more

fluid now... in the beginning stages it was just awkward I guess is the word... but... every time I practise it gets better... that's what it's for I guess. (Caitlin, SEM 6)

As she progressed through the fourth year of her program Caitlin was able to purchase a new instrument however she continued to change her shoulder and chin rests in the hope of finding more comfortable ways to play. By the end of the year she perceived that any discomfort she may have been feeling when playing violin could be a carryover from sleeping position or exercise. She had also begun stretching after playing.

I really don't, feel, pain any more I've been fiddling around with my shoulder rest too... I have a *Wolfe Forte Circonde* ... we're really refining it now [Teacher A] and I down to... getting it absolutely perfect... problem is she is trying to put it on my collarbone, [laughs] which is a bit annoying but, I'm not actually under any discomfort it is more just finding an even better, alternative to what I'm doing. (Caitlin, SEM 7)

I've been doing more stretches... I've been taking that a little more seriously actually since, [a music camp]... any of those [national] programs... not so much with myself, but seeing other people damaged... there's a lot of people, who have got tendinitis in their hand or their arm and, I feel really fortunate not to be one of those people I'd like to keep it that way so, [laughs]... I've... been doing what they do... prevention is better than cure kind of thing... I don't stretch before I stretch after... because apparently that's when it's, more likely to take, on... in your sleep so, I'll do it before, I go to bed especially but after when I'm finished playing so, that doesn't catch up with me later [laughs]. (Caitlin, SEM 7)

It's always getting better I guess... I'm not in pain at all... I've been using an extended, chinrest and, I bought a, *Kun Bravo*, so, it's a nice shape for, your upper part, of the body and... I put on extendable legs as well so I am supported... but I am supporting better with my body as well so, I think, that's something that I'll always just be learning about. (Caitlin, SEM 8)

I'd say it's [my pain] very minimal and in fact, it could even just be to issues, surrounding playing like it could be that I slept badly or something like and, just playing accentuates it, I don't really feel like many things are caused by playing any more. (Caitlin, SEM 8)

As she continued through her Bachelor of Music program, the focus of Caitlin's pain was continually changing. Body parts affected include her shoulders, arms, neck, back, and right hand.

You think you're making a breaking point and well you are, but... then you realise there's a problem, in another field like it... might provoke, pain in your neck instead of your back... and I actually, am... open-minded to it, changing. (Caitlin, SEM 8)

Early on Caitlin identified that she could experience playing-related discomfort/pain during orchestral rehearsals due to the long hours required and limited breaks. (She was also more likely to experience pain in a concert situation.) However, as she progressed through her program, she highlighted Orchestra as being an indication of her improvement in terms of pain. With each successive year the rehearsals were less painful and by the end of her program she was certain that she wished to be a professional orchestral player. "In Orchestra... if I go 45 minutes without breaking at all... I really feel it then" (Caitlin, SEM 2).

If I have been playing, for a very long time without stopping usually only when there is a concert... probably am a bit more tense to begin with anyway. (Caitlin, SEM 4)

Even in Orchestra, even if I'm there for hours I don't notice it. (Caitlin, SEM 6)

For the duration of her program Caitlin took regular breaks during her practice. Initially these were taken because of pain however as her pain decreased Caitlin, (unlike many others in this research), continued to take breaks as a preventative measure. On reflection Caitlin perceived that now she was able to do much more practice because she was no longer experiencing pain.

I'll probably do no more than an hour and a half [practice] at [a] time... and, within that hour and a half I'll... go for a little walk and have a little bit of a stretch after a half-hour of something... I don't have to I just think it feels good to do it... I'd rather, do that than after an hour, be interrupted by the fact I might be sore. (Caitlin, SEM 7)

I do practise more now... two reasons really... one I'm not in pain now, and, secondly... even if I was, in a, particularly good physical state one day, I wouldn't feel enthused to practise because I just thought "well, it just doesn't feel any good, I'm not sounding any good, it's not enjoyable..." I was really getting into a bit of a negative patch there but now it's much more of a positive thing and there is no pain there. (Caitlin, SEM 8)

Caitlin was reportedly very happy to discuss her experiences of playing-related pain with other people and seemed open to suggestions. She originally believed that the pain was the result of having a lack of support between her neck and shoulder due to a large collarbone (on advice from a previous teacher). However by the end of the first

year of the program she had changed her mind completely and was adamant it was a result of a lack of support from the lower back. (As mentioned above, visiting pedagogue, Teacher S, was instrumental in changing this thinking.)

There was a guest speaker that came in, [Teacher S], and he, actually was the one who helped me the most with it because, he has my problem... I talked to him a lot about it, and just friends... because they are interested. (Caitlin, SEM 2)

[Teacher S] came... for a workshop and I had a lesson with him and he had my build pretty much, and he said he did Alexander Technique for seven years, and it didn't help, what helped him was sports... physiotherapist because it taught him how to use the muscles in his lower back... and... he taught me how to sit properly... so that immediately I had more support... then I was taught to lengthen my back... like a string bean pulled up here... on your head... and then I was taught to broaden out. (Caitlin, SEM 3)

I actually talked to my old teacher... and... I talked to some of my peers about it... but... it was generally just [Teacher A]... because at first we thought it was my shoulder rest, didn't really consider that it was just that I wasn't supporting myself, so... once we discovered that, she looked more into it and told me what I should be doing because she's smart. (Caitlin, SEM 3)

The pain was there for a long time but... it's just that I was going about it the wrong way I thought that it was my shoulder rest that was the problem not actually, how I was supporting myself, and, when somebody opened my eyes to that it... did fall into place quite fast. [MW "Where did you get the idea that it was, from your shoulder rest...?"]... From my old teacher... just because... it did

seem like, I... [did] not have enough support here... but... well the fact of the matter is... she was trying to build it up more here but the more she builds it up here... the less... lower back muscles I was using... and we were just... going backwards... she just did not know, and I can't blame her and even [Teacher A] wasn't quite sure. (Caitlin, SEM 4)

However, as she progressed through the remainder of her program Caitlin continued to change her mind as to the cause of her pain. She purchased a new violin and bow, experimented with several different chin and shoulder rest combinations, and sought the advice of many people.

I've got a different shoulder and chinrest now [laughs]... it's much better... we realised that the problem really wasn't in my, shoulders as much as it was in my neck... because I have a long neck... and, I clamped my head down, to, keep my instrument steady... but what we actually bought now, is a chinrest you can extend the height... and that seems to have really solved it I have also bought a shoulder rest you can bend to fit your body shape... and the instrument being lighter, obviously, makes it easier. (Caitlin, SEM 5)

No actually my neck is not the problem at all... when I last spoke with you... I didn't have right shoulder rest, and, that meant I was raising my left shoulder too much and, so if I was to get tight it would be... between my neck and my left shoulder that muscle there but... I have, put more support there, so... I'm finding that is less of an issue and, I think as well... as my playing improves I realise, where I can relax to prevent things like that it's... more of a sign of a technical, fault in my left hand then it is my, lack of support. (Caitlin, SEM 8)

Throughout her program Caitlin discussed her experiences with her past and present violin teachers, visiting pedagogue Teacher S, and other students including during state and national orchestral programs. She also attended a workshop taken by an Alexander Technique teacher and two workshops during which a physiotherapist gave a talk. After these workshops Caitlin discussed strengthening various body parts with her personal trainer.

We had Alexander Technique... two morning workshops, and... she taught us how to actually sit up straight and what we should be feeling... she also said... “If you get tired after maybe half an hour to 45 minutes of practice, you should lie on your back with your legs up like this on the floor, like you’re having a baby... it will help the spinal discs... go back to where they began and it helps, relieve any knots in your back” and... that helped me... speed up the process. (Caitlin, SEM 3)

If I noticeably am feeling sore [during orchestral rehearsals] I will tell someone and... they usually agree... a lot of people get... sore during the slow passages... it’s more that they can concur with what I'm saying [laughs]... and maybe share some advice but really it's more just to say “hey I've got it as well and we'll be fine we'll get through it”. (Caitlin, SEM 5)

It actually helped, when [Teacher B], came here I had a few lessons with him and, he's got a very similar, sort of, set-up to me like he's got long arms... he gave me like a really good bow hold which [Teacher A] has worked with... and, we've come to a happy medium and it all works... the weighting is better and it, really has helped. (Caitlin, SEM 6)

I talk about it with [Teacher A] all the time... it's something that we like to keep active because, I have come so far with it... and, it's good to... just go “oh” you know “look how much better that is because you're doing this” you know “keep working with it keep actively thinking about it”. (Caitlin, SEM 6)

I just talk to my peers too... they're really good to talk to especially ones that you've seen have made a transformation... talking to people with similar body types as you and seeing what they do about it and... it's even interesting talking to people with totally different body types than you and seeing... what problems they face... talking to as many people as possible is the best way, you never know... if somebody is going to say something and a penny will drop... mostly, it is up to you to just, try things and, have a good mind frame about it... because negativity isn't going to help anyone. (Caitlin, SEM 8)

Caitlin's strategies for preventing playing-related discomfort/pain throughout her program included awareness, stretching, taking breaks during practice, positive thinking, extra padding on her shoulder rest, taking breaks during her practice, strengthening the muscles in her lower back, using the mirror, different chin and shoulder rests, and purchasing a lighter instrument and better bow.

I just have to keep thinking, “open and up...” I... am getting more in tune with my body I think in a way that if there is a pain I... know where it's coming from and what I'm doing wrong... I'm relying on more of a visual aspect too... I am using a mirror... that... really, helps me see where my hand is supposed to be in position and, more importantly where my, elbows are supposed to be... because I was finding a lot of the pain [I] was getting was from bringing my arm around too far. (Caitlin, SEM 4)

I've been working... every day just trying to sit up straight... not, slouching... or relying on the chair to hold me up actually holding myself up... and strengthening the muscles there. (Caitlin, SEM 3)

There is a few things I can do... first of all just to make sure my shoulders are the same, level... sometimes I've noticed my left one can be higher than my right one... make sure that my left elbow is in the right spot that it's... not, causing me any strain because it's not too, far this way and I'm having to stretch with my fingers... and... just making sure that my right elbow isn't too high... just to consider all those things and... usually if I adjust something it will, do me well for a while until I feel a bit more discomfort and I will do something else and just, in between playing and resting, just to do a few... neck rolls and... stretch back, and I'm okay. (Caitlin, SEM 5)

If I get any kind of discomfort which is most likely at my neck... I will hold... my neck gently to the side... stretch for... at least 30 seconds and... [Teacher A]'s been talking about, doing a lot of stretches during Orchestra... how important that is so, I've been doing a lot of... bending my hand towards me and then bending it, towards me the other way and... just after I finish playing regardless of, whether I need it or not... I'll, stretch out my back. (Caitlin, SEM 7)

For the majority of her program Caitlin did not do a specific warm-up before practising. During her third year she commented that she noticed she felt much better after attending Teacher A's Tuesday morning workshops, which reportedly involved lots of stretching and technical work. However it was not until the fourth year of her program that she incorporated stretching and specific technical exercises and scales into her practice routine.

If I have a study I will start with that, but otherwise no... I'll just, begin by working on, passages and... if those passages, are better assisted with a scale or a study that I know of I'll do that. (Caitlin, SEM 6)

Tuesday morning workshop's usually, pretty good because we do lots of warm-up things and... as a result of those you can do these things easier and... the more you have to think about the less these things happen... I didn't think that... I always... thought very backward and negatively like, "oh it's just me and it's all broken and, crap"... [laughs]... but now it's... "this stuff is actually really good and if I think about it actually helps me physically". (Caitlin, SEM 6)

I find if I start in the morning I'm more stiff than I am during the day... because of that... I will actually do stretches, if I practise really early in the morning before I've gotten up and about. (Caitlin, SEM 7)

I just, stretch because it feels good and, I haven't actually been interrupted by any disruption but, I've been warned by people who, are, [experiencing pain] and, I'm really just been becoming more aware of it and just wanting to prevent anything and also be aware of my older years, probably inevitably I'll get some sort of discomfort here and there just due to general aches and pains of getting older... I just, would rather take it seriously now. (Caitlin, SEM 7)

For the majority of her program Caitlin worked long hours, at times as much as 40 to 50 hours a week. Jobs included shop assistant, cleaner, violin teacher, and telemarketer. Caitlin initially said that she didn't experience any pain whilst working however she later revealed she did get pain when cleaning, particularly whilst vacuuming. On reflection, she cited long working hours as one reason why she hadn't been able to practise as much as she would have liked.

The work wasn't actually physically... disarming me or anything, but, because I'm more relaxed, at mind, it helps me be relaxed in any other case, so... when you are more relaxed you are more positive, and when you're more positive you take a lot more in. (Caitlin, SEM 3)

I hated... just standing around all the time and... bending down with the cleaning... with the vacuum cleaner. (Caitlin, SEM 4)

The reason I haven't been able to practise as much as I like throughout my degree is because I've had to work... I decided... I could keep working or I could, see what it's like not to go to work because it actually was starting to affect me... it's not nice being on the phone to people who don't want to talk to you so, [laughs] it was making me feel a bit sad. (Caitlin, SEM 8)

For the duration of her program Caitlin enjoyed running and claimed that she exercised regularly. Favoured activities included running, treadmill, and light weights. During her fourth year she also added in personal training once a week. At this time Caitlin said that she was taking care not to exercise on days when she had to do a lot of playing. For the first time she also mentioned that any discomfort/pain she may experience as a result of playing the violin could be a carryover from other activities such as exercise or sleeping.

Not so much the weights anymore, but the treadmill, I keep up, and I do that three to four days a week in the morning... it's just good to keep the exercise up because it keeps you, fresh and energetic and healthy. (Caitlin, SEM 5)

Weights have been really good actually... because we've had, a physio come to morning workshop twice, to teach us some stretches and, I used to struggle... not be able to keep my back straight... but... the personal training has helped me

become more aware of what that feels like and, just getting in general more strength in my lower back and everything cause I've told her what I want to focus on and why. (Caitlin, SEM 7)

I, actually find some days I don't like to exercise because I don't like to make my body sore before playing... I find that... especially if I haven't been doing it in a while I'll select which days I don't think I'm going to have as many rehearsals and, I'll do a big chunk of practice and then I'll go for a run and then sleep it off. (Caitlin, SEM 8)

As she progressed through her program (and her playing-related pain decreased), Caitlin became less concerned about her experiences. By the end of the third year she said she was seeing any discomfort/pain in a positive way, i.e. as a sign that something could be improved or fixed. Caitlin was consistent throughout in perceiving that a change in her thinking (from negative to positive) was instrumental in helping to overcome her pain.

It's not so bad and, it's a positive... way of thinking too, because before I am like "this is never going to get fixed", so I just persisted in doing it, not trying to do anything, whereas now I am like, "well if I'm feeling this way, all I've got to do is this, and it's fixed". (Caitlin, SEM 3)

I feel like I, can actually go forward now and I was, getting really disheartened last year I didn't, actually know, what was going to happen if it couldn't get fixed... but, the fact that it is fixed, I mean, I feel like if I can fix that I can do anything you know? (Caitlin, SEM 4)

I think that it's [pain] something that people don't take seriously enough until it's beyond repair... or, takes years to repair. (Caitlin, SEM 8)

Only thing that concerns me... would be, that I'm young, and I don't know, if it could catch up with me later... I think that I'm pretty sensible about it but... for example I've been doing the [professional orchestra] internship thing and... I've asked them how have I been going, they have gone fine but I, work too hard... I find they often really sit back... in rehearsals don't push themselves to do it as they would in a performance... I remember talking to [Teacher A] one time and, sometimes... she'll, really know where the aches and pains are in her body and she says that actually really is quite helpful for, knowing, how to play better but... that's the thing I'm young I don't feel that. (Caitlin, SEM 8)

I was terribly concerned [about my pain]... it was really affecting everything, like, my playing and everything around my playing... it's so easy to tell yourself that, with the right shoulder and chin rest everything is fine, but really a lot of it is up to you your posture and... doing the right stretches and really... knowing when things hurt and thinking about how you can adjust your technique to fit in with that... the first thing was definitely admitting to that and then... being patient is the next thing... you've got to give things a trial run before you decide if they work or not... really keeping track of what you're trying and, how it's good how it is not good until you find the right thing and then, you know talking to [Teacher A] about it is always good and I did actually have a few lessons with [Teacher J]... that style workshop I was telling you about in, with the Baroque music it, is really good to just... go from square one like that and, just think “well”, you know “how well can I go without support?” ... Trusting how much your own body can really support you, I think, is what's helped and I wasn't

really taught that and I don't really think you can be taught I think you have to teach yourself [laughs]. (Caitlin, SEM 8)

On reflection, Caitlin said that her first notable experiences of pain occurred when she was in Grade 10. At the time she just put up with it as others advised her that the pain was just because she was growing and that she would grow to be stronger. However, when she saw that other people had serious back problems and RSI Caitlin thought she should take it seriously. She did have discomfort and pain before that but just put up with it as other players also seemed to experience it. Caitlin believed that learning to play the violin in a school group situation definitely had an influence on the development of her playing-related pain and commented that she did not take private lessons until she was in Grade 7.

When you are little you kind of, just put up with it... around Grade, 10 when I started, having to play for long periods of time harder pieces that required me really to jump... I really noticed it then and I didn't really know what to do I just put up with it and it just kept getting worse... I think I did just let it get to a point... because, I thought... other people... thought that I was still growing and... they thought that I would grow into being strong enough not to get that pain, so I just put up with it, and then I realised... when I was listening to people getting RSI and, back problems and needing to go physios I really thought I should take it a little more seriously. (Caitlin, SEM 4)

I played in just groups for ages I didn't get private lessons until Grade 7... I think that if I had of started in private lessons I would have started on the right track... it's hard to teach, proper technique in a group but... I do think, that it is because of that. (Caitlin, SEM 4)

On reflection Caitlin perceived that, at its worst, her discomfort/pain was Grade 4-5 and Excruciating. She acknowledged that she may have said it was a lower grade because she was in a “bit of denial” about how bad it was.

I'd say, four or five at least... I don't remember what I gave myself I think maybe, I could have even given myself a lower grade than it was... because, I, was in a little bit of denial [laughs]... as much as I talk about it I didn't really like to, fully admit to how bad it was I think it made me too sad. (Caitlin, SEM 8)

Caitlin recalled her most severe pain as occurring during an orchestral rehearsal (outside of the institution) in the first year of her program. She recalled this experience as being so bad that she was crying. (At the time, she did not mention any of this, and the highest grade she gave her pain at any stage was a Grade 3 and Distressing.) Caitlin said she was not sure whether her teacher was ever really aware that she was in that much discomfort, the main purpose was simply to improve her playing.

[In another orchestra]... in first year... I remember after one concert with them, I was, in so much pain I was actually crying, [laughs] it was so bad... I think what had happened was... my shoulder rest wasn't right for me and my left, shoulder was so raised it kept pushing it off... and so, there would be times in the concert I'd actually be, playing in a way I had to tense up, so my shoulder rest wouldn't fall off. And... it was, so painful because I think I'd already been in pain before playing and then I was adding to it so much more, and it was just unbearable. (Caitlin, SEM 8)

[Teacher A] and I just obviously, we regularly talk about it because... she's happy with my progress as well as wanting to keep on going with it... I think that she is aware that I was in discomfort but... she wasn't really ever working on it

for the discomfort it was more than I looked awkward and there is better things I can do to better my playing. (Caitlin, SEM 7)

At the conclusion of her program Caitlin was planning to go overseas and do some more study. Eventually she was hoping to become a professional orchestral/chamber musician. She said that this was only a viable option now that she had managed to resolve her pain issues.

I have this opportunity in [a foreign country] to, live there for free... and get free flights so... I've been... applying for a few places... that offer international scholarships... I am aware it is very difficult for music... but at the end of the day I am happy to go there and have lessons, with somebody and, just pay for lessons because... they definitely have a very musical culture there and, they have great history backing up that musical culture and I think it could be a very different experience... the standard is higher, and, that could be a real eye-opener I think... pushing myself out of that comfort zone a bit more I think that always is what helps you to improve... too many people hide in their shell I think.

(Caitlin, SEM 8)

I always did tell myself I wanted to be in an orchestra... but I think it's, more decided now... I think the reason I was hesitating was... at the time I thought that it might be too hard because I was in a lot of pain, but... AYO is really good at, justifying that it's not too hard to play for long periods of time. (Caitlin, SEM 8)

Actually a big thing as well is what I wear... a day like today when I'm wearing a singlet, I might need to, think more about... my body than, on the day when I'm wearing a jumper... cause it's just more naturally supportive because there's more clothing. (Caitlin, SEM 8)

In conclusion, although Caitlin frequently seemed to think that she knew the origin of her pain, her tendency was to come back at the next interview with a different explanation. She openly admitted to being wrong in the past about her interpretation of her discomfort/pain and moved on to the next explanation with enthusiasm. She seemed very open to suggestion and appeared to have some influence on others because of the perceived strength of her convictions and her personality (though she did admit to certain insecurities). Her case was also unique in the way that she actively looked to prevent future problems.

Student 6: Cassie

Cassie was a violinist whose experiences of playing-related discomfort/pain throughout her program were not particularly severe (although she did appear to experience a relatively high amount of discomfort/pain in general). She presented as friendly and open and was obliging when it came to scheduling research interviews.

The most interesting aspect of Cassie's case centred on her physical fitness. During the second half of her program she became increasingly physically active and there was a corresponding increase in her pain levels both generally and whilst playing. Her physical activity reportedly increased from yoga three times a week to intensive bodybuilding training for one and a half hours, five days a week.

For the duration of her program Cassie perceived that her playing-related discomfort/pain was decreasing with each successive questionnaire. However her answers did not necessarily reflect this. By the fourth year her playing-related discomfort/pain had increased to be present after 20 minutes of playing. At this time she also claimed that some of her general discomfort/pain (which transferred to violin playing) could last for two to three days after an exercise session.

Like many students in this research, Cassie perceived that her playing-related discomfort/pain could be influenced by factors such as playing fast and repetitive repertoire, carrying items on her back, slouching whilst sitting, and stress. Cassie also found that she could experience more discomfort/pain when completing the requirements of the Orchestra course. She perceived that the atmosphere within rehearsals could influence her level of stress and therefore the severity of her playing-related discomfort/pain. Late in the second year of her program Cassie also participated in the Opera and found this particularly difficult in terms of playing-related

discomfort/pain. She was assigned a viola part to play, despite only having taken up the instrument earlier that year.

As she progressed Cassie worked consistently as a violin teacher and she took a keen interest in the available Pedagogy courses offered at the institution. She said these courses were greatly beneficial to her own violin playing as well as her private teaching practice. During the third year of her program she began expressing an interest in the area of movement as well.

For a time Cassie did consider studying physiotherapy. However by her final semester she had changed her direction towards holistic health and movement practice (specifically yoga, kinesiology, healthy diet and lifestyle, and personal training). At the conclusion of her program Cassie was planning to pursue one of these avenues alongside her private violin teaching business.

Table B6

Reported Pain Experience for Student 6: Cassie

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	3	(2 years ago)*	(Upper left side of back) *	(8)*	More than 3 hours	N/A
2	2	3	One month ago	Back of the shoulders and neck	3	2 to 3 hours	N/A
3	1	1	Previous Saturday	Shoulder and left side of neck	3	1.5 hours	2 hours
4	3	2	3 weeks ago during Opera	Upper left arm, around the spine, and left shoulder blade	3	2-3 hours	6 hours
5	2	1	2 weeks ago during Orchestra	Left hand	3	2-4 hours	6 -7 hours
6	1	2	Present at time, 1	Both shoulders, left hand	2	2 hours	8 hours
7	2	2	Last week during lesson	Upper right arm	3	2-3 hours	6-7 hours
8	2	2	That morning	Left arm	2	1-2 hours	6 hours

*Cassie appeared to have misunderstood some questions in her Initial Questionnaire and described her most recent experience as occurring two years ago. She later clarified that she was describing her most severe experience.

Prior to her studies at the institution, Cassie had experienced playing-related discomfort/pain in her left fingers, left wrist, left hand, left shoulder, neck, and her back. Her discomfort/pain recurred when she was sitting down and playing for long periods of time.

By the end of the first year of her program, Cassie was indicating that she only experienced occasional pain in her neck, shoulders, and upper back. She believed this pain was affected by carrying items such as her laptop, violin and bag, her stress levels, and her job.

As she continued through the second year of her program Cassie perceived that her playing-related discomfort/pain was decreasing however she said that it could still be influenced by carrying a heavy load and also by playing fast and repetitive repertoire. Around this time Cassie took up yoga and commented that it helped with some aspects of playing but that it did not necessarily reduce her pain levels. “A bit of tension now and then... but no really sore pains or anything that I can't, cope with” (Cassie, SEM 3).

I haven't really carried too many heavy things, but when I do, carry maybe a violin and a viola for instance and then a bag on, at the back, it... creates... heaviness on the shoulders. (Cassie, SEM 3)

In my arm, when I'm playing... fast... for instance... the E major Prelude [Bach]... when you play it very fast [laughs] once you get to around the last page, it gets a bit tight and then you notice it. (Cassie, SEM 3)

[Yoga] helps with focus, and breathing as well... and just energises you to play... better. (Cassie, SEM 3)

Later in her second year Cassie participated in the Opera Orchestra and noticed a corresponding increase in playing-related discomfort/pain. She was assigned a viola part

(even though she only took up the instrument earlier that year) and reportedly struggled with the heavier weight of the instrument. Her discomfort/pain was worse early in the week and she believed it was also influenced by her carrying in and practising both her viola and violin.

When I did Opera I was playing the viola and I took that up this year, so... the first few rehearsals I did get a bit of pain... because it was a bit heavier... I was carrying both instruments I was playing more, violin and viola... and then... near the end of the week I wasn't... touching the violin at all. (Cassie, SEM 4)

Early in the third year of her program Cassie began to greatly increase her physical exercise. She said that she did not have much playing-related discomfort/pain but that she sometimes experienced stiffness and tiredness in her back when sitting down during Orchestra. She was experiencing some stiffness in her shoulders and neck from carrying heavy items but said she was feeling much better physically as a result of exercise. "I don't have too much pain anymore over playing... I get sometimes stiff, or... if I am sitting down long in Orchestra... might feel a little bit more tired, in my back" (Cassie, SEM 5).

Not too much my back but my shoulders and neck can get a bit stiff from carrying [heavy items]. (Cassie, SEM 5)

[I exercise] most mornings, yeah, but otherwise, on the weekend, I go to Body Balance on Saturday and Sunday... that helps... you usually feel much more relaxed... more energetic to play, and stay relaxed... I think it's good for your, mentality as well, to keep it healthy and, if your physical, is healthy, then it will... make playing easier as well, so that you can, be relaxed, in your mind and relaxed in your playing. (Cassie, SEM 5)

By the end of this year she had increased her exercise regime to also include three sessions of weights per week. Cassie said she had noticed a decrease in discomfort/pain however for the first time it was present at time of questionnaire completion. Cassie said that any pain could last and carryover to violin playing for up to two days after she finished the exercise session. "I don't really feel, too stiff now like sometimes I get pain but it's from exercise and things... like that, not from playing... the arms... and back... gets a little bit sore as well" (Cassie, SEM 6).

I think the exercise helps strengthen you so you can, last longer. (Cassie, SEM 6)

I enjoy playing more because it's easier when you have got more strength to play. (Cassie, SEM 6)

I have been doing more... weight training... [a] lot of yoga and, a bit of, cardio... Body Combat and, running... on a normal week I would be doing... weights three times a week, and cardio two times a week, and maybe a little bit of yoga class in between. (Cassie, SEM 6)

At the beginning of her fourth year, Cassie moved the focus of her exercise regime to bodybuilding. She said that she trained at the gym for one and a half hours a day five days a week and she was aiming to compete. Her pain continued to last and transfer to violin playing for up to two to three days after an intense physical workout. However she commented that she now had a greatly increased pain tolerance so it no longer bothered her. At this stage Cassie claimed she was a little more concerned about her playing-related pain as she had read that bodybuilding was not good for violinists.

These days I'm training, about, one and a half hours, five days a week... I'm, going to try and do some bodybuilding... maybe next year do a competition or

something... I don't really, think of violin playing as painful in any way really, because... painful is the other stuff [laughs] that I do, and... that, only lasts for a little bit... the longest is probably two to three days... that I've got back pain and, the muscle has to rebuild... [MW: "So it's raised your pain tolerance?..."]... Yeah ... it deteriorates your muscles but then it also builds it, back... and if you watch your diet and everything you can still regulate healthy lifestyle, and... have the energy to do other stuff straight after. (Cassie, SEM 7)

I have... felt a lot... stronger, in my, stamina, practising... and concentration has improved... sometimes, when I play for a bit of a longer time my arm get a little bit sore... usually if I went... training... you can ... notice that difference more... but otherwise... maybe after, half an hour playing... a little bit, of, tightness around the back area... and, here as well [points to back of shoulders]... or just the traps around here [trapezoidal muscles]. (Cassie, SEM 7)

By the conclusion of this year Cassie said she had cut her exercise back to four sessions a week and that she had replaced that exercise time with additional practice. (Note however that, at time of her last interview she was doing two to three hours of practice and now she was doing one to two hours.) Cassie stated that throughout her program her discomfort/pain had decreased but then clarified that she perceived it was just no longer related to playing the violin.

[MW: "Are you still doing a lot of the bodybuilding?"] Oh no, I have been...doing less of that actually this term... focusing more on violin playing... but I do still try and train... whenever I can... I just haven't been having the time because I've got, so much on. (Cassie, SEM 8)

It's [my pain] definitely decreased... well, it's not, related to the playing of the violin [it's more] fitness pain... [MW: "So was it worst when you were in first year?"]... I guess... yeah whenever I felt the tension it would be, more, significant, because I wasn't as used to it... but... if I, have pain now I'm used to it and I know I will recover. (Cassie, SEM 8)

As she continued through her program, the focus of Cassie's playing-related discomfort/pain changed many times. Body parts affected included her neck, shoulders, arms, back, elbows, and right thumb. For the first few semesters the focus of pain generally swung between her neck, shoulders, and upper back. However in the final semesters it shifted to her right arm and elbows.

Cassie consistently said that her playing-related discomfort/pain was decreasing as she progressed through her program. However her answers showed her pain recurring more frequently and earlier in a practice session. For example, in the second year of her program her playing-related discomfort/pain was recurring after she had been playing for around one and a half hours. By the conclusion of her fourth year her discomfort/pain was present after 20 minutes of general practice. "I sometimes feel more tension, in my left, arm and my shoulder, when, I'm sitting down... after one and a half hours of playing" (Cassie, SEM 3).

Usually if I went, maybe, training or something then you can... notice that difference more... because you already tired your arm out a little bit... in the gym, but otherwise... maybe after, half an hour playing. (Cassie, SEM 7)

Like many other students in this study, Cassie perceived early on that her discomfort/pain was more likely to occur when she was sitting down and playing for long periods of time. As a result she tended to have some difficulty during Orchestra

rehearsals. She stated that she could also find rehearsals stressful and this in turn could influence the amount of playing-related discomfort/pain she experienced. “I had a bit of, soreness in my hand the other day, maybe from, playing, a lot, in, Orchestra... in the first few rehearsals” (Cassie, SEM 5).

Also because you just feel the stress from, you know have to get it, all right otherwise [Teacher C]... can get very cranky... you... feel a bit more pressure, and then, you do get a bit tired after that. (Cassie, SEM 5)

Cassie claimed that she had particular difficulty when participating in the Opera late in the second year of her program. This difficulty was exacerbated by the fact that she had to play viola, despite only taking up the instrument that year. Cassie noticed that her discomfort/pain was worse at the beginning of the week as she was not used to playing the heavy instrument or the long rehearsal hours. In addition, at the outset she was carrying both her viola and violin into the institution and trying to do additional practice. After a couple of days Cassie realised this was not sustainable.

When I did Opera I was playing the viola and I took that up this year, so... the first few rehearsals I did get a bit of pain... because it was a bit heavier... I was carrying both instruments I was playing more, violin and viola... and then... near the end of the week I wasn't... touching the violin at all. (Cassie, SEM 4)

Generally speaking, Cassie took regular breaks throughout her practice sessions. Over time her breaks became more frequent and, by the end of the program, she was taking three breaks in a one to two hour practice session. Generally Cassie took breaks in her practice because she had lost concentration however she said that she would take a break if she was experiencing playing-related discomfort/pain. Within her breaks she would stretch and relax. “I like to have the break, where you can relax and... feel

comfortable... more aware of playing with better posture, and trying to minimise any tension” (Cassie, SEM 3).

I don't usually go much longer [in my practice] than having a little bit of pain... because I don't want it to get worse. (Cassie, SEM 4)

I like to, twist, and... do, regular yoga and, all those sort of, exercises to help me just... release myself of the tension... to keep my body moving. (Cassie, SEM 5)

I can keep playing for another, maybe five [or] ten minutes after I... feel like I want to stop and then I stop, after that... start again after I, have my break.

(Cassie, SEM 8)

For the duration of her program Cassie's warm-up consisted of technical work. At various stages she experimented with a physical warm-up however she reported that she needed to take care not to overstretch. Cassie claimed that she was very flexible and had a high pain tolerance and that, as a result of this, she had injured herself stretching in the past. Generally Cassie stretched during her breaks and after playing. “I like to try and free it up. Just, stretching my shoulders up, raising them and lowering them, and tilting my neck” (Cassie, SEM 3).

Usually just scales, to warm-up, and... I usually... like to stretch otherwise... if I just wake up and then start playing I feel a bit, dead. (Cassie, SEM 5)

I do, a stretch a day... but, I recently, hurt my [laughs] leg from overstretching...

[MW: “...Are you particularly flexible...?”] Yeah... and also I can endure pain pretty long [laughs] so I probably should have listened to my body and...

stopped a bit sooner. (Cassie, SEM 6)

I do like to shake, my limbs out... give them a good stretch... not often before my practice... after usually. (Cassie, SEM 7)

I think the stretching of the arms... any neural stretch, is good and shaking... just dropping your arm, to allow the circulation to flow... usually feels better... if you, don't, hold anything as well afterwards. (Cassie, SEM 8)

For the duration of her program Cassie perceived that her discomfort/pain could be influenced by carrying a heavy load on her back (i.e. laptop, bag, and/or violin). Other perceived influences included physical exercise, stress, anxiety, fast and repetitive repertoire, using the computer, slouching whilst sitting, the position of her chin and shoulder rests, and playing the viola versus violin.

Usually if I carry something heavier I do get... a work-out with my muscles so then it tenses up a bit, but then after a while my back strengthens I find, and then it doesn't become too much of a heavyweight. (Cassie, SEM 4)

Sometimes I have to push forward especially if my... shoulder rest isn't, as comfortable... I've been, playing around with it... sometimes I find my, chin pushing forward especially if I'm playing loud or something... just all, cramps up into, my neck and my chin. (Cassie, SEM 6)

I think, the, lack of openness in my playing is caused by my shoulders leaning forward a lot, so... I remind myself to sit, with my shoulders back a bit more... [MW: "Do you think that's related to sometimes carrying the heavy stuff on your back?"] Yeah it could be and... slouching in the desk and, things like that" (Cassie, SEM 6)

Early in and prior to her Bachelor of Music program Cassie was not physically active at all. She took up yoga briefly during the second year of the program but committed to it regularly early in her third year, and added in at least two gym sessions

a week. By the end of this year, her exercise had increased to at least five sessions including weights, cardio, Body Combat, running, and yoga in between.

By the final year of her program Cassie was exercising for one and a half hours five days a week. At this time she was bodybuilding with the goal of competing and she was also taking supplements. Although she did cut her exercise back somewhat to four sessions a week later in the year for the last few semesters of her program she was stating that her pain could last two to three days after a work-out. Cassie's physical transformation over the semesters (i.e. development of muscles) was clearly visible.

If I do a... a work-out on my legs, I pretty much, can't walk very well... because it's really sore... I have decided whenever I have my violin lesson that day I am only going to do my leg work-out... so that I don't do any upper body. (Cassie, SEM 7)

I don't really, think of violin playing as painful in any way really, because... painful is the other stuff [laughs] that I do. (Cassie, SEM 7)

If you do too much of it [exercise] than it can... make your body really stiff and... tired... but if you try and balance it, a bit more so... have your rest day to... just stretch and no... actual, exercise, then that's fine. (Cassie, SEM 8)

Cassie's main strategies for preventing playing-related discomfort/pain included awareness, taking breaks during practice, watching her posture both in Orchestra and when at the computer, massaging the pain out, yoga stretches, swinging her arms around, drinking water and herbal tea, and playing lightly if experiencing pain. "I am aware of how I sit in Orchestra and... just sitting at the computer... if I'm slouching I remind myself to sit up" (Cassie, SEM 3).

I usually just try and relax in the area and play lighter [if experiencing discomfort/pain]. (Cassie, SEM 6)

I think, it's important that you do drink a lot of water... to refresh your mind when you are practising and... also rejuvenate your muscles and... swinging your arms to keep them loose, is good. (Cassie, SEM 6)

Generally speaking Cassie was not concerned about her experiences of playing-related discomfort/pain. The exception was early in the fourth year of her program, at this time she was bodybuilding and had read that it was not good physically for violinists as it reportedly shortened muscles and decreased flexibility. On reflection, Cassie said the only point where she was concerned was before she came to the institution when she had a bad experience of pain in her back. “No not too worried [about any discomfort/pain]... because it usually goes away quickly” (Cassie, SEM 5).

A bit more [concerned], because... I read, how it's not really good for violin players to do bodybuilding... because... their muscles [laughs] get in the way of the flexibility, because of the shortening... but, if I... take care of my body and make sure I'm doing everything properly and, stretching, a lot as well then I think it won't be as bad. (Cassie, SEM 7)

[MW: “Did it ever worry you a great deal?”]... A little bit, when I first got the really... bad... muscle, knot... in my back. [MW: “... Did it just go away on its own...?”] Yeah, sort of did I think, after a few weeks. (Cassie, SEM 8)

Cassie discussed her experiences of playing-related discomfort/pain with her Major Study teacher (Teacher A) during the second year of her program. At this time Cassie was participating in the Opera and experiencing increased back pain. Teacher A reportedly advised Cassie not to carry so much on her back. Although Cassie did not

say she had discussed her experiences with any health professionals she did say that she was receiving regular massages by the conclusion of her fourth year.

Yeah [I discussed my pain], with [Teacher A] a little bit when I was carrying a violin and a viola and a backpack at the same time, and told her that, I was having a bit of back pain, and neck pain from it, and she just told me, to be careful and so, I tried my best not to carry it around too much. (Cassie, SEM 4)
I haven't been getting a lot of pain... I've been going for more massages. (Cassie, SEM 8)

Cassie thought there were a lot of students at the institution experiencing playing-related pain. She perceived that she was someone that they would come to for advice because they knew she was interested in the body, movement, and stretching etc.

[MW: "So do you think there are many other students at, string students at The Con who are having problems with pain...?"] Yeah I think there would be... I can notice, them in discomfort sometimes in Orchestra... some people, come to me and ask me for... some stretches... the twists are really good, especially after you've been sitting... for a while. (Cassie, SEM 8)

For the duration of her program Cassie worked consistently as a violin teacher. She greatly increased her work hours early on and, by the conclusion of her program, was teaching well over 20 students a week.

Cassie found the Pedagogy courses offered at the institution to be very useful. In her opinion the courses were interesting and taught her a lot about her own playing. Over time she expressed a growing interest in studying and combining physiotherapy in conjunction with her music teaching business. "I think it is, better for me like this

[focusing on Pedagogy], because I am interested in physio as well, I might do that after music” (Cassie, SEM 6).

I have got the book on... how muscles learn and I've been trying to read that... Pedagogy is very insightful... and, I get lots of things that are useful for my, teaching and my playing... I am interested in the... physio later on so I can help musicians. (Cassie, SEM 6)

Definitely Pedagogy has helped me... understand, that... being a teacher is a lot of responsibility... and do really take your... students and give... time for them. (Cassie, SEM 7)

By the conclusion of her program Cassie was thinking of a more holistic health approach as she perceived that there was a very intensive workload for physiotherapy programs. She was planning instead to undertake a qualification in an area such as kinesiology, yoga, or personal training and to combine this with her private music teaching business.

I am interested in... yoga as well... and if I can get a teacher training for that I can incorporate it with, my own teaching of music and, I'm sure, I can advertise it to my students... and set up a class with all the music students and things like that... I think that's beneficial... also, because I live so close to all the gyms, it would be, handy to have, even the personal training certificate, and that's only eight weeks. (Cassie, SEM 7)

I was interested in physio but, now I'm thinking I'm not sure if I really want to go all the way to [another institution] and... it's pretty full-time... so I'm not sure if I can juggle all that many students if I do physio, I'm thinking of doing something like my yoga teacher training... because I'd really like to teach that

one day... otherwise... I'm interested in the fitness... industry... so I could, possibly, become a personal trainer as well... and work with people, and, also... I'm interested in Kinesiology... energy healing, so things like that, are probably, my, direction, and... Natural Therapy. (Cassie, SEM 8)

[MW: "Is this... what you saw yourself doing when you came to the institution...?"] I didn't really want to... be in an orchestra... or even really, think that I would teach, but I really like teaching now... and I think that's, one of my... specialities these days... I've been lucky I have been doing Pedagogy classes and... that... has helped a lot... [I] definitely see the, most improvement, and... learning through teaching, I think. (Cassie, SEM 8)

In conclusion Cassie's experiences of playing-related discomfort/pain were not particularly severe. However she appeared to be prone to experiencing a fair amount of pain in everyday life and perceived having a high pain tolerance. Her increasing interest in combining music teaching and physical fitness also set her apart from some of the other students in this study.

Student 7: Tom

Tom was without doubt one of the most severe cases of playing-related injury in this study. A cellist, he spent long hours practising his instrument and working out at the gym. He appeared to have an obsessive personality and continued on with these activities regardless of their apparent implications to his playing-related pain.

The main area of Tom's pain was his hands, in particular the left fingers. He described this pain as a restriction of movement as well as a tense and burning feeling. Throughout his program, Tom consulted several health professionals regarding this pain, and reportedly found their advice to be of little use. He seemed to go through certain fads, at first he was convinced that glucosamine was the answer, then acupuncture, then fixing his diet. Tom discussed his pain a little bit with his cello teacher however claimed the teacher had no useful advice.

Tom first commented that his discomfort/pain was always present early in the third year of his program. However, he also said at this time that he was used to it and therefore didn't really notice it. His pain affected many other activities of everyday life including writing and using the computer. It is interesting to note that he was left-handed, so wrote with this hand as well.

Tom's most severe experiences of playing-related discomfort/pain occurred at the end of the third year of his program, a week or so before his research interview. Prior to these experiences, he was reportedly doing up to seven hours of practice a day with no breaks or stretching. He described the resulting pain as a wake-up call to practise sensibly and claimed that he had had to take some days off playing. However, at the time of his interview he was still planning to practise for four hours a day.

There were some similarities between the reported experiences of Tom and Robert (Student 35), a violist. Both young men appeared to be obsessively practising and trying to build upper body muscle at the gym and both claimed to be very concerned about their playing-related pain. In addition, they both perceived that the amount of practice, lack of practice breaks, and the amount/type of exercise that they were undertaking were counter-productive to their pain levels. Both young men chose to continue with the same habits regardless.

Given that they both appeared so obsessive and perfectionist with at least these two areas of their lives, it was perhaps unsurprising that they were also the hardest students with whom to arrange meetings. Both young men constantly missed scheduled interviews and it took much persistence on my part before we eventually met. Perhaps this was because they were so involved in those activities that they had no spare time.

During our interview at the end of his third year, Tom was planning to come back and undertake a fourth year, so I was surprised when he didn't. Through email Tom revealed that his hand problems got so bad that he felt he had no choice but to take time off and reassess his options. Although the rest of his journey is unknown, we do know that Tom never returned to finish the fourth year of his Bachelor of Music program.

Table B7

Reported Pain Experience for Student 7: Tom

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	3	A few days ago	Left fingers	3	More than 3 hours	N/A
2	4	5	Present at time, 1	Left fingers	2	More than 3 hours	N/A
3	3	4	Today	Left fingers	2	3-5 hours	7 hours
4	1	2.5	Present at time, 1	Left hand	3	4 hours	5 hours
5	1	3	Present at time, 1	Left hand	2	4 hours	6 hours
6	4	3.5	Present at time, 1	Left hand	2	At least 4 hours	7 hours practice plus Orchestra

Prior to his studies at the institution, Tom had experienced playing-related discomfort/pain in his left fingers.

As he progressed through the first year of his Bachelor of Music program, Tom noticed a lot more pain in his left fingers, in particular during Orchestra. At the end of his first semester this pain became so severe that he was unable to move his hand. Tom consulted a GP and his teacher without success, before a health food store recommended glucosamine.

There was a stage where, it was really unbearable... but... I found something that... helped, a lot... glucosamine... to the point where recently I... stopped it... and the pain just came back... so now I'm in a bit of pain at the moment but it's getting better because I started back on it... [MW: "... Who recommended that you take that...?"]... Health store. (Tom, SEM 2)

Glucosamine is in your body naturally, it... just produces more... it replenishes, the worn-out cartilage... it's solving the problem instead of... treating it... instead of just rubbing some, ointment or something on it... to numb it... I had to start taking it when I went back [home]... end of first semester... I had to because there was a point where I couldn't even move my hand. (Tom, SEM 2)

At the beginning of the second year of his program, Tom was still experiencing pain in his hands and had consulted a hand physiotherapist. The physiotherapist had recommended some stretches and Tom claimed that he had been doing these regularly. At this stage Tom's understanding was that the pain was occurring because he was overworking the muscles of his hand. He perceived that the exercise he was undertaking at the gym was aggravating his pain significantly but continued on with it regardless.

I saw a hand physio actually, and I... got some exercises, and now they're hands alright, I... get... not so much pain any more... [MW: "... So do you still take the glucosamine?"]... I do, and that seems to help... I stopped for a bit, but when I stopped I noticed that the pain... came back, and then I... went back on it... and it seems to be working for me. (Tom, SEM 3)

Basically over the Christmas period... I couldn't practise, much, until I saw the hand physio who... said I didn't have any major issues with my hands, it was

just, basically, the muscles getting tired, and the load being transferred to the joints... and that's what really causes the pain. (Tom, SEM 3)

[MW: "So does that [gym work] help to reduce your level of pain, do you think?"] No... probably aggravates it, but [laughs]... it's fine. (Tom, SEM 3)

By the end of his second year, Tom had cut back the amount of exercise he was undertaking due to lack of time. As a result he claimed that he had much less pain in his hands. However, he was planning to resume his exercise regime at his previous level as soon as time permitted. He was no longer taking glucosamine and no longer thought it was beneficial at all. He had tried acupuncture and this had apparently been more helpful.

It [my pain]... fluctuates, I noticed that because of the gym, the extra strenuous work... it causes more pain. [MW: "So when you go to the gym a lot it's worse?"] Yeah... there was periods when I was, going and then there was another period when I stopped for weeks... [MW: "... Did you stop because it was hurting too much or?"]... No, I just stopped because I just had no time... [MW: "So does that mean that your playing-related pain is not as bad now?"] ... Probably not as bad, it's more just muscle fatigue. (Tom, SEM 4)

When... there was a lot of pain... acupuncture, helped... release the tension and make it, feel a lot more relaxed... [MW: "Did you have to have several sessions of that before it worked or?"] I might have had two... which did the job... [MW: "So, will you get that done again do you think or?"]... If the pain gets back and gets really worse, yeah... because it seems to really work. (Tom, SEM 4)

Early in his third year, Tom was still noticing a link between going to the gym and how much pain he was experiencing. However he had recently started exercising

again with the aim of increasing it back up to its highest level. By this stage his pain was always present and affecting other activities such as using the mouse, and writing (he was left-handed). He now spoke quite strongly about the hype regarding supplements such as glucosamine. Tom claimed that he had greatly improved his diet to include lots of fruit and vegetables which eliminated the need for him to take supplements. "Once I stopped gym, it was fine... at the moment... because I started exercising again there's a bit of, discomfort but... nothing, that I am not used to... it's just... always there" (Tom, SEM 5).

I know when I do exams, I get, really sore [laughs] ... [MW: "Do you click the mouse with your left hand?"] I can but... I use my right hand as well... I'm sort of ambidextrous... so not everything is done with this hand. (Tom, SEM 5)

Acupuncture helped... when it [the pain] was really bad. (Tom, SEM 5)

There's so much hype for... supplements and stuff, but you should really get it from your food... I'm eating healthy that's the other thing... I think diet has something to do with it as well... it's... how your body... repairs itself... because in... first year and second year I was eating... really bad... no fruit, at all. (Tom, SEM 5)

By the conclusion of his third year, Tom's pain was much worse and affecting many other activities. He had just come off a period where he claimed that he was practising non-stop for seven hours without breaks or stretching. He said that these most recent experiences had been a wake-up call for him to practise sensibly with breaks and to continue stretching. Tom also believed that he had hit the maximum amount of practice possible and had "crashed and burned". After a few days of "taking it easy"

Tom was now taking breaks during his practice every 20 minutes and was aiming to push his practice back up to four hours. He had also resumed working out at the gym.

It's [my pain] actually got, pretty bad at the moment... because I've been practising... without, breaks... there was a particular thing... I, didn't take breaks... because I had to keep playing... it's one of those things... I've taken a few days off, but the week before was, pretty crazy... one day I did... seven hours... private practice on top [of Orchestra]... that's why my hands are pretty bad at the moment, but I found that... just stopping everything and taking breaks really helps... it's like a wake-up call to practise, really, properly. (Tom, SEM 6)

It's the worst it's been, ever... [MW: "... That must have been a bit scary."] Yeah it was, but, it's alright, I just have to control it. [MW: "So was it affecting... your ability to do other things?"]... A little bit... that was... probably the worst... thing... but now I just avoid it and put... emu oil on it, massage it and stuff, which seems to calm it down. (Tom, SEM 6)

I've reached the maximum and I crashed and burned and now I'm, [laughs] building it up again. [MW: "So what do you think you will build it up to...?"] Four hours, at least. [MW: "... That's still a lot of practice though, isn't it?"] Oh, not really... you've got 24 hours in a day, 12 hours spent doing random stuff, and you've still got 12 hours to practise... just a third, of your free time [MW: "... Are you going to try and do the four hours practice when you have got Orchestra as well?"]... I think so... because I need the four hours to improve, but I will, structure it in a way where I can, knock it out... so... Orchestra is the last thing... to do during the day. (Tom, SEM 6)

Early in the fourth year, I realised that Tom had not returned to do his fourth year as planned. Through email correspondence, Tom revealed that his pain in the left hand had become so severe at the conclusion of the previous year that he saw no option but to take time off and reassess his options. “I have been okay – just sorting out my future really! Yes I basically took this time off to sort my hand problems and re-assess the situation [music as a career]” (Tom, October 5, 2010, via email).

For the duration of his program, the focus of Tom's pain remained his left hand. However at the beginning of each interview he often referred generally to having more pain in both of his hands. At the conclusion of his third year he clarified and said that he did get pain in his right hand as well, particularly when he had been practising technical things over and over again.

There can be no doubt that the amount of pain that Tom was experiencing was directly related to his practice habits and the amount/type of exercise he undertook. For the duration of his program he practised three to seven hours a day (on top of Orchestra), rarely taking a day off. To put this into perspective, prior to taking the glucosamine in his first year he said that his pain was so bad that he had to take two days off of practising. “I had to stop, practising for a little while... two days straight without doing anything” (Tom, SEM 2).

As he progressed through his program Tom spoke many times about the importance of taking breaks during practice. However, like most of the students in this study, he was inclined to practise without breaks when he felt he had a lot to get through. Generally, during his practice breaks he would stop playing and give his hand a rest.

The best thing I've found is... to practise... in blocks of... half an hour, and... then have a break, and then go back do it again another half an hour, and then have a longer break... between the next. (Tom, SEM 4)

If I do practise over half an hour blocks, say like an hour and a bit, my hands really start to hurt and I feel... restricted movement. (Tom, SEM 4)

It depends really on, my study load, at the time... because... if I'm pressed for time, I will practise longer... and without, so many breaks. (Tom, SEM 5)

It... makes a real difference if I, take a break or not. [MW: "Do you find at a certain point it kind of goes numb and you don't notice it any more or?"] Not really... I'm always conscious, I don't ignore it... I mean there is a concerto audition which... I am going for but... I'm... trying to work smart for that. (Tom, SEM 6)

I'm only doing 20 minute increments at, the moment... with a break... that's for my private practice, I can't help what, I do... in Orchestra, which is a bit frustrating. (Tom, SEM 6)

Tom also appeared to have an almost uncontrollable obsession with physical fitness. It was fascinating the way that he was aware of and constantly mentioned the perceived impact of exercise on his pain but made few efforts to modify his behaviour (unless forced due to extremely severe pain or lack of time). At the conclusion of his third year, Tom said exercise was okay in moderation, but then admitted that he was not sure what moderation was. "I noticed after I stopped, gym... that's when pain was gone" (Tom, SEM 5).

I'm just getting back into it, so at the moment... I do... it in the morning but not much, just like sit-ups and push-ups and stuff... but, then... we've got a gym at

home now, and... I use that, probably every second day... for a couple hours.

(Tom, SEM 5)

I'm not going as... crazy as I was... I am a bit smarter with how I work, out

[MW: "... I know that you said... in the past you have done... 20 hours a week..."] Was I doing that much? Holy crap [laughs]... I was nuts, my god... but it's good... it's going to be easy for me to get back into it, because, your body... remembers... and you can just, get back up to scratch... without too much effort so that's pretty handy. (Tom, SEM 5)

I want to build... bulk... get bigger... and that's hard to do as well... because it's all, about muscles, and if you changed the shape of your muscles... the whole structure of your arm changed so, I suppose that's the other thing... if you are playing music, everything changes, so your technique will change. (Tom, SEM 5)

I suppose it [exercise] made it harder. It's obvious that it is affecting it, yeah... if it's kept in moderation I suppose you can avoid, causing too much. (Tom, SEM 6)

At the moment I am taking a break... before... every few days I'd go to the gym... every two days... an hour or so. [MW: "... Are you going to try and ease back into that as well or?"]... Maybe not so much... I should write it down and then I can see... what actually happens how I feel, so then I can... really think about, if I'm gonna do it. (Tom, SEM 6)

Early on, Tom highlighted the Orchestra course as being problematic for him, and it remained so for the duration of his program. In his opinion, the main reason for this was that there were a lack of breaks and he spoke about the need for more stringent

rules regarding regular breaks during rehearsals. His main strategy for preventing playing-related pain during Orchestra rehearsals was to play softly.

Before I started taking the... glucosamine, I... found it really hard, sometimes, in Orchestra, because it was just so long... compared to... [A professional symphony orchestra], they are only allowed to play for... a certain time and then they have to have a [MW: "Because they've got Health and Safety regulations"] yeah, and here we don't have that... I think... maybe we should... have something in the lines... because, last time we did two hours non-stop. (Tom, SEM 2)

I suppose... it is an issue when, when my hand problems... when they are actually hurting a lot... but if they're not... it's alright. (Tom, SEM 4)

I haven't had many rehearsals recently but we are about to have two this week... which, I suppose will, tire me out a bit... I had a Cello Galaxy rehearsal for... four hours the other day... and that was pretty tough... but I think my hands, could handle it.... it is just... overworked fatigue. (Tom, SEM 6)

It's interesting to note that Tom also tried a higher bridge during the first year of his program but had to take it off because it increased the pain in his left hand. Despite this Tom went back to the higher bridge in his final year. At first he experienced no problems, in his opinion because his fingers were stronger. However, by the end of the year, he was again thinking that it was affecting his pain levels.

I changed my bridge back to the one I used to have in the first year... I'm not sure if you have documentation but I had a, bridge which was really high, and... that caused serious problems I think that was one of the main causes of my hand problems because... of the tension required... but now my fingers are I suppose stronger and more used to... taking that load. (Tom, SEM 5)

It could be to do with the cello as well... I've got to change a few things, and see if that works, cause the bridge is too high... maybe it's the, build-up of that... I got a new bridge... which helped a lot, but now I changed back to the original bridge which I had in first year, because the sound is much better. (Tom, SEM 6)

When the pain in Tom's left hand initially worsened in his first year, he consulted his General Practitioner and his Major Study teacher, reportedly with little success. He then went into a food store, where glucosamine was recommended to him. For the next 12 months Tom thought this was very effective in reducing pain. On two separate occasions throughout this 12 month period he stopped taking the glucosamine and claimed that he noticed his pain increased greatly. "Different teachers, and different professionals... have suggested stretching and stuff. [MW: "So have you spoken to a doctor or anything?"]... Yeah but not a specialist... just a GP and they don't know what they're talking about" (Tom, SEM 2).

[MW: "Over Christmas did you have like a huge break, or?"]... Yeah, because my hands were really bad at the start. [MW: "... Because you stopped taking the glucosamine...?"] Partly... and, just... yeah I think so... ["So when you started back did you have to start gradually...?"] I had to, yeah... for, maybe four weeks... before I could start to feel the effects. (Tom, SEM 3)

Not really... [Teacher D] doesn't... take it [the pain] that seriously I don't think... but... it's not his problem really. (Tom, SEM 4)

[I have] not really... [discussed my pain with] [Teacher D], a bit, but he just says "Don't practise so much..." [MW: "And have you been back to the doctor at

all?"]... No... not really... doctors... can't do anything... they've got no idea... they just palm you off to someone else. (Tom, SEM 6)

However, by end of his second year Tom perceived that any decrease in pain was linked to factors other than glucosamine. In fact, he became quite vocal about the hype surrounding supplements and what a waste of money they were. From this point on he believed that acupuncture was the best way to limit his pain.

I am not sure if it does actually help... I've had a lot of drastic changes, a lot of different things I've tried, and I, can't really relate glucosamine to actually helping at the moment, because... acupuncture really was... instant. (Tom, SEM 4)

Acupuncture... helps, but I'm not sure if its placebo or anything... that's what the doctor seems to think... but... acupuncture for me to release tension, helps, so I might go... some time... now it's more of a burning feeling not a tension feeling... which is, probably worse, but... I'll see... I know acupuncture when I've got... really sore hands, I go to it and... in a few days it will, be fine. [MW: "So have you been this year to acupuncture?"] Yeah... this year I have been... two times. (Tom, SEM 6)

Tom's other strategies for preventing/reducing his playing-related discomfort/pain throughout his program included stretching, taking breaks, massaging himself, using emu oil, warming-up his hands in hot water, and playing softly during Orchestra. "Stretching really does help, cause, I go to the gym... so, I always stretch now... and I also ice down sometimes... because it's supposed to relieve the toxins that build up after... you, use the muscles" (Tom, SEM 3).

Just basically preparation before practice... really helps, and, then, maintaining the stretch during breaks and just watching yourself... is good, and, and I think it's just about building your own strength... before jumping in and doing some hard practice. (Tom, SEM 3)

Breaks between practice... the techniques of warming-up... the fingers... stretching is probably the best... I saw a hand physio and they said to stretch as well, so. [MW: "Sounds like not going to the gym as much is helping too"]
Yeah... I think that's [exercise], another... contributor to the problem. (Tom, SEM 5)

Tom's warm-up consisted of stretching followed by an elaborate and detailed program of technical work. If he did not have time to warm-up properly, he would put his hands in hot water instead.

Yeah, I do a warm-up... finger exercises, firstly I start off with right-hand bowing... and then left-hand, slowly... just chromatic exercises... to get, my hands... warmed up. [MW: "Okay. And do you stretch before you begin, or?"]
Yeah, yeah I do. (Tom, SEM 3)

Every day, when I start practising, I warm-up with open strings for at least 15 minutes... warming up my right hand... and then after that, I'll do technical works... to warm-up my left hand... for intonation purposes I would do... chromatic... series of notes, on the A string... [and] I'm always constantly stretching, every time, everywhere, any time... of the day... and that really helps because it just loosens the muscles. (Tom, SEM 4)

When I start playing... I notice I have, discomfort if I just... go nuts... but... I have a routine which I do for warming up, technical stuff which I do, first warm-

up, my right hand, with different bowing exercises and then left hand... with simple finger exercises chromatic, just making up, my own exercises... just basic... really controlled stuff... every time I start for the day, and when I... have my break I usually, quickly warm-up or if I'm in a rush, just want to get straight into it if I need to learn something... I will just warm my hands up in hot water... and... that just does it. (Tom, SEM 5)

Stretches... taking breaks has obviously helped... but... hopefully it will prevent this sort of thing happening again or just, relaxing when you play... not putting all your effort into it. (Tom, SEM 6)

For the majority of his program Tom professed to be very concerned about his playing-related pain. The exception to this was the beginning of his third year, when he claimed he was getting used to it. However, like many other students in this study, Tom's concern did not appear to have reached the point where he was prepared to modify contributing behaviours. “Yeah [it concerns me], but I generally don't think about it, just got to get the work done. [MW: “... Why does [it] worry you?”] I dunno... future really... you shouldn't, be feeling the pain at the moment” (Tom, SEM 3).

Not too much because I know, acupuncture is there, and... I've been too busy to even think about that. (Tom, SEM 4)

It doesn't feel serious... but it's not normal [laughs]... it's not too concerning, because I've... looked at, a lot of treatments and... acupuncture is the way to go if you want... instant sort of thing... but, to prevent it, you should practise in little sections. (Tom, SEM 4)

Not really [worried] no, I suppose I'm just getting used to it. (Tom, SEM 5)

It was really bad... to the point where it was just burning... really concerning... I didn't know what to do... if ice is good for it... hot water... massage... or... stretch it... in that state so I just left it. (Tom, SEM 6)

It worries me, a fair bit... there's no real, solution for these, issues... there is treatment... but, prevention, I am still trying to figure out how my body works as well. (Tom, SEM 6)

Tom worked throughout his program at various jobs including cello teaching and sales. During his final semester he was working at venues in the institution which involved lifting things, and said this was also aggravating his pain. “I am, working at [the institution]... lifting stuff so... (that) doesn't really help my situation... but, I lift things, properly” (Tom, SEM 6).

Unfortunately Tom's unexpected departure from the Bachelor of Music program meant that I was unable to find out any more information. In conclusion, his experiences of playing-related discomfort/pain were severe and seemingly aggravated by his excessive practice and physical fitness training. His left-hand pain ultimately prevented him from completing the fourth year of his Bachelor of Music program.

Student 8: Wendy

Wendy was a cellist who had some severe experiences of playing-related discomfort/pain throughout her program. She came across as a mature, friendly, and conscientious person, and was one of the few students in this research project who regularly attended string workshop.

Wendy was prone to experiencing back pain during everyday life and had previously had an operation on her spine. She undertook regular physical exercise throughout her program and credited this as greatly helping to decrease her back pain. Interestingly, during her interviews, she often stated that she had had no discomfort/pain in her back before later revealing (in the same interview) severe pain in her back during orchestral rehearsals and practice.

It follows then that, like many students in this study, Wendy was prone to experiencing pain whilst participating in the Orchestra course. However, she was unusual in that she did not like the chairs in the theatre at the institution. She perceived experiencing very severe pain when having to use them and believed this was because she couldn't adjust them to the right height. Wendy also perceived that a lack of breaks within rehearsals, the cumulative effect of rehearsals on successive days of the week, and the time of day rehearsals were held could also influence her discomfort/pain. After participating in Orchestra she perceived that her back pain would often be present until the next day.

In addition to her back pain, Wendy also experienced playing-related discomfort/pain in both of her hands, her arms, her shoulders, and her neck. She perceived that activities such as carrying her cello, working, and sleeping could influence the amount of discomfort/pain she experienced.

Wendy had her most severe experiences of playing-related discomfort/pain during her final semester. (She was one of four students in this study who reportedly had a particularly severe experience in the fourth and final year.) After three to four weeks of severe pain in her hands, Wendy consulted an acupuncturist, who advised her that the problem was that she hadn't been eating enough protein. Wendy found the acupuncture treatment in conjunction with increased protein intake successful in eliminating pain.

At the conclusion of her program, Wendy was hoping to do a further study and eventually to play the cello professionally in an orchestra. She said that her experiences of playing-related discomfort/pain had never concerned her as she had been able to resolve them.

Table B8

Reported Pain Experience for Student 8: Wendy

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	2.5	Last practice session	Back of both shoulders	6	1-2 hours	N/A
2	3	2	Previous day during Orchestra	Right shoulder, back	5	2-3 hours	N/A
3	1	2	One week ago during practising (but shoulder sore from gym at the time)	Left fingers	3	2-3 hours	6 hours
4	2	2	Last Saturday whilst practising	Back	5	2-3 hours	6 hours
5	1-2	2	Previous week during rehearsals	Shoulders and back	5	3 hours	7 hours
6	2	2	Previous day	Right thumb	2	2 hours	7-8 hours
7	2	2.5	Previous week during a rehearsal	Right thumb	2	2 hours	5 hours
8	2	3	Two weeks ago	Both hands, right arm	4	N/A	N/A

Prior to her studies at the institution Wendy had experienced playing-related discomfort/pain in her left fingers, wrist, hand, elbow, and forearm; her right shoulder; and her upper back. The discomfort/pain in her left fingers bothered her the most and recurred every few days.

As she progressed through the first year of her Bachelor of Music program, Wendy noticed more pain in her left fingers and right thumb. She thought this was because she was practising a lot more and had decreased the frequency and duration of breaks within her practice in order to retain her practice room. Wendy was also experiencing discomfort/pain in her right shoulder and back during Orchestra.

There's been a lot more, finger, pain... maybe just thumb, in my right hand, but, my whole left hand... I think that's because... last year I, tended to have lots of breaks, but this year... because... you have to get a room... you just want to stay there for as long as you can. (Wendy, SEM 2)

Early in her second year, Wendy said she was noticing less pain in general, and particularly in her fingers. She thought that this could be due to playing a new cello and/or doing lots of strengthening exercises for fingers (as in double stops). At this stage she said that she had a problem with tension (although not necessarily pain) in her shoulders all the time.

There is a lot less [pain]... especially in my hand... I don't know what happened, it just suddenly... got a lot better... I think it's just been pretty recent, actually... I did get a new cello so that... might have had something to do with it, but I've also been working on strengthening my left hand which has really helped as well. (Wendy, SEM 3)

My shoulder muscles... still get really really tense... they are always really tight, like I have big knots in both shoulders... I think I am not as relaxed as I should be, in my shoulders... I tend to raise them a bit... [Teacher D] is always tapping my shoulders. (Wendy, SEM 3)

At the end of her second year, Wendy reported that she now had no pain in her back and shoulders when playing. However she was inconsistent as she said that she had constant knots in her shoulders and back pain during Orchestra. Wendy was also experiencing some shoulder pain which was being aggravated by carrying her cello. As a result, she tried to leave the instrument at the institution and come into the venue to practise.

There's been a lot less... which is good... maybe I am sitting, with my cello differently, because I noticed that sometimes, it feels a bit uncomfortable and then if I change... the positioning or whatever, it is better and then the pain, goes away, or... doesn't get worse. (Wendy, SEM 4)

That's pretty much it, that's like, all the back pain and shoulder pain and stuff has gone it's just fingers... [But then in regards to her most recent experience]...

Saturday, when I practised, I wasn't comfortable in the chair and everything and so my back was hurting... if my back cramps up, sometimes if I just get up, and then walk around and then come back and readjust completely, it's okay. Other times it's still bad. (Wendy, SEM 4)

At the beginning of her third year, Wendy again said her discomfort/pain had decreased (although her back and shoulders were still particularly bad during Orchestra). However, as the year progressed Wendy noticed that the discomfort/pain in both of her thumbs was getting worse. Although it was not necessarily present every

time she played, when it was present, it was present from the start of playing. “There's been a lot less... it's just... still shoulders, and back depending on chair but... my hands don't cramp, anymore” (Wendy, SEM 5).

My thumbs are getting sore... it's, getting a bit worse... but that's all... everything else seems to be getting better... I've tried to work out what it is... if it's the way I am sitting or the chair or, whatever but I can't figure it out... if it hurts, it usually hurts... as soon as I start playing. (Wendy, SEM 6)

Whenever I sit on those chairs, the, the wind-y ones... my back, seizes up... all the, around the back of my rib cage, all that bit... just really tight and my shoulder blades... it usually stays until, I have had a sufficient, break... usually... those rehearsals are at night, then the next morning, it's okay. (Wendy, SEM 6)

Early in her fourth year Wendy was still experiencing playing-related discomfort/pain in her thumbs as well as in her shoulders and neck during Orchestra (although she claimed it was gone by the next day). Wendy said she still couldn't link the pain in her hand to anything but that it would occur several times in one week and then not for several weeks. “I think if anything there would have been less pain... it's the same pain, it's just, it occurs less frequently” (Wendy, SEM 7).

If it [discomfort/pain] happens it usually happens... three times, in... a week, and then I'll have, two weeks, where nothing happens... all I know is that when it happens, especially [in] my right hand... I'm not feeling comfortable or, at ease when I'm playing and I don't know why that is but... I'd say that's why the pain is there. (Wendy, SEM 7)

In the theatre chairs... after about an hour, in there... I notice my back starting to cramp up and I just want to keep... stretching it... but that doesn't really help... and

then when we have a break in the rehearsal that really helps, being up but... 10 minutes after I sat back down I can feel it and it is worse... for the second half of the rehearsal... I'll go home and have dinner and then I usually go to bed so it's, okay then when I'm lying down... but I have to wait until the next morning... on the bus on the way home it's usually pretty sore. (Wendy, SEM 7)

Wendy's thumb pain escalated significantly as she progressed through her fourth year and reportedly took only a couple of days to get “really bad”. It then continued to worsen over a period of three to four weeks to the extent that it was affecting her ability to undertake other activities such as texting on her mobile phone. Wendy talked to her cello teacher who advised her that she must have been playing more. However, in Wendy's opinion, there was no change in anything prior to her pain coming on. (She later revealed that the onset of pain was two days prior to her audition for a national orchestral program and that a few days prior to this audition she experienced severe pain in her right hand during an Orchestra concert.) Wendy consulted an acupuncturist about her pain and reportedly found the treatment and advice helpful. The practitioner said the problem was to do with her intestines and that she should eat more protein. At the time of her final interview Wendy said that she had increased her protein intake and this had resolved the pain.

About, five or six weeks ago... I just, started getting pain... in both hands... when I played... and it just started... very brief and then it just got worse and worse and worse, then... I talked to [Teacher D] about it, and he was like... “You’ve probably just been playing too much.” But, it just, it started when I hadn't been doing any differently, it wasn't like I suddenly... started doing... four hours more playing a day... it just started hurting... so I tried... sports cream that heats up,

and that worked, for a few days, and then, it just stopped working and, the pain was really bad and... I couldn't, play... it just really hurt, um, and then... I, went to get acupuncture on it... and... she, thought it wasn't to do with playing at all she said it's, to do with, my intestines... and she said I need to eat more protein which is, true, and ever since then... the acupuncture helped with the pain, but I have been eating more protein and it has been fine since then. (Wendy, SEM 8)

I went to first see her [for acupuncture]... Nearly two weeks ago... and it's pretty much stopped since then... it only took a few days to get really bad... I noticed on the weekend, I was practising and it, and it was sore, but... I could deal with it and then... it must have only been a couple of days because then on the Monday I was supposed to have my... audition and I could hardly practise before because my hands were really sore, I still did the audition... they were both bad this time but the right was worse. (Wendy, SEM 8)

It started, only when I played the cello but it got to the point where... if I was texting on my phone or something... it would hurt to use my thumbs... [MW: "Is it the worst you've ever had?"] Yes, I think so especially because... a few days before, it actually started, we had the Brahms concert... for Chamber Orchestra, and I was fine, leading up to that but... in the concert... from about halfway through the third movement, to the end of the piece, my right hand cramped up, and by the end... it just... clamped on. (Wendy, SEM 8)

Orchestra was problematic for Wendy for the duration of her program. She consistently reported experiencing pain in her back, neck, and shoulders during rehearsals and this pain could remain present until the next day. However, over time this discomfort/pain decreased in severity. Wendy was one of the few students who

perceived that the chairs in the theatre actually increased her pain. She thought this may have been because she couldn't get them to the right height. She perceived that a lack of breaks during rehearsals, the time of day, and number of successive days rehearsals were held on could also influence the severity of her discomfort/pain. "Usually I practise in the morning, and... that's alright, and then, in the afternoon after... an hour and a half, of Orchestra, it starts... and it gets, really bad really quickly" (Wendy, SEM 4).

The pain only happens... when we rehearse in the theatre because of the chairs... I can't get it to the right height... so, I get back pain there but... on the normal cello chairs it's fine. (Wendy, SEM 4)

I noticed... on Wednesday when we started the rehearsal my back was fine, and then on Thursday when we started it was, already a bit sore... from as soon as I sat on the chair... because I find that build up really bad. (Wendy, SEM 5)

It usually depends on when we have our break... sometimes he [the conductor] makes us go for... over two hours, and then we have a break and that really... is bad... but if we have a break after... an hour and 15 minutes... then... my back hurts by the end of the rehearsal as opposed to... earlier on... the next day usually they are okay. (Wendy, SEM 8)

The focus of Wendy's playing-related discomfort/pain changed throughout her program from her left fingers to her hands, shoulders, hands, and finally back to her right hand. Other body parts affected included her right arm, her neck, and her back. Generally speaking, when she experienced playing-related pain, Wendy would stop, stretch, and/or have a break. If the pain was still severe when she continued to practise

she would stop for the day (unless in Orchestra). Her playing-related discomfort/pain could last until the following day.

If it starts, and then I keep going it gets, worse and worse until I stop, and sometimes if I go too far, it will keep going after, I finish playing just, for maybe the rest of that day... I usually stop... stretch... but... if I have stretched and then I keep going, if it starts hurting again I will stop straight away... because I know that... something is not right. (Wendy, SEM 5)

With any pain... if it starts just, stop playing and... move... try and relax the muscles... [MW: "So do you always stop when you start to experience it...?"]

Unless I have to keep going... in a rehearsal... if I am just practising and... it hurts I stop straight away. (Wendy, SEM 8)

Wendy was also prone to experiencing back and shoulder pain in everyday life as a result of other activities. Examples of such activities included carrying her cello, sleeping, and travelling. In order to minimise her shoulder pain during the second year of her program Wendy began to leave her instrument at the institution so she didn't have to carry it in and out.

When I carry it... my shoulders... really hurts... on both sides [MW: "Do you have to carry your cello much...?"]... I try and leave it here as much as I can... and... I come in and practise on the weekends and, everyday... and if I have to take it home I, as much as possible drive, here and then drive home. (Wendy, SEM 4)

[MW: "So it's definitely linked to the amount of playing you do?"] I think so yes... and the way I sleep too because I, used to, just use one pillow and I thought that was fine but I was getting really bad, pains and... it's still tight but it

doesn't hurt, now... I started using two pillows and I have them... up... ever since I started that, I have... not had the pain there. (Wendy, SEM 6)

Wendy also experienced discomfort/pain when she was working. During the final year of her program she took on a job as a carer for disabled children. At this time she noticed that she could experience pain when supporting their body weight and/or lifting their wheelchairs into and out of the car. "Sometimes if I've just, lifted something heavy [I will experience pain]... but it usually goes away, really quickly" (Wendy, SEM 4).

I work with children with disabilities, so I take them out and, do things with them to give their parents a break... it is very very tiring, very draining... emotionally and, physically as well because... you just have to, be aware of them all the time and what they're doing... one girl... she is in a wheelchair and... she can walk a little bit so she can walk... from the car to her chair and she can walk a little bit but you have support her but, when she sits in the chair you have to go behind her and... pull her back, and... I've noticed, that, sometimes gives me a bit of pain and also getting her chair in and out of my car. (Wendy, SEM 7)

Wendy was one of the few students in this study who appeared to exercise regularly but not excessively. She reportedly went to the gym three to five times a week. Early in her Bachelor of Music program she disclosed that also she had an operation on her spine when she was younger and that this, in conjunction with regular exercise, helped to decrease pain in her back. "I had an operation on my spine, a few years ago, some of my muscles are a bit haywire... when I go to the gym, I get a lot less back pain" (Wendy, SEM 3). "In general... I feel better when I do it... I just feel more energetic when I have, exercised" (Wendy, SEM 7).

Wendy's strategies for preventing playing-related discomfort/pain throughout her program included stopping if experiencing pain and stretching/flexing her fingers; going for a walk or resting; taking regular breaks during practice; eating more protein; getting her dad to massage her shoulders; using a massage cushion; trying to relax whilst playing; lying flat on her back after Orchestra rehearsals; and using heat cream. "Sometimes I... go for a walk, and just, rest for a few minutes... and then come back and it's usually okay" (Wendy, SEM 2).

The shoulders... my dad massages them for me, and that really helps, and we have a massage cushion... for everything. (Wendy, SEM 3)

Shake them [my hands]... and then I keep going and, if it's still bad... I have a break, but... usually that gets rid of a lot of tension. (Wendy, SEM 3)

Just, stopping, and... if, my back starts hurting just think about, the position of my instrument... working out if that's the problem... some days I just feel really uncomfortable with it. (Wendy, SEM 4)

Stretch and, try and stop playing for a while and if it keeps going then I stop, playing. (Wendy, SEM 5)

Prior to and for the majority of her program, Wendy said that she was taking regular breaks throughout her practice. Generally she would play for no longer than 45 minutes before stopping. The exception to this was in her first year. At this time she said that she was afraid of losing her practice room and so was practising continuously. Wendy linked this to more pain in her fingers. On reflection, Wendy said she couldn't remember taking breaks in her practice before she came to the institution.

I've been doing it [my practice], pretty much in one go... last year I, tended to have lots of breaks... and... do... half an hour here and half an hour there, but this

year... because... you have to get a room... so you just want to stay there for as long as you can. (Wendy, SEM 2)

I don't think I took breaks before I came here actually I... don't remember doing it I just remember, sitting down and I would just play for two hours... but I think, because, here, you have to... practise... in a much more focused way and concentrate... you need to give your mind a break at least. (Wendy, SEM 8)

Wendy's warm-up of technical work and exercises for around 20 minutes remained consistent throughout her program. When she experienced pain she would generally stop and flex stretch the affected area before taking a break. However she did not stretch as a part of her warm-up routine.

Wendy claimed that her experiences of playing-related discomfort/pain did not really concern her at any stage. On reflection she said that she would have been worried in her fourth year if acupuncture and protein had not resolved her pain.

Not, too much I think if it got worse [during Orchestra] I would probably say to [Teacher P] "Look can have a different chair, in here because, these ones, I find really uncomfortable and they hurt my back" but, at the moment it's, it is bearable. (Wendy, SEM 7)

With what happened recently it went away... if she'd said... "It's because of protein" and I ate more protein and it still hung around I would be worried then but, it went away... and so I am like "Okay that's probably what it was..." because I do tend to, slack off when it comes to eating protein, I am a carb, person... so I'm not really worried at the moment. (Wendy, SEM 8)

I think... if it has changed it would be I am less worried, now, because... over the program I've, learnt, how to play, better for my body... in turn... [MW: "And

how have you, learned that... through your own experiences of... or through your teacher?"].... And lessons, and watching other people... I find, it really helps me, if I watch myself in the mirror... and if there's something I don't like about... the way I look when I play I will watch, the other cellists and see how... they do that. (Wendy, SEM 8)

At various times Wendy discussed her experiences of playing-related discomfort/pain with her cello teacher (Teacher D). She reported that he advised her to stop playing if experiencing pain but to differentiate between good and bad pain. At various times he also linked her discomfort/pain to increases in playing time and tension in her shoulders but Wendy did not believe they were the cause of her problems. Other than on these occasions Wendy discussed her experiences with the acupuncturist in her final semester and generally with some other students.

A little bit with [Teacher D], but he's, just... said... "If... something hurts, stop... sometimes, your fingers hurt because, you're pressing on the strings for a long time, and in that case, you have to build up the resistance, but, if... something's wrong, then stop playing". (Wendy, SEM 2)

He said that, "If it's real pain... some things wrong pain, to stop... but if it's, just, your hands not used to it... then keep going because you have to, make it used to it", which is what I was doing with the strengthening exercises. (Wendy, SEM 3)

No, because I just stop, and [Teacher D] said "If, it hurts just stop", so, I do and then it's okay. (Wendy, SEM 4)

One time in my lesson [Teacher D] said... if my shoulder, was up then I would have all this tension and, I noticed then... if I kept my shoulder relaxed and low

then my thumb didn't hurt but sometimes, even when my shoulders are relaxed my thumbs do hurt. (Wendy, SEM 6)

On reflection, Wendy perceived that her playing-related discomfort/pain had eased over the course of her program. She said that she had a tendency to get quite emotional and believed this affected the amount of pain she experienced. "It's changed but I suppose overall it's gone down... I seem to be more comfortable, when I play" (Wendy, SEM 8).

As to whether she thought increasing pain was linked to stress:

I don't get stressed... I, get more emotional... I have emotional breakdown as opposed to getting stressed but... I think probably it is, a lot to do with that and everyone's like "Oh it's the final one [exam], put lots of pressure on yourself". (Wendy, SEM 8)

I think... I'm finding it easier than it would have, three years ago... I think over the course of this program, you just have to build up that endurance. (Wendy, SEM 8)

At the conclusion of her program, Wendy said she was hoping to undertake further study and eventually to play in an orchestra. She said that it had been helpful to be a participant in the research project because it had made her think about her playing-related discomfort/pain. To the best of her recollection, she thought she probably had pain prior to arriving at the institution but assumed everyone had it and that it was normal. She was still of the opinion that everyone had some experiences but clarified that the topic was not really discussed. "Hopefully my Masters or, some form of... focusing on, playing, like lessons or, whatever, I want, eventually, to be an orchestral musician" (Wendy, SEM 8).

Yes it has [been helpful talking]... because it gives you the chance... to go... “Is there a problem...” because often, if we didn't have this opportunity, people might just go, “No I don't really have to think about it it will go away...” [MW: “Had you ever thought about this kind of, thing at all before you came to the institution, or?”] Um not really, no... I had got pain before and I just... assumed that, everyone had it, in some way... like the other day we were talking about, where you put your thumb when you hold the bow and it, someone was like “Oh I used to put it there but then I found that, I got really bad pain through my thumb so I do it here”. (Wendy, SEM 8)

I think, what I would have done differently is, focused, more, earlier on, on how to prevent, pain like it's been... a gradual thing all along and I think that's good but I think it would have been better if... in first year it was... a lot more intense the study on it... trial and error... about what works for me and what doesn't but, I guess you have to learn these things, when you are ready. (Wendy, SEM 8)

In conclusion, Wendy appeared to be prone to experiencing discomfort/pain in everyday life. Like many students in this study, she consistently said that she was experiencing less discomfort/pain as she progressed. However at times her responses to various questions indicated otherwise.

Student 9: Jena

Jena was a cellist who withdrew from the Bachelor of Music program during her first semester of study. As a result she did not participate in any interviews and our interactions were limited.

Prior to her studies at the institution Jena had experienced playing-related discomfort/pain in her left fingers, hand, and wrist; her right shoulder; her neck; and her back. Her left hand pain recurred occasionally in winter and her main strategy to prevent playing-related discomfort/pain was keeping her hands warm. Jena did a technical warm-up and took breaks in her practice every half an hour.

Jena only completed the Initial Questionnaire. During the second round of data collection she was contacted by mail regarding further participation in this research project however she unfortunately did not reply. It is therefore unknown whether her experiences of playing-related discomfort/pain influenced her decision to withdraw.

Table B9

Reported Pain Experience for Student 9: Jena

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1-2	4	6 months ago	Left hand, back of neck, shoulders, and upper back	6	1-2 hours	N/A

Student 10: Molly

Molly was a cellist who withdrew from the Bachelor of Music program after completing her first semester. Prior to her studies at the institution she had experienced playing-related discomfort/pain in her left fingers, right wrist, back, and lower body. Her back pain was the most severe and recurred after 10 minutes of playing. She believed it was caused by a physical health problem and her posture. (She worked 6 to 10 hours a week in a job that required her to bend over a lot waiting tables, picking up dishes etc.)

In the Initial Questionnaire Molly revealed that her back pain was always present after she had been playing the cello for 10 minutes. She had reportedly already reached the stage where she had to take breaks during practice due to pain. Molly had discussed her discomfort/pain with a family member, teacher, medical doctor, physiotherapist, and alternative therapist (Rolfing). She had not been diagnosed with any condition however stretching and physiotherapy were recommended. Her main strategies for preventing her playing-related discomfort/pain were stretching and cracking her back (both recommended by the physiotherapist). However she did not do a warm-up of any type before cello practice.

Unfortunately, due to her early withdrawal from the Bachelor of Music program, Molly did not participate in any interviews. She was contacted by mail regarding further participation in this research project however she did not reply. This was a shame as it would have been very interesting to know whether Molly's experiences of playing-related discomfort/pain influenced her decision to withdraw.

Table B10

Reported Pain Experience for Student 10: Molly

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	4	4	Present at time, 2	The back just below the shoulder blades	5	Less than one hour	N/A

Student 11: Mary

Mary, a cellist, was without doubt one of the more interesting cases in this study. At the onset of her Bachelor of Music program she was experiencing recurring playing-related discomfort/pain in her neck and shoulders. Over a period of three years, this discomfort/pain steadily worsened to the point where it was constant, disabling, and she developed a lump on her neck. It was not until this time that Mary admitted to having a problem that needed to be addressed.

The most fascinating thing about Mary was her attitude towards her playing-related discomfort/pain. One of the more advanced students, she seemed to maintain a dismissive and evasive manner, not only towards her own and others people's playing-related pain but also towards the research project in general. She consistently broke appointments we had made and frequently laughed during our interviews.

For the first three interviews it was very difficult to get Mary to elaborate on anything and she basically just gave yes/no answers to direct questions. However, as her pain got worse in her third year Mary began to discuss her problems and their effect on her in more detail during our interviews. She also asked more questions about the research project in general.

Over the years it was relatively easy to predict her reported eventual outcome of constant and disabling pain. Mary said that she practised extremely long hours with limited breaks, played through pain, and had the attitude that pain in the string player was normal. Over time, she began to wake up with pain and experienced it when carrying her instrument. In addition, in the second year of her program she participated in another research project which included being assessed by a physician. Although he apparently advised her that she had a problem with her back and shoulders and said she

needed to take breaks in her practice, do more physical exercise, and adjust her posture, she did none of these things.

Like many students in this study, Mary also experienced particular difficulty during Orchestra. In her final semester she led the cello section and found this particularly stressful, as she perceived that she was blamed for any mistakes made by other students. After this experience she said she never wanted to play in the Orchestra again. Mary also experienced a lot of pain during teaching, which she did for many hours each week.

In the end Mary decided to exit the Bachelor of Music program at the end of her third year to complete a Graduate Diploma of Education. She admitted that her experiences of pain (in particular during Orchestra) had made her decision easier. By this time her pain was reportedly affecting many other activities such as computer work and teaching. Mary said she planned to consult someone about the problem once she had finished her program. However, she said she would be unable to take much time off because she needed to prepare for a prestigious competition. Unfortunately, knowing her eventual outcome was beyond the scope of this research project.

Table B11

Reported Pain Experience for Student 11: Mary

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	2	Previous week	Front of both shoulders and neck, middle of back, and outside of both wrists	2	1-2 hours	N/A
2	1	3	Yesterday	Left side of neck	3	5-6 hours	N/A
3	1	3	Yesterday	Back of neck	3	5-6 hours	Up to 9 hours
4	1	2	Last week during practice	Back of neck	2	4 hours	8-9 hours
5	4	4	Present at time, 1	Right thumb and left fingers	2	4-5 hours	9 hours
6	4	4	Present at time, 3	Back of left shoulder	5	5 hours	5 hours

Prior to her studies at the institution Mary had experienced playing-related discomfort/pain along the entire left side of her body. The discomfort/ pain in her neck and shoulders pain recurred “every couple of days” but she said that it did not concern her.

At the end of the first year of her program Mary said that her discomfort/pain was the same and that it still recurred “every couple of days”. However, later in the

interview she admitted it was now present every time she practised. She said that she had increased her practice substantially to five to six hours per day and that she had particular difficulty (i.e. experienced more pain) during Orchestra rehearsals.

As she progressed through the second year of her program, Mary said that she still got neck pain but remained inconsistent as to whether it occurred every time she played or only occasionally. She said that she was still practising five to six hours a day with limited or no breaks. Orchestra was still a problem however she found herself better able to tolerate any discomfort/pain. "I try my best to fit in five to six hours [of practice] but sometimes it is only four" (Mary, SEM 3).

[MW: "So do you still get... neck pain?"] Yeah... if I play in the Orchestra for... three hours... but you kind of get used to it after a while. (Mary, SEM 3)

At the conclusion of her second year Mary highlighted the pain as being significantly worse. Although she was inconsistent about this, her pain scores and frequency of pain also suggested that it had increased. Mary now believed that her pain could be related to her sleeping position. She said that her neck now cracked in several places when she woke up in the morning and that she had noticed that her fingers were changing shape as well. "Neck... hurts... I suppose after Orchestra, but otherwise no it's okay" (Mary, SEM 4).

I have, more neck pains, but that's it... [MW: "When did it start increasing, do you know?"] I'm not sure, probably the beginning of the year... it's not really a pain, it just cracks... every morning, and every time I practise, so... I don't know if it's got anything to do with practice, or... the way I sleep, or something... it hurts when I practise a lot... when you sit on the cello... sort of bent but otherwise no [it doesn't hurt]. (Mary, SEM 4)

At this stage Mary stated that her pain was much worse after she stopped playing and that this happened at the beginning of the year (although it was not mentioned in the previous interview). She claimed that she got used to the pain as she continued to play, and that she was not worried about it. However she also said that she did not want to develop a lump on her neck. “I'm not really worried about it, because I know it's normal, but then again I don't want to end up when I'm older, to have like a huge bump on my neck or something, you know what I mean?” (Mary, SEM 4).

By the beginning of her third year Mary's pain had reportedly spread to be present in her neck, shoulders, arms, and fingers. At this stage it jumped from being Grade 1 to Grade 4 and present at time of questionnaire completion. Mary said that she thought the increase in pain may have been influenced by carrying her cello around. After she carried her cello she had deep marks on her shoulders and sometimes the skin was broken. However, she later said that she didn't know why it was hurting.

I've got more pains in my shoulders now and my arms... and my neck... I think also because I carry my cello around a lot... and it's quite heavy, so... my shoulders have been hurting a lot... after I play the cello... or after when I'm carrying it... I don't know why, I just, I think maybe, it was time for them to start hurting [laughs]. (Mary, SEM 5)

Yeah it hurts [carrying my cello]... I usually carry it over both shoulders... but still it leaves a lot of marks on my shoulders and... breaks the skin. (Mary, SEM 6)

Unfortunately, by the conclusion of her third year the pain had worsened significantly to the point that it was constant and disabling behind her left shoulder. At this time Mary had a clearly visible lump growing at the base of her neck that she

claimed was growing rapidly. The pain was reportedly very bad and restricting many activities other than playing for example computer work, teaching, and cooking. The pain was always present however she claimed that sometimes she only became aware of it once she started using her hand.

I have a huge lump growing on my neck... I think it is a bone spur or something... I think it's from the cello... it just hurts to put my hand up or, anything like that... so I haven't been able to practise much at all. [MW: "... Is that worrying you?"] Yes because... it hurts to even teach, or to sit down, it just hurts, all the time. [MW: "... So is it painful... when you are at the computer and stuff?"] Yeah. (Mary, SEM 6)

It's distressing but sometimes I don't notice it but, as soon as I started using my hand or, playing... or anything like that... it really starts to hurt. (Mary, SEM 6)

When I practise a lot, my fingers hurt, but other than that... it's alright. (Mary, SEM 6)

By this stage Mary perceived that there was very little she could do to ease the pain (except for crack her back and lie down on the floor) so she said that she was just pushing herself to get through her final exams. After this she planned to consult a physician and have a break from playing for a week or so. Mary said she was not becoming more used to pain and that in fact she had cut down her hours of practice. However she continued to practise for five hours, five days a week with no breaks. In her opinion this was necessary to get through the work that her teacher expected of her. "It's sort of relieves the tension a little bit... and if I turn around... my, spine... cracks as well" (Mary, SEM 6).

[MW: "... And what about, the lump on your neck? Have you seen anyone about that or?"] No, I'm going to but after my exam probably... I think it's just because I play the cello... bowed down a lot... to look at my fingers, I spend most of my time like that, so. [MW: "... When did you first notice it?"] Oh, a couple of months ago, but it's... started growing and growing and, it's becoming bigger... it hurts a lot... especially after a long day, it just... really hurt[s]. [MW: "Has that affected... your decision to not continue next year with the cello and do Education, or?"] I think it's a small part of it... I've had my doubts this semester but, now that I have this pain I'm... glad I don't have to practise any more... after this exam... it's next week, so... whatever the pain is I just want to get through it and then... die. [MW: "Are you going to have a break for a while after that?"] Maybe yeah probably a week or so. (Mary, SEM 6)

[MW: "Do you think... you're getting more used to having more pain or?"]
 [Laughs] Not really! It actually hurts so much that... I have cut down my hours of practice a lot... I don't do it as often... maybe five times a week, but when I practise I practise for five hours. [MW: "... Do you have... breaks within the five hours...?"]... Five minutes to go to the bathroom... to eat or something.
 [MW: "And is the pain there even before you start playing?"] Not usually no.
 [MW: "So how long can you play before it, starts to come?"] A few hours, four hours say, three hours. [MW: "... You don't have any before that, or you just don't really notice it?"]... My neck... hurts a lot... but my fingers they don't hurt... about 20 minutes after I've done... five hours... I start to realise that they actually hurt... with my shoulder, it hurts any time, all the time... whatever I do. (Mary, SEM 6)

The amount of work that [Teacher D] gives us... having to, stay up to it... there's no way I can fit, all my pieces in one hour or... two hours I have to, spend... a lot of time on every piece. (Mary, SEM 6)

Mary flagged Orchestra as being difficult for her in our first interview and this continued for the duration of her program. At the beginning of her third year she claimed that any pain she experienced as a result of Orchestra would continue for some time after she stopped playing. How long the pain lasted depended on what she was doing however she said it was fine by the time she woke up the next morning. “[After Orchestra] I just feel dead. [MW: “... Are you okay the next day...?”]... Definitely, just go to sleep and wake up and, do it again” (Mary, SEM 5). “Depends, what I do next... if I go to bed then, in the morning its fine” (Mary, SEM 5).

One of the most fascinating things about Mary was her attitude towards her playing-related discomfort/pain. From the very first interview she was constantly laughing about the problems and saying that they were no big deal. She reinforced to me her belief that pain was a normal part of playing a stringed instrument and seemed to ignore the warning signs. During her second year she also participated in a research project for a friend which involved being examined by a physician. He said she had a problem with her back and shoulders and recommended changing posture, taking breaks, and doing physical exercise. Mary said that she did not follow this advice.

I went to a physician on Friday... I'm just doing a survey for a friend... they said that I have a problem with my back and, my shoulders... because of the way I sit... they asked me to sit straight and, to take breaks and to do physical exercise. (Mary, SEM 5)

It was not until her discomfort/pain reached the point where she had developed a large lump on her neck and was in constant pain that Mary admitted there might be a problem and became concerned. At this time she said she was planning consult another physician however she wanted to get through her final exams first.

This one does worry me because... it's there all the time whatever whatever I do... if it was just when I played the cello then I'd go "Yes it probably doesn't matter, it will go away..." I can't really lift up heavy things... I can't play tennis, I can't cook or anything it's just, it's there all the time... and especially when I teach, I find that after, the first two students, it... hurts so much that, I lose my concentration and get really frustrated with the other ones because it just hurts.

(Mary, SEM 6)

I'm not sure [why I am experiencing the pain] maybe... I dislocated or something it just really hurts... it's never been like that before. (Mary, SEM 6)

I am going to see a physician... after my exam... [MW: "Hopefully it won't be anything serious it's usually not"]... That's right... I just, I hope this lump, goes away soon because it looks really ugly [laughs]... it's downhill from here! [MW: "No it's not like that I am sure it will be fine, once you see someone"] Oh, I don't know. (Mary, SEM 6)

Throughout her program Mary generally didn't take breaks during her practice unless she wanted a drink etc. She also admitted that she continued to play regardless of any pain. Initially she would do a warm-up of two hours of scales and technical work but over time ceased doing this. She did not do a physical warm-up and did very little physical exercise. "I don't usually take breaks when I practise, unless I really need to go

to the bathroom... [MW: "... So when you get the pain... you won't take a break?"] No" (Mary, SEM 5).

Mary highlighted teaching as having a significant impact on her perceived pain. This was mostly because she did not use her own cello for fear of it getting damaged and relied instead on spare small instruments. Although she had considered the possibility of having two cellos she claimed that didn't want to do this. During her final interview she said that the pain whilst teaching was so bad that after one to two students she couldn't concentrate and got annoyed with the rest. "If I have to teach all day without breaks... because, the cellos are quite smaller than mine... and I have to sort of lean forward to show, then yes I get pains in my neck as well" (Mary, SEM 5).

I find it really hurts to teach because... the kids smaller than you are and you have to... bend over... to fix the fingering all the time... I find that after, the first two students, it just hurts so much that, I lose my concentration and get really frustrated with the other ones because it just hurts. (Mary, SEM 6)

Mary was inconsistent throughout the years as to how frequently her pain occurred and at times it seemed as though she was trying to play down her experiences. For example, at the beginning of her third year, she said it was not present every time she played. She then used the example of playing for five minutes and then taking 30 minutes break, and stated that in this (unrealistic) situation it wouldn't really hurt.

Not every time depends on... how much I play, and, how concentrated my practice is I mean if it's just, practise five minutes... have a break half an hour then it doesn't really hurt but... if I practise, for three hours and have a lesson for an hour and then have chamber group for an hour and then my neck will just be, dying. But if I, did, all that time in just my own practice, it wouldn't hurt as

much because I wouldn't be, as concentrated and I would have had, breaks and stuff... I could probably play for five hours... I mean, just play through... without breaks then I could do it for five hours, but, or three hours possibly I don't know, it depends really. (Mary, SEM 5)

She consistently stated throughout her program the perception that it was normal for string players to experience discomfort/pain and that it was nothing to worry about. Mary said that she believed playing an instrument was like a sport, and you had to train. As time went on she also said that she had become used to and came to expect the discomfort/pain. Despite the severity, she reportedly only discussed her experiences with the cello teacher once in her final semester. "You are a string player, so it's normal to get pains... it's like a sport... you are training" (Mary, SEM 4).

I could, but I don't think it's necessary [to discuss it with Teacher D], I'm sure he's got... pains too. (Mary, SEM 4)

It doesn't really worry me much... because I, I assume that's a normal thing for a musician, it hurts or it, nags on me but it doesn't really worry me because... can't escape it, I guess. (Mary, SEM 5)

I think I mentioned it to [Teacher D] last semester... and he just told me not to, lift my shoulders up when I play... not my fingers haven't mentioned that to [Teacher D]. [MW: "... What about your neck? Have you, talked to him about that?"] Yeah, I showed him my lump and he said it's probably because I bow down too much so... I don't sit straight when I play... and I don't sit on the edge of my chair, I tend to sit back a little bit, so that affects it as well. (Mary, SEM 6)

In the end Mary decided not to complete a fourth year in the Bachelor of Music program. At the time of her final interview she was planning to undertake a Graduate

Diploma in Education. On reflection she said that she had found her third year very difficult, and that her pain had played a part in her decision not to continue. In particular, she found the most recent Orchestra program extremely difficult. She was leading the cello section and found it stressful.

It's been painful... I'm so glad I don't have to do it again... the rehearsals and, having to concentrate a lot... [MW: "Do you find... it's a bit hard with [Teacher C] as a conductor? Because I know some people say 'Oh if I try and relax, he immediately has a go at me,' or?"] Yeah he does actually, yes, but, I think with [Teacher C] as well, you have to stay alert all the time. You can't lose your concentration so you... focus on your music all the time you can't really sit back or anything... I think he's a very scary person... I led the, section this semester and it's been the most awful experience that I've ever had, with [Teacher C] so I'm like, "Oh I'm never doing this again". (Mary, SEM 6)

On reflection, Mary said that she couldn't remember experiencing any playing-related discomfort/pain before she came to the institution. She seemed quite surprised when reminded that she had. She said it had been helpful to be a participant in the research project because it had helped her to become aware of her experiences.

I don't remember having pain before I started, at Uni here, at all... and my fingers were actually straight. [MW: "Would it surprise you to know you did say you had quite a lot of pain in the first year, when you filled out my survey?"] Yeah... [MW: "You said you had neck pain."...] Neck pain... but not my shoulders or my fingers though... but... neck pain has gotten a lot worse... because... you can actually see the lump, even if I'm standing straight... [MW: "... Has it, made you more aware of it do you think having to speak to me about

it?"] Yeah, definitely... I... look over like, "Oh yeah maybe I am getting, more and more sick [laughs] physically". (Mary, SEM 6)

In her opinion, there were not that many students at the institution who were experiencing playing-related discomfort/pain. When she was a young student she was always told to take a break after every half-hour of practice however she never did. Looking back she became concerned about her discomfort/pain when it became constant. However, on reflection Mary said that she would not have done anything differently. "I always got told that you should take a break after every hour [MW: "... And did you do that before you came to the institution?"] Not really" (Mary, SEM 6).

I know a couple [of other students] have problems with their, hands... but, I don't know anyone with a neck problem or anything like that. (Mary, SEM 6)

A couple of months ago when I, really started feeling the lump on my neck and started feeling the, pain in my shoulder [is when I started to get concerned].
(Mary, SEM 6)

No, I don't think so. I'd, probably do the same thing. (Mary, SEM 6)

In conclusion, Mary's experiences were particularly severe. She had a definite opinion that pain was an unavoidable part of playing a stringed instrument. As a result, she seemingly ignored any warning signs and continued to practise long hours even when she was significantly disabled.

Student 12: Sam

Sam, a cellist, was an international student. At times he struggled to converse with me in English during our research interviews. However his English improved greatly over the period of three years and he contributed much valuable information to the research.

Sam's experiences of playing-related discomfort/pain throughout his program seemed quite significant. He perceived from early on that he suffered from very severe anxiety in performance, class, and group situations and consistently linked this to a high amount of playing-related discomfort/pain. Sam acknowledged experiencing significant anxiety in everyday life as well. Examples included any public situation that required speaking (including the research interviews), writing assignments, and teaching.

Sam also consistently claimed that he was unable to concentrate on more than one activity at a time. As a result, he said there could be periods of two to three weeks during which he did not practise whilst he focused on assignments. His anxiety and inability to focus on multiple tasks may also have been reasons why he frequently did not show up to meetings related to this research that we had scheduled.

During the second year of his program Sam started to notice a lot of tension and pain in his right shoulder and arm (bowing). From this point onwards, his main strategy in reducing this pain was to play softly when practising. This was very effective in reducing the amount of discomfort/pain he experienced in the practice room however he continued to experience severe pain in other situations.

Like most students in this study, Sam also found that his playing-related discomfort/pain could be greatly affected by his warm-up, practice breaks, amount of practice, and the chair he was sitting on. As he progressed he experimented with many

different types of warm-up and constantly changed his opinion as to what was most effective. He did not exercise regularly or work long hours at any stage of his program.

Ultimately Sam decided to exit the Bachelor of Music program after three years with the aim of completing a Graduate Diploma of Education and becoming a cello teacher. He cited a poor relationship with his Major Study teacher (Teacher D) and lack of employment opportunities as being the main reasons he wished to pursue teaching. It's interesting to note that, on reflection, he thought that Teacher D was only good at teaching "talented" students and that such students had no problems with playing-related pain.

Table B12

Reported Pain Experience for Student 12: Sam

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	2	Two years ago	Left fingers	2	1-2 hours	N/A
2	1	1	Last month whilst practising	Left fingers	2	At least 3 hours	N/A
3	1	3	Last week during practice and Orchestra	Left fingers	3	2-3 hours	7 hours
4	2-3	2	Last month when practising for Piatti prize	Right shoulder and arm	3	2-3 hours	6 hours
5	3	2	Previous month when preparing audition tape	Left hand and arm, both shoulders, and neck	4	4-5 hours	8-9 hours
6	2-3	3	Two weeks prior during Sonata prize	Left forearm and hand	3	2-4 hours	7 hours

Prior to his studies at the institution, Sam said that he had had one experience of playing-related discomfort/pain that affected his left fingers (two years prior). This experience was reportedly so severe that he was unable to play his cello for four weeks.

At the end of the first year of his program, Sam said that he had been experiencing playing-related discomfort/pain in his left fingers when playing the cello for long periods of time. In his opinion his pain was decreasing. However when it did occur it was reportedly still severe enough to stop him from playing. “It’s getting better... but if I practise... for a long time, I do [experience pain]” (Sam, SEM 2).

During the second year of his program Sam consistently said that his playing-related discomfort/pain was decreasing even though he was experiencing pain in more parts of the body. In order to decrease his right arm and shoulder pain, Sam began to play softly when practising and found this to be a very effective strategy for reducing pain in the practice room. However, he continued to experience severe pain when playing the correct dynamics in public. “In practice room, I always get tense, but try to... play... *mezzo forte* whole time not playing *double forte*... while I practise and... it's much better now and I can practise a lot more” (Sam, SEM 4).

Early in his third year Sam said that he thought his nervousness was getting worse as he was putting more pressure and expectation on himself. Practising softly continued to be his major preventive strategy and generally, his discomfort/pain only occurred when playing in public situations. Again, more body parts were now affected including his right forearm and arm, left fingers and arm, both shoulders, and his neck.

[MW: “Would you say you still get as nervous as you used to...?”] I think it's getting worse... because in the first year I was like... “Just make mistakes that's all right I just enjoy”, second year third year and now I'm third year I shouldn't be making mistakes... that's what I think and then... I put... pressure on me... expect, a lot... in my mind, as well, not, just in my body. (Sam, SEM 5)

Much... less [nervous]... still a bit... in a concert... I get sometimes nervous, but in a practice room this is always, comfortable and I can practise as long as I like. (Sam, SEM 5)

For the remainder of his program Sam continued to experience discomfort/pain in his hands and shoulders during performance. During his final interview he revealed that he would get so nervous and shaky that he had to tense his muscles in order to stop shaking. Unfortunately, he would get so much tension in his left forearm that it was like a rock and he couldn't even move his fingers. Sam said that he had been thinking lately that this was not normal and that it might be time to see someone about it.

Gets... so hard... [raps fingers on the table], like that... and then so tense, and I can't sometimes play anything, because... my muscle is like so tensed up. [MW: "Was it like that... at the beginning when you started here?"] Possibly, probably I didn't notice but... recently I was like "Oh this isn't... usual..." so I will have to see [a] physio or something... [it's] not really... that bad but... sometimes if I don't warm-up I don't stretch or anything... I can't, really play [MW: "And does it go away... as soon as you stop playing...?"] I have to... stretch and then do everything that I can... and then stop playing... for a little while and it will get better. (Sam, SEM 6)

Sam consistently claimed that his discomfort/pain was decreasing as he progressed through his Bachelor of Music program. However with each questionnaire completed his pain was appearing in more parts of the body. His pain also increased from grade one to grade three, and from discomforting to distressing at worst. The focus of his playing-related discomfort/pain shifted frequently (including from the left side of

the body to the right and then back again). “Last year... I got shoulder sore... still... little finger... sometimes if I practise... too much I'll still, a bit hurt” (Sam, SEM 3).

It does get... tired, and... sore a bit, especially for the... right arms... when you use bow, I get really tense and then just stiff there and then just get tired. (Sam, SEM 4)

I think I got, so much better... more relaxed and then stronger. But, still, in a performance... my hands will get tired my shoulder... sometimes. (Sam, SEM 6)

Generally, Sam seemed to struggle a lot with anxiety. He said that he found it difficult to concentrate on more than one activity at a time, so if he had assignments due he wouldn't practise at all. This could apparently go on for several weeks (and was a possible reason why his most recent experiences in his third year were several weeks prior). “When we've got exams I always get... stressed out and... I can't practise when I am stressed out... because I can't do two things at the same time” (Sam, SEM 3).

Sam perceived that, the more nervous he became, the worse his pain would get. As a result he felt more pain when playing in public situations/Orchestra/performances. Sam's experiences of playing-related discomfort/pain worried him a lot and he claimed that the feeling of pain invoked fear in him. His nervousness actually increased in the third year. However, at the end of his program Sam said that he was feeling less worried. This was because he believed that he had learnt the difference between good and bad pain and that he now had the ability to resolve his pain. “When I get pain I feel fear... because I can't play” (Sam, SEM 3).

When I get... tense then I get nervous... in the cello class in a concert, in the workshop... not in a practice room. (Sam, SEM 4)

I find that, it's all from the nervousness... in the concerts... when you get, pressure, then you forget everything if you don't think about relaxing... I'm still finding strategies... how I can relax and play... in the practice room, I can see myself... when I do that... and in the concert I can't that's why I can't... improve. (Sam, SEM 5)

It depends... in the situation, I had a concert on Sunday, I sort of enjoyed it, I was a bit nervous... but competitions, I can't stand it, I just, get so nervous... I get really shaky, and then try to stop it, I get tense... and back gets stiff... so that would make, the tension as well. (Sam, SEM 6)

I do really worry about my... pain... or tension... but, I'm pretty sure I can... solve this problem so I, don't how long... it's going to take but I will find out. (Sam, SEM 6)

Sam also perceived that his pain could be affected by how loudly he was playing his cello. In the latter part of his program he stopped practising *double forte* in the practice room and found that this significantly decreased the amount of pain in his right arm and shoulder during practice sessions. At various times he also claimed that his discomfort/pain could be affected by the amount of playing, number of breaks, the chair he was sitting on, and physical/technical warm-up. “Not every time, only I practise too much... without the break... three, four hours” (Sam, SEM 3).

High chair is always better, for, playing, but... sometimes I prefer, lower chair, because my cello fits better... when I have to sit longer maybe I would prefer lower chair [MW: “So what do you think of the ones in the theatre? That you can wind up?”]... Sometimes it's broken... but I think that's a really good idea, to have that kind of chair so you can adjust. (Sam, SEM 6)

Sam altered the method and the amount of practice he was doing several times throughout his program. During the early stages he was practising up to four hours, sometimes without breaks. However, by the final semester of his program he was practising no more than an hour a time, and stating that breaks were the most important thing. On reflection, Sam said that he did the most practice in the second year as he felt most pressured at that time. “If I, have... half an hour, and then I have a break, then I will lose the concentration so I try not to do that, I try, to do longer, so two hours three hours... in one go” (Sam, SEM 5).

If I take a break, I can go up to four to five, six hours but if I don't... then one hour is maximum... non-stop. (Sam, SEM 6)

I used to be really competitive but now, I know what I want... so I can't, really think about others... but in the second year I was so, competitive... heaps more I practised in the second year. (Sam, SEM 6)

Sam also tried many different ways of warming-up during practice. During his second year, he started doing technical exercises but perceived that he shouldn't start with slow things because it increased tension. He then started jumping around and stretching prior to practise in order to get his blood flowing. However, by the end of his program Sam believed that he was overstretching his muscles whilst they were cold. As a result he modified his routine again to slow playing for around 10 minutes before stretching to relieve tension. “I'll do bowing exercises and stuff [MW: “Do you start... with slow, stuff...?]. Not too slow, because, I have to try to... relax the muscle” (Sam, SEM 3).

I take... one to two hours to warm-up... my cello it's... so hard to get a... big sound, so I have to... wake him up... so what I have to do is, do bowing... and

scales slowly, to faster... and then trying to get intonation, and then do arpeggios, and then double stops. (Sam, SEM 4)

What I do is before practice... especially in winter, all my body... the blood is not ready... so like, jumper on and running around... the practice room and I stretch and stuff... and then, for the cello... the... bowing and then stuff and it's still tense, and if it's still cold, then I will just, jump around, and then I run around or I, stretch. (Sam, SEM 5)

I used to stretch but, sometimes I find that, wouldn't help. You have to slowly... build up your muscle... now I'll just play open strings slowly and just relax body... and then just do finger exercise and then... I can feel if it is getting tense. Then I stop, and just, start stretching a little bit... so I will do that about 10 to 15 minutes and it would help so much. [MW: "And when did you like start doing that?"] I think that was... a couple of weeks ago... because... my student had the same problem, he was... so tense... and then... we were like, talking about how we can solve this problem and we try and solve with things like jump around the room... and now I discovered it just... gradually get better you can't just, start playing something hard... it doesn't work or you can't stretch... everything. (Sam, SEM 6)

Sam perceived that awareness played a key role in reducing his discomfort/pain (and that it was also possibly a reason for noticing increased discomfort/pain in certain parts of the body). From the second year onwards he became aware of when and under what circumstances he was experiencing tension. By the third year he was sure that all his pain originated in his shoulders. However, he was inconsistent in many areas including the perceived importance of practice breaks, whether or not he knew what the

cause of his pain was, and what parts of the body were affected. "I think it all comes from... shoulders, and then, body tense" (Sam, SEM 5). "I can't see... why I get sore... what I have to do, so still, I'm trying to work out" (Sam, SEM 4). "I know... what's the problem and then... what I have to do" (Sam, SEM 4).

Sam expressed an interest in teaching and took on two cello students during the third and final year of his program. He claimed to find teaching stressful because he perceived it to be a huge responsibility and said that he had not enjoyed his relationship with his cello teacher at the institution (Teacher D). Sam believed many of the other students learning from this teacher felt that same way about their own relationships with this teacher. Despite this, by the end of his program Sam had decided to pursue teaching as he felt that there were limited options for him career wise unless he obtained a Diploma of Education. "I get nervous with... teaching sometimes... because that's pressure... because you can't teach anything bad to them... so you have to be... always concentrating, and then sometimes assignments... and it's all in my mind... and... speech" (Sam, SEM 5).

I'm going to complete the Bachelor of Music here... and then I'm going to do, Graduate Diploma... in Education which is one year... so that would help me to get a job... I, still want to play the cello... so I will do, a bit of quartet playing as well, and... a bit of cello teaching... might go to other cities... now I have only one option do, cello... but if I did Education... I will get more opportunity. (Sam, SEM 6)

At the conclusion of his program Sam said that he felt enormous pressure from his cello teacher to practise etc. Although he tried on several occasions to discuss his problems of tension with Teacher D, he felt that he did not receive any useful advice.

Sam was under the impression that this particular teacher was only good at teaching the talented students. Interestingly, Sam also had the perception that talented students had no problems with playing-related pain. “[MW: “Have you discussed it with your teacher or anything like that?”] Yeah, I did, and then, he said, because I’m... always, tense... [MW: “What did he say to do...?”] Oh just relax... and don’t, be nervous” (Sam, SEM 2).

With my teacher... he always says... I have to relax, I am too tense... that’s all he says. (Sam, SEM 4)

Yes [I talked to my teacher about my pain], but he doesn’t help me he said I have to find out by myself. (Sam, SEM 5)

I am still not sure what’s... causing my problems.... [MW: “And [Teacher D] hasn’t been able to help with that?”] No... he’s good at teaching... talented students... they don’t have any problems... so... what he can teach is just music... nothing much... but... I don’t think he’s good at teaching, students who has got, problems... because he can’t really show them, his English isn’t... he can’t really explain it. (Sam, SEM 6)

[MW: “So... you really felt... pressured to practise to get ahead, is that right?”]... In the second year... not... this year... [MW: “Do you feel that was coming... from [Teacher D] a bit too?”] Yeah... but now I’m like, “Oh, I could be a better teacher, than, a performer...” that’s what I, think I want to be. (Sam, SEM 6)

On reflection, Sam said that he had found participating in the research project beneficial because it had made him think about the nature and causes of his playing-related discomfort/pain. In his opinion lots of other people experienced pain whilst playing but the topic was not really discussed. In his opinion it would have been a good

idea to have a class in the first year to help students understand the best postures for playing their instruments etc.

[MW: “Do you think... being in this project has, made you more aware...?”]

Yeah... it's a good thing... because I realised how much I have to work on that... because... you don't say... “Why do I get pain?” I am like... “Just a normal... and natural thing...” and then now I'm like... “I have to solve this problem” but no one can help me at the moment... as in, to show me how to, or something... I think you have to find it by yourself... [MW: “...And do you think that other people have pain, whilst they play?”] Yeah, pretty sure they do, but... some people... don't realise until they get the pain... [MW: “But, it's not really talked about or?”]... Not really I heard someone was saying about “Oh I've got a pain blah blah blah”... But you don't really go “Oh why, what happened?” You know we don't really talk about that. (Sam, SEM 6)

[MW: “Do you think it would be beneficial if there was some kind of, class you had to take in first year which, taught you about the body and how it all works and?”] That was like Movement... but I didn't really, think it was necessary to take... it doesn't help anything... they should instead of doing that... because I have seen a lot of people playing in different ways... but maybe it's better for them, so maybe... have a discussion about that or something. (Sam, SEM 6)

In conclusion, Sam's experiences of playing-related discomfort/pain seemed to be relatively severe compared to some of the other students in this study. He was prone to experiencing severe anxiety in music performance and perceived that this affected the amount of tension and subsequent pain he felt whilst playing.

Student 13: Erin

Erin was a cellist whose experiences of playing-related discomfort/pain seemed to be less severe than those reported by many other students in this study. She presented in her interviews as friendly and open, and was easy to meet up with as she regularly attended workshop and kept scheduled appointments. However, she spoke very fast using fillers (such as *like*, *um*, and *yeah*) and at times her spoken words were inaudible.

One of the most interesting things about Erin's case was an apparent link between the number of Orchestra and Chamber Music rehearsals she was participating in and her playing-related pain. Erin did not participate in any external orchestras and, until the final semesters of her program, she was in no more than one Orchestra program per semester and no Chamber Music ensembles at the institution. Perhaps unsurprisingly, as soon as she was participating in more rehearsals Erin reported that she was noticing more pain in her left shoulder. She also noticed an increase in pain in her back and actually consulted a chiropractor about this. Erin subsequently asked to be let out of Chamber Orchestra in her final year but used the excuse that she was too busy and stressed due to completing her Honours dissertation. Her pain reportedly resolved once the number of Orchestra rehearsals was reduced.

As with many other students in this study, Erin perceived that she could experience pain when carrying her cello and/or a heavy backpack. She also commented that her pain could be aggravated by sitting during the long commute on the train from where she lived. In the final year of her program, she began leaving a second instrument at the institution so she didn't have to carry her cello.

On reflection, Erin claimed that her playing-related discomfort/pain had remained the same throughout her whole program. She didn't highlight that the fourth

year had been particularly difficult despite her experiences in Orchestra and the need to consult the chiropractor. Rather, she highlighted participation in the Opera in her third year as being her most memorable experience of playing-related pain. At the conclusion of the program she was planning to take time off, work, and then possibly do a degree in another field. She was unsure whether she wanted music to be her career and perceived there were limited options for her in terms of future employment.

Table B13

Reported Pain Experience for Student 13: Erin

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	2	2 months ago	Left shoulder	2	2-3 hours	N/A
2	2	2	3 months ago during an Orchestra rehearsal	Left shoulder, lower back	3	2-3 hours	N/A
3	1-2	2	Last week whilst practising	Left shoulder	4	2-3 hours	6 hours
4	2	2	Last month whilst practising	Left shoulder	5	At least 3 hours	5 hours
5	2	2	2 weeks ago whilst practising	Left shoulder	4	At least 3 hours	6 hours
6	2	2	2 weeks ago during Opera	Left shoulder	5	3 hours	6 hours
7	2	2	Last week during Orchestra	Left shoulder	6	2 hours	6 hours (but more often)
8	2	2	Last week	Left shoulder	5	2 hours	4 hours

Prior to her studies at the institution Erin had experienced playing-related discomfort/pain in her left fingers, left shoulder, both sides of her neck, and her back. Her shoulder and neck pain bothered her the most.

As she progressed through the first two years of her program, Erin said that her playing-related discomfort/pain was remaining much the same. She noted that it was most likely to occur during Orchestra or when she was practising for a long period of time. She had noticed that her discomfort/pain could also be influenced by the difficulty of the repertoire. “Not really... just after Orchestra rehearsals... or when I just practise longer than I usually do... like, after about three hours” (Erin, SEM 3).

With regards to her most recent experience of pain: “I think I got a new piece, and... just kept on practising that... over and over again... probably wasn't so good... and it was... technically difficult” (Erin, SEM 4).

At the beginning of her third year, Erin noticed that her discomfort/pain could now be influenced by carrying her cello and/or a heavy bag and that, when present, her playing-related discomfort/pain was discomforting. When questioned on this she said it was possible that she just didn't notice it until it reached that level. “I don't really get anything anymore... just the left shoulder... once every, five or six weeks maybe” (Erin, SEM 5).

With regards to her most recent experience of pain: “I think I... carried my cello in, from home that day... I also had a bag, and lots of stuff and I... carried it too far, [laughs]... and then done practice on top of that... I always do carry my cello on this shoulder, so it could be from that” (Erin, SEM 5).

I think it's always discomforting... [MW: “... So you don't notice it when it's mild, perhaps?"] Probably, yeah [laughs]. [MW: “... Do you think it's possible

that you might have a little bit and you don't notice it? At other times or?"... I don't know. (Erin, SEM 5)

In the following semester Erin said that she had noticed a decrease in the severity of her playing-related discomfort/pain. She attributed this decrease to carrying her cello on both shoulders and having three weeks without playing the cello over the semester break. However Erin said that she did experience a lot of pain during the rehearsals for the Opera (although she claimed that this pain bothered her less as the week progressed). In her opinion this was because of the long hours of sitting up straight.

For the three weeks in between semesters... I went overseas so I didn't play my cello at all... and I found that... I didn't get that pain at all for like heaps after that I think it's because I didn't play at all... that really helped. (Erin, SEM 6)

I did Opera this year... so... I was playing for... heaps more a day then I usually would, and I think... maybe just sitting down and keeping... a straight posture and a straight back... I dunno maybe I've got... a weak muscle there or something and it just like stretches it and it's, just sore from being... in that position. (Erin, SEM 6)

At the beginning of her fourth year, Erin noticed an increase in the amount of playing-related discomfort/pain she was experiencing in her left shoulder and back. The pain increased around the third week of semester when she was participating in two Orchestra rehearsals a week plus Chamber Music on top of her own practice. Erin said that she consulted a chiropractor over the Easter holiday and he advised her that she had a slipped disc in her back. He recommended that she carry her cello on both shoulders, maintain good posture, and do some specific exercises.

At the beginning of semester I was in... two Orchestras... I did heaps and heaps of playing and it came back, but then I... asked to get out of one... I am only doing one at the moment and... it's gone again... it just comes back... a little bit [MW: "... So when did you first notice it... being a bit worse than usual?"] Probably when I was doing... the, two rehearsals in a week plus my practice... and then, I'm doing a lot of... Chamber Music this semester... I've got a quartet and a quintet. (Erin, SEM 7)

I went to the chiropractor... over the holidays... and he did... stuff, with my back... he basically just... said... I put it out and a disc out and... he was telling me to carry it [my cello]... on two shoulders... instead of just on the one shoulder which I have been doing... and it seems to have balanced it out a lot better. (Erin, SEM 7)

I did see the chiropractor, and he was saying that... it could be from the way that I hold my neck when I'm playing... leaning forward... because he said that my neck [is]... more straight... than it normally should be so... he was telling me all these exercises I should do... I'm supposed to go back but I haven't just because I'm really busy... but I will go back... [MW: "So what kind of exercises did he give you to do?"]... Pretty much just putting... a rolled up towel, under my neck and lying on the ground, and then just... good posture and all that sort of stuff. (Erin, SEM 8)

At this stage Erin said that she was trying to minimise her discomfort/pain by keeping a second instrument at the institution (she perceived that carrying her instrument aggravated her pain). Erin asked to be out of one Orchestra program but

reportedly did not use pain as the reason why. Instead, she said that she was struggling to cope with writing a dissertation and the long daily train commute.

[MW: “Was it an easy process for you to get excused from the other Orchestra?... I did ask [Teacher C], and originally he said “No...” but then, I walked past him that next week and he was... “Oh, I decided to, take you out, because I think there are too many cellists anyway...” I don't know why he changed his mind. [MW: “... Did you tell him why you wanted to get out of it...? Did you just say you were having pain in your shoulder or?”]... I also just find it really hard to find time to practise for... two Orchestras plus everything else and then... trying to write my dissertation... and, travel and stuff, cause I have to travel... two hours, both... in and back home. (Erin, SEM 7)

By the time of her final interview Erin claimed that she was no longer experiencing any back pain. Now she only experienced discomfort/pain in her left shoulder approximately once every couple of weeks. She linked a decrease in her pain to no longer participating in Orchestra, fewer Chamber Music rehearsals, and doing the exercises the chiropractor recommended to improve her posture.

My back is okay... my left shoulder still hurts a little bit sometimes but, not, really badly, at the moment, so... this semester I haven't had Orchestra, that much... that could be the reason... I'm not quite sure, if there is any particular, one reason. (Erin, SEM 8)

For the duration of her program, the focus of Erin's pain remained in her left shoulder. However she constantly referred to her back as being twisted out so at times it was not clear whether she was actually talking about her left shoulder or her back. Generally speaking, her discomfort/pain went away as soon as she stopped playing.

“When I used to carry the cello on my shoulder I also would get sore... that kind of twisted my back out... I had to stop doing that” (Erin, SEM 6).

Like most of the students in this study, Erin was consistent in perceiving that her discomfort/pain was worse when she had to participate in Orchestra rehearsals and/or play for long periods of time. Generally speaking, Erin was in no more than one Orchestra program per semester, no Chamber Music ensembles, and was not in any additional orchestras outside of the institution. The exception to this was during the fourth year of her program, and it was at this stage that she had to consult a chiropractor.

I don't seem to get it in Chamber Music, I don't know why... I think it might be the chairs in Orchestra, or maybe just... sitting still... cause... in Chamber Music... I might just get up to, get a drink of water or... move my seat, whereas in Orchestra I don't think I tend to do that. (Erin, SEM 7)

Aside from the chiropractor, Erin also discussed her playing-related discomfort/pain with her family and with her teacher (once). She was under the impression that her teacher (Teacher D) didn't have any experience with (or sympathy for) those experiencing playing-related pain.

[Teacher D] is a bit like... I don't know I don't think he's ever experienced any pain from playing cello so he is just like “Alright everyone gets it so it's okay”, sort of thing... he is not really focused on... that sort of aspect. (Erin, SEM 7)

My parents and... I talked to [Teacher D] but... I think he just thinks everything is from being tense. (Erin, SEM 8)

Throughout her program Erin's practice remained fairly consistent. She was one of the few students in the study who decreased her personal practice as her Orchestra

rehearsals increased. Erin reportedly took regular breaks throughout her practice although not necessarily if she was experiencing discomfort/pain. Towards the end of the program, when she was experiencing more discomfort/pain, the practice breaks were less frequent. “If I really have to practise, then I will just keep on going, but otherwise I’ll just stop” (Erin, SEM 3).

Erin did a consistent warm-up of technical work and scales for the duration of her program. On a couple of occasions she also mentioned doing some stretching, mostly during breaks. During her last interview she said that she would stretch maybe 50% of the time. “I’ve just been doing... overall... stretching and stuff, but not any in particular... probably not every time, when I think about it which is, oh, maybe... every couple of times” (Erin, SEM 8).

Erin’s strategies for preventing playing-related discomfort/pain included taking breaks, keeping her posture “good”, consulting a chiropractor, and “putting up with it”. At various stages she talked about investigating some exercises that would strengthen the muscles along the back of her shoulders. However, like most students in this study who said things like this, she did not follow through. “I try and keep my posture, good when I practise... use good technique... [MW: “Do you ever stretch or anything?”] Yes. [MW: “Before you play?”] No [laughs]... in my breaks usually... as... a preventative thing” (Erin, SEM 4).

Just trying to keep good posture all the time... I was thinking of looking at some exercises that would... strengthen, the muscles along there [indicates along back of shoulders] or... something like that. (Erin, SEM 6)

Pretty much just carrying my cello with... the two straps instead of the one... and, taking breaks... if it starts to hurt, and then going to the chiropractor if it... stays bad. (Erin, SEM 7)

Erin claimed that her experiences of playing-related discomfort/pain did not worry her a great deal as she did not think they were serious. However she did admit to being a little more concerned when she went to the chiropractor. "Sort of [concerned], but not really. [MW: "Okay."] Yeah. ["So you don't think it's really going to have any long-term effect or anything?"] Not really, because it's not that often" (Erin, SEM 3).

It's not that I'm not worried about it but... if I did find something that could help it I probably would do it... I should do something about it... [MW: "You said you were thinking about getting some"]... Exercises [MW: "To strengthen the muscles?"] Yeah [MW: "Have you got any ideas how you might go about finding that information, or?"]... Maybe just look in... physiotherapy books or something or... ask someone... go to a physiotherapist. (Erin, SEM 6)

Maybe a little bit more [concerned] but, I think I, know what to do if it gets really bad... I'll definitely go see a physio, and go back to the chiropractor... check-up with them... I'm pretty sure it can be fixed I just haven't had the time, or money. (Erin, SEM 8)

Erin was inconsistent as to whether or not she was concerned about losing her practice room when taking a break during practice. "[MW: "Do you find... that the practice rooms are an issue... if you get one you feel like you have to, go hard because you don't want to lose it?"]... Kind of, yeah" (Erin, SEM 2). "Usually people don't take the practice rooms... they are pretty good about it" (Erin, SEM 4).

Erin did not exercise consistently over the four-year period. However, she did claim to notice that she felt better when undertaking regular exercise. She was only employed for one semester of her program. “I have been going to the gym a lot more and I found that helps... with... the strength, and just... in general” (Erin, SEM 7).

On reflection, Erin thought her discomfort/pain had remained at about the same level throughout her program. She claimed that the only experience that stood out to her occurred when she was participating in the Opera in her third year. Erin said that she really didn't do anything when she experienced playing-related discomfort/pain. This was mostly because her discomfort/pain didn't get any worse as she continued to play.

I don't actually do very much. [MW: “Just keep going?”] Yeah... or... take breaks more often but, not anything else. [MW: “Does it get any worse as you continue to play or is it just the same?”]... No it just stays the same. (Erin, SEM 8)

I can't remember, what I had in first year, but I think it's been pretty much the same... throughout... I remember being really uncomfortable, during Opera because we played so much but, nothing in particular besides that. (Erin, SEM 8)

At the conclusion of her program, Erin said that she was probably not going to continue with music as a career. She was planning to have half a year off studying and work, before either teaching cello or completing a degree in another field. Erin said that she didn't really know what she wanted to do when she came to the institution it was just that she liked music. In her opinion there should have been more emphasis on Chamber Music and Pedagogy in the program as these provided more realistic options than solo playing in terms of future employment.

I'm not quite sure [what I will do next], I don't think I'll... keep on going with... studying music... I'm going to take a break for... half a year and then... work and whatever and I dunno, study after that. [MW: "So, do you, want to continue with music as your career, or do another degree or?"] I will probably do another degree... or maybe... do some teaching and stuff... [MW: "So, has that changed a lot... what did you want to do when you came into The Con?"]... I didn't really know what I wanted to do I just did The Con because I liked to play music... and... I didn't really have any other... ideas of what I wanted to do at the time. (Erin, SEM 8)

I really think they should have had... more interest in the Chamber Music... area because... not everyone can be a soloist... but Chamber Music's like an option that could have been there... and that's really disorganised... or, even just have... some sort of ideas as to... places you could teach... Pedagogy is not really, a big, thing either which is not really that good since a lot of people do end up teaching, music... I really enjoyed Pedagogy when I did it... I think the Orchestra part of it was good I just don't want to be an orchestral player. (Erin, SEM 8)

In conclusion, Erin experiences of playing-related discomfort/pain throughout her program were not particularly severe. However they showed a clear link between the number of Orchestra and Chamber Music rehearsals she participated in, and the severity of her playing-related pain.

Student 14: Julie

Julie was an international student who played the cello. She had many things in common with the other students in this study including increased discomfort/pain during Orchestra rehearsals (particularly during the first year) and the transfer of discomfort/pain from other activities to playing.

At the onset of her program Julie was very helpful and willing to talk in detail about her experiences of playing-related discomfort/pain with limited prompting. However, during her second year she began asking many questions about the other cellists and their experiences of playing-related discomfort/pain. I also noticed that she was taking great care to emphasise that her discomfort/pain was related to her sleeping position rather than playing the cello.

During her fourth semester Julie's discomfort/pain was present at time of questionnaire completion. Unfortunately this was the last questionnaire that she completed. In her third year Julie broke several scheduled meetings with me. On one occasion she even gave me her phone number to ring and then answered and said it was not her! Julie claimed to practise very long hours and other students in this research project noted that the atmosphere was very competitive among the cellists. I assumed that this had some impact on her evasive behaviour and eventual unwillingness to participate in the research project.

Table B14

Reported Pain Experience for Student 14: Julie

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	3	1 month ago	Right hand and right elbow	1	2-3 hours	N/A
2	2	2	2 weeks ago during an Orchestra rehearsal	Middle/lower back, upper right arm, both knees	6	4 hours	N/A
3	0	0	N/A	N/A	N/A	At least 4 hours	10 hours
4	1	1	Present at time, 1	Back of neck	1	At least 4 hours	8 hours plus rehearsal
5	Withdrew from research project	-	-	-	-	-	-

Prior to her studies at the institution, Julie had experienced playing-related discomfort/pain in her left fingers, right hand, right wrist, and right elbow. Her right hand pain bothered her the most but was not ongoing.

As she progressed through the first year of her program Julie began to experience more playing-related discomfort/pain, particularly in her back. Although this pain went away when she used heat packs, she said that it could affect her sleeping position.

Normally I don't feel, sore... I only feel afterwards, when I go home... and when I sleep... straightened out... you can't really sleep like that, you have to lie in the side way... normally I put a heat pack on it and next day it will be good. (Julie, SEM 2)

At this time Julie highlighted Orchestra and performing in general as being of particular concern. She noted that she could experience discomfort/pain in her back, neck, arms, and legs in these situations. Possible perceived reasons included low chairs, no breaks, nerves, and repertoire.

Mahler was so bad... my whole body was so sore... because we are holding the note for so long... and we tense up... and we... don't have any break... only five minutes... I have... a sore back... neck... arm... because they have a low chair for us... they have... the tall one for the front seat, and then where I sit at the back, they have the low chair... and we have to concentrate so hard because... the back is always hard to follow the orchestra, and [Teacher C] always like to pick on us. (Julie, SEM 2)

When I, do my Bach prize... beginning of this year, my arm getting really really sore. I think it's from my, like, physical, I was really nervous... so that tense my body up, I can't sleep well, so my muscle never relaxed... but now as I play more... I feel more comfortable I only get nervous like the night before... not like a week before... so... I never get... sore from my arm. (Julie, SEM 2)

As Julie moved into the second year Orchestra reportedly became less of a problem for her. She believed this was mostly due to her increased confidence and the less intense Orchestra rehearsal schedule. In fact, early in the second year she said she was not experiencing any discomfort/pain at all whilst playing. In addition to increased

confidence, she attributed the decrease in discomfort/pain to improved posture, adjusting the height of her spike, taking longer breaks during practice, and decreased stress.

In Orchestra... because I can actually play more... I more enjoy, rather than just so nervous and... so tense... you have no idea what you are doing, so that make you feel uncomfortable... and you feel like, why so slow... and you feel under a lot of pressure. (Julie, SEM 3)

This year... it's really easy we didn't do that much, and... rather than... more frequently practise like the week before concert... now we just do once a week, and on a concert, week we just do twice. (Julie, SEM 4)

Despite these changes, by the end of her second year, Julie said that her neck and back were bothering her again. Although she claimed that she was unaware of discomfort/pain until she stopped playing, at times she could wake up with pain. In this situation she would take some Panadol. This was her main preventative strategy, along with fixing her posture and not practising when feeling unwell. "If I take Panadol I don't feel anything then" (Julie, SEM 4). "If I don't feel well then I won't, play" (Julie, SEM 4).

Most of time I stop practising when I am tired... I don't over practise... but when I get, things like today, I only do two hours today because I only have two hours for practice anyway. (Julie, SEM 4)

Julie claimed adamantly that her discomfort/pain was more to do with sleeping than playing the cello and took care to reinforce this several times. However, she did acknowledge that increased discomfort/pain may have also been due to factors such as not taking breaks during practice, practising longer hours, and stress. She also said that

access to the microwave in the common room had been cut off so she was no longer able to use heat packs at the institution.

Maybe just second year has been really stressful for me... and... the fact that I didn't get a good sleep, so sometimes I twist my neck... but that doesn't affect my practice. [MW: "Okay. So... does it hurt while you're playing though...?"] Yeah even though I have to take the Panadol just for neck and back... I think it's that I didn't sleep well... it's more like the other thing affect my cello. (Julie, SEM 4)

Sometime I find... you really hard to, have a break... like during the lessons three movement... consumes half-hour... without stop. [MW: "Do you ever notice that your back and neck hurt more when you have to do that? Or?"]... I don't know but, it could be because, yesterday I have long rehearsal... four hours, with only like, four break. Normally I should have more... and you have to play much harder when you play with piano and... you use a lot of energy. I don't know whether that affect my sleep but, before I go to bed I don't feel any pain... until I wake up... so I still think that's because I didn't sleep well. (Julie, SEM 4)

From the start Julie reportedly practised long hours, at least four hours of personal practice with a maximum playing time of 10 or 11 hours. Generally speaking her warm-up consisted of technical work. However at the beginning of the second year, (when she had not experienced any discomfort/pain yet), she mentioned also doing some stretching.

I wasn't as crazy as I was last year because now my pieces is much harder... eight hours would be the maximum... plus the rehearsal... if I feel anything, like,

uncomfortable I will stop and go home... or do something else because there is so much assignment to do. (Julie, SEM 4)

I stretch... I do it because in the first day when I come to here, we have a workshop, and the lady... she told us to do it. (Julie, SEM 3)

Although she did not actively exercise, Julie walked for at least an hour every day getting to and from various places.

Julie claimed to be relatively unconcerned about her experiences of discomfort/pain throughout and did not discuss her experiences with anyone. As she progressed through her program she consistently said that her discomfort/pain was decreasing. However, with the exception of early in the second year, her experiences of discomfort/pain became more frequent, and in her final questionnaire she was experiencing some at time of questionnaire completion.

In conclusion, the overriding impression was that Julie was conscientious but competitive and did not want others to know whether she was experiencing playing-related discomfort/pain.

Student 15: Brad

Brad was a male cellist who presented as sensible, studious, and reserved. He was easy to arrange meetings with as he regularly attended workshop. However his experiences of playing-related discomfort/pain were limited compared with most of the other students in this research project. As he progressed through his program he consistently stated that the only parts of his body affected by playing-related discomfort/pain were his right hand and his back.

Brad perceived that his playing-related discomfort/pain could be aggravated by fast, repetitive, or complex repertoire; physical tension; and the type of chair he was sitting on. Generally speaking participation in the Orchestra course was not a problem for him. His main strategies for preventing playing-related discomfort/pain throughout his program included awareness of tension, working on his posture, and doing a technical warm-up. Although he didn't mention it specifically as a strategy for preventing pain, Brad also reported that he took regular breaks throughout his practice.

Brad was self-employed as a computer technician and spent a lot of additional time on the computer for work and leisure. It may be of interest that he used his right hand to operate the mouse. This area was consistently the focus of his playing-related discomfort/pain. However Brad repeatedly stated that he never experienced any discomfort/pain whilst using the computer.

Brad found the Pedagogy subject extremely beneficial in helping him to address his own playing-related discomfort/pain and, on reflection, could trace the pain in his right hand back to early learning experiences in a school group setting. At the conclusion of his program, he was planning on doing further studies and becoming a private cello teacher. He was one of the few students to say on reflection that he enjoyed

the Orchestra course. Of note was that he participated in substantially less hours of Orchestra and Chamber Music rehearsals than most other students during his program.

Table B15

Reported Pain Experience for Student 15: Brad

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	3	8 months ago during Orchestra	Right hand	13	2-3 hours	N/A
2	1	2	That week during Orchestra	Right hand	5	2-3 hours	N/A
3	1-2	2	That week during practice	Right hand	5	2-3 hours	8 hours
4	1-2	2	2 days ago during practice	Right hand	5	2-3 hours	8 hours
5	1	1	That week during practice	Right hand	2	4 hours	12 hours
6	1	1	Previous week during practice	Right hand	2	4 hours	11 hours
7	0	0	N/A	N/A	N/A	4 hours	6 hours

Prior to his studies at the institution Brad had experienced playing-related discomfort/pain in his right hand, both sides of his neck, and both sides of his back. The discomfort/pain in his right hand bothered him the most, and recurred after a few hours of playing.

As he progressed through the first year of his program, Brad continued to experience discomfort/pain in his right hand. He perceived that this discomfort/pain was more likely to occur when he was not paying attention to his posture, was tense, or was playing loud passages during Orchestra. “The only pain I ever get really is sometimes I tense up in my... wrist... with the bow” (Brad, SEM 2).

Sometimes it can happen also... in Orchestra... if you're playing... a really loud section... usually... if, I continued playing like that... without stopping... it would get worse but... in Orchestra [we] generally have rests... and it goes away. (Brad, SEM 2)

During the second year of his program Brad changed his bow hold from “Russian” style to “French” style. At this stage he perceived that his discomfort/pain was continuing to decrease although he still experienced tension in his right hand and back. He now said that discomfort/pain could occur in Orchestra or private practice and that he could actually be less likely to notice it when playing long hours because he became accustomed to it as he worked.

I... started off with, different bow techniques... I'm learning a French technique at the moment... so it's a lot of moving back and forth, and, it's... very free... but... I started with a Russian teacher... and then in between I... had no technique. (Brad, SEM 3)

It's probably getting better... I wouldn't say it's pain anymore just... slight discomfort every now and again... on average once a week. (Brad, SEM 4)

Sometimes actually, the more you play, the better it becomes... your body becomes relaxed and other times it can... become worse, it depends... on the situation. (Brad, SEM 4)

By the third year of his program, Brad's discomfort/pain was only occasional in his bow hand and back. At this stage he said he had noticed that, if he didn't do scales and technical exercises in the morning, he was more likely to be tense and therefore more likely to have discomfort. He also perceived that his discomfort/pain was more likely to occur if he was playing something fast and complex.

I definitely notice... I've been doing more.... regular... warm-ups like scales and stuff in the morning, but if I don't do that... my... playing is not as relaxed... and that [discomfort] can happen, whereas if I do... it's generally not an, issue. (Brad, SEM 5)

Probably too rare to say, it would just be, occasional... tightness... probably more in Orchestra than... private practice... [MW: "Have you got any ideas why that might be?"]... Probably complexity of music... and... in Orchestra you are... performing the whole time whereas practice... you're... stopping. (Brad, SEM 6)

During the fourth year of his program Brad was only making up academic credit points he had had to defer earlier. As a result he was not doing any practical subjects such as Orchestra. His total amount of playing time decreased and he couldn't recall any recent specific experiences of pain. "It's, pretty much non-existent" (Brad, SEM 7).

For the duration of his program the focus of Brad's pain remained his right hand. The only other body part he reported experiencing pain in was his back, and he highlighted the chairs in the theatre as being best for him. "The best ones are the ones that are... raised on the back" (Brad, SEM 6).

I don't really have much, pain... it would only be the occasional discomfort... in, the bow hand... [or back] if you are on... a bad chair or something. (Brad, SEM 6)

During the early stages of his program Brad struggled to keep his practice consistent but this improved as he progressed. Brad perceived a link between consistent practice and less discomfort/pain and claimed that he always took breaks during his practice sessions.

I'm trying to make it more regular two to three hours a day... when I first started I was... some days not practising at all and then some days doing like six hours seven hours... [MW: "... Did that result in more pain or?"]... Probably doing for a prolonged period of time does... but also I just found that practice technique, it's better to do regular practice. (Brad, SEM 2)

Brad was one of the few students who claimed not to experience many difficulties within Orchestra rehearsals. However he was involved in significantly fewer rehearsals than many other students in this study. He only participated in Chamber Music in his sixth semester and generally was only in one Orchestra program and one additional rehearsal outside of the institution each semester. He was also one of the few students to say on reflection that he enjoyed the Orchestra course. "I know some people, don't enjoy it [Orchestra]... I've enjoyed it... probably it could be more, musically... exciting... it's kind of a very dry rehearsal, process" (Brad, SEM 7).

Brad was consistent in stating his belief that his discomfort/pain was a result of tension and not paying attention to his posture. However, he was inconsistent as to whether his discomfort/pain was more likely to occur during Orchestra. (At various stages he said that it was but at other times said that it was related to the repertoire.) It is worth underlining that during his final questionnaire completion he was not doing any Orchestra rehearsals at all and couldn't recall his most recent experience of discomfort/pain. "I don't think it's [my discomfort/pain] really due to... an extended

period of time it is more... incorrect, tension” (Brad, SEM 5). “I don't think it's... specifically during Orchestra... you are doing something constantly at *forte* maybe” (Brad, SEM 7).

Brad also perceived that his discomfort/pain was more likely to occur when he was playing a piece he had played before because he might revert to old habits.

The more I develop my bow technique, the better it gets, but sometimes I'll revert to... old way of doing it... especially if it's in a piece you've already played before, you just sort of naturally do the habits you used to. (Brad, SEM 3)

Brad was self-employed in information technology and cello teaching and worked consistently for 6 to 15 hours a week before and throughout his program. Unlike other students who were working, he perceived that his work didn't affect his playing-related discomfort/pain. However he was right-handed and used the mouse with this hand, and this was reportedly where he experienced his playing-related discomfort/pain.

Brad said that his experiences of playing-related discomfort/pain were not severe enough to stop him from playing but early in the program he claimed that they could be the reason that he took a practice break. By the end of his program he reportedly did not need to take an extended break and could simply stop, “shake his hand out” and keep going.

Whenever I am feeling physically tired, or mentally. [MW: “...Are you sometimes already in pain when you take a break?...”]... Yeah... sometimes. I can also not... go away and take a break, but just stop playing... and shake your hand or something. (Brad, SEM 3)

Brad said that he found the best strategy for preventing playing-related discomfort/pain was to do a warm-up of scales and exercises every day. He also

highlighted awareness as a key factor. He did not do any stretching or physical activity at any time throughout his program. “I guess be aware of what you are actually doing with your hand” (Brad, SEM 3). “Usually I start with, a really slow scale... which is also good for the bow” (Brad, SEM 4).

Not much it's pretty much gone, provided... I do, daily warm-ups then, everything is relaxed. (Brad, SEM 5)

Probably the best strategy is to, do... an hours, warm-up, each day... I wouldn't say I was getting a lot of pain, it, makes, you more... dexterous... everything moves better... you feel more relaxed when you do it. (Brad, SEM 5)

Brad claimed that his experiences of playing-related discomfort/pain didn't really worry him at any stage because he perceived that they were not severe and also that he knew how to adapt. Although he did not really discuss his experiences with anyone he participated in a research project for cellists at another institution (along with Student 11, Mary) and reportedly learned some interesting things about how his body had adapted to playing. “It's annoying when it happens, but... it's fixable, but it... takes a while” (Brad, SEM 3). “Not really [worried] because... I think it's, solvable, and it's not really... like it used to be” (Brad, SEM 4).

No I don't think I'm really worried. I did... [for] someone else who is doing... research... at [another institution]... all these physio tests... it was specifically for cellists and their shoulders and... this shoulder, the shoulder blade is, a lot closer to my spine than this one... which was quite interesting... it was... about how your body, moulds to the instrument. (Brad, SEM 5)

Brad demonstrated a mature understanding of why some people may have experienced more pain than him. However, he was also of the opinion that not many

other string students were experiencing pain whilst playing, with the exception of Student 7 (Tom) whom he mentioned specifically (as did several other students).

I, think... if you over practise something... if it starts hurting, then don't keep going... but if you keep going, then, it's going to get, worse... if you start feeling something wrong then, see how you can, adjust it or fix... and, I guess also just being aware of... your posture... depends what you are thinking about when you're... playing. (Brad, SEM 7)

I think that, there's probably, oh I I'm thinking of cellists, probably more violinists... or violists... in terms of, cellos I don't think, as much... I think I [Tom] had... a problem. (Brad, SEM 7)

Brad highlighted the Pedagogy courses offered at the institution as being particularly beneficial for him, in terms of his playing, his own discomfort/pain, and his future career. At the conclusion of his program, he was certain that he wished to be a cello teacher. He did not want to teach any violinists because he believed that he didn't have a good enough understanding of the instrument.

I think... through doing Pedagogy I have become more aware of, different things... but... I, didn't, really have any, pain, as such. [MW: "So you find Pedagogy to be quite helpful...?"] Yeah... well, you kind of learn to teach and teach to learn, and [MW: "Yeah, oh gee, that sounds like [Teacher J]!"] Yeah, that's actually her quote [laughs]. (Brad, SEM 6)

I'd like to come back next year and actually do post grad Pedagogy [MW: "... Do you think that's helped you in... improving your posture and all that kind of stuff, Pedagogy or?"] Yeah I, I think in most aspects of playing actually, and then also, just physically teaching other people because you have to... understand

what you are doing and, be convinced of it so [MW: "So what are you hoping to do... once you have finished here?"]... One-on-one private teaching cello... if I can avoid teaching the violin I will try... [MW: "Do you feel, confident at all doing that...?"]... Probably for beginners but I don't think you'd get, the same, out of it and you actually notice teaching, cellists that have learnt from a violinist... bad postural things... but I think, it's better, for the student they can get more out of it if you... experience the instrument yourself. (Brad, SEM 7)

On reflection, Brad thought that his pain got worse at the beginning of his program before gradually getting better. As a young student Brad got a lot of pain in his bow hand and he said that he started learning in a group situation at school. However he claimed that this pain never limited his playing. In his opinion some people experienced pain because they played through it and over practised without thinking about what they were doing.

I, improved my technique since I've been here... relaxed, got better bow, control and also, I guess, when I first started, and came in, I wasn't practising as much, so then... when I increased that, it's, more of a... getting used to... practising that much... [MW: "So you find that when you increase your practice you can experience a bit while you get used to the amount, is that what you mean?"] Yeah... cause... I guess, your faults intensify... over, a longer period of time, where as if it's, just a little bit of tension for a small amount of practice, then... it cannot have an effect. (Brad, SEM 7)

When I was... a, smaller student... I had... bad bow holds I used to get more pain than... now... I guess when I was, beginning and then... I changed, bow holds

and different things, eventually... I started in... Grade 2 string program. (Brad, SEM 7)

I think... if I had of... done something else and, just kept playing cello, on the side then, probably wouldn't have, really... thought, about it [playing-related pain/injury]. (Brad, SEM 7)

In conclusion, Brad's experiences of playing-related discomfort/pain seemed mild compared to most of the students in this research project (even though he was physically inactive and spent a lot of time on the computer). He participated in substantially fewer hours of Orchestra and Chamber Music rehearsals than most other students throughout his program.

Student 16: Mark

Mark was a cellist who presented as extremely confident and sensible. These characteristics were immediately apparent in the manner with which he spoke and dressed (usually suit, tie, and dress shoes). Generally speaking, his experiences of discomfort/pain throughout his program were relatively minor. However Mark did have two serious episodes of playing-related pain in his left hand during the fourth year of his program.

Due to his personality and perceived self-confidence, Mark appeared to approach and view life in a different way to some of the other students in this research. Everything he said sounded logical and on occasion he came across as very dismissive of certain ideas. These characteristics were also apparent in the way he approached his discomfort/pain. Throughout his program Mark consistently implemented strategies in order to prevent playing-related discomfort/pain. These included awareness, taking breaks during practice, practising sensibly, and warming-up before playing. Generally speaking the strategies were very effective for him.

Mark also spoke very strongly against certain behaviours that he believed were counter-productive to preventing injury such as practising through pain and noted how “silly” he thought that people were for doing things like that. He was particularly interesting to observe during Focus Group 2, where his perceived confidence in himself and the fact that he reportedly hadn’t had serious experiences of discomfort/pain by that time were clearly intimidating to at least one of the other participants. This participant later told me she felt uncomfortable discussing her experiences during this focus group for this reason.

Mark also displayed an entirely different perspective on the way his cello teacher regarded injuries and pain. Although Mark said that they rarely discussed these things directly, he believed that Teacher D encouraged taking breaks, practising in moderation, and stopping whenever experiencing pain. Mark claimed to have had no concerns regarding talking to this teacher about his experiences. He also stated that he was not afraid of losing his practice room and that his health was more important than that. However, he did still display some of the common characteristics. For example, Mark seemed to take great care to downplay his experiences, particularly in the fourth year when he had two serious occurrences of playing-related discomfort/pain. There were also some inconsistencies among his responses.

At the conclusion of his program Mark was planning to do further study and hoped eventually to play professionally in an orchestra. He said that he had no desire to teach except perhaps advanced students at some stage in the future. He stated consistently throughout the four years that he found being in the research project very beneficial as it heightened his awareness of playing-related pain.

Table B16

Reported Pain Experience for Student 16: Mark

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	5	Previous few months	Right hand	1	1-2 hours	N/A
2	2	2-3	That morning when practising	Right hand	2	2-3 hours	N/A
3	1	1.5	Previous night	Both hands	1	2-3 hours	5-6 hours
4	1	1	Every time to an extent	Left hand	2	2-3 hours	7 hours
5	1.5	1.5	February	Left thumb	1	3 hours	5 hours
6	1	1	Previous evening	Left thumb	2	4 hours	8-9 hours
7	1.5	2	2 weeks ago	Neck	4	3.5 hours	7-8 hours
8	2	3-4	9 weeks ago	Palm of the left hand	5	2-5 hours	8 hours

Prior to his studies at the institution Mark had experienced playing-related discomfort/pain in his right hand only. This discomfort/pain recurred when he was either doing a lot of practice or playing sustained loud passages.

As he progressed through the first year of his program, Mark noticed an initial increase in pain in his right hand. However his pain subsequently decreased as he

improved his technique with the help of his cello teacher. Mark perceived that his discomfort/pain had the potential to affect him every time he played if he was not aware of it and actively preventing and adjusting.

No, it's actually improved... since [Teacher D] has... adjusted my technique a bit... it's important then to have the right technique because you can cause yourself serious problems otherwise [MW: "So did it get... worse initially, as you started the year or?"]... Probably for a while, but... I've never really had a lot of trouble with my left hand... [and] since my, bow hold has been adjusted a bit it has... improved a lot. (Mark, SEM 2)

It affects me whenever I play... if I don't use the right technique... so... it's a good incentive not to slip into bad habits... it could affect me... all the time if I let it. (Mark, SEM 2)

Early in his second year, Mark commented that both his hands were now affected by discomfort/pain. His left hand now bothered him the most; however he was trying to build up the strength in this hand through double-stop studies. Mark had now begun stretching out his fingers and waving his arms around (as he demonstrated) as part of his warm-up and, by the end of this year, claimed that he was only experiencing tension in his left hand. "Sometimes it's in the left... with big double-stop passages or whatever... but I'm doing a lot of exercises at the moment to try and slow that down" (Mark, SEM 3).

I think my left hand has gotten a lot stronger... I'm doing studies now that are, basically all double stops... and that, caused quite a lot of pain for the first... little while, while my hand was getting used to, going under the amount of duress... because the whole study... for pages would just be constant double-stopping...

and on cello that means a lot of weight... and strength from the hand but... if you take it gradually, and... do it in parts and when your hand gets, sore keep going for a little bit but then stop... and, build it up until you can play the whole thing, in one go... and now I hardly experience, that at all. (Mark, SEM 4)

During his third year, Mark said that he was not really experiencing any playing-related discomfort/pain. However he did experience some tension/soreness in his left thumb when coming back to practice after the Christmas holidays. As the first semester progressed he also found that he was experiencing a lot of fatigue in general due to working long hours as a sales assistant.

I was away for about, a month and a half over the Christmas holidays... I didn't have the cello with me then, so I came back and... had to... start from, more or less scratch... and I suppose that... [left thumb tension] was just a bad, lazy habit I suppose... came out again but I... knocked that over. (Mark, SEM 5)

I'm finding I get quite fatigued from... working... you have to concentrate on all these other things, so you get tired even if you are still getting seven hours of sleep a day... I think if I do more exercise I will improve that... I am... currently looking into that, quite, seriously. (Mark, SEM 5)

By the end of this year Mark was exercising regularly and said that he was feeling a lot better in general. He had reportedly had some trouble with his shoulder but not as a result of playing, rather of his sleeping position. Although this discomfort/pain disappeared relatively quickly, it did bother him a little whilst playing.

My shoulder was giving me a bit of trouble a couple of weeks ago but that was completely unrelated to the cello... I think that came about because I just slept on it the wrong way or some, fairly... minor, detail... it's, totally back to normal... it

did hurt a little bit but... I couldn't... not play because I had rehearsals and things and unfortunately that's often the way things are you've got to... put up with [it].

(Mark, SEM 6)

After the Christmas break Mark commented for the first time that he had experienced some stiffness in his right forearm. This stiffness occurred during a music camp at the end of the previous year and in his opinion was due to his shoulder being too high. Around this time he had also changed his posture after noticing some tension in his neck and back (although on reflection later he said he had never noticed any tension in his neck).

Last year I... did a camp... played Richard Strauss all day six hours a day for, a couple of days after a while I noticed that the, forearm of... my bow arm, was getting, a bit, stiff... and I noticed my shoulder was too high and I found that... if you relax up here [indicates shoulder] then the rest of it seems to... go along with it. (Mark, SEM 7)

I changed my posture a bit again... I lean forward, a lot more now, over the instrument... to, get more sound and also because I found my... neck was getting stiff because I held it out. (Mark, SEM 7)

[Teacher A]... always thinks that I must have an incredibly sore neck because I sit like this... but, I never find that that's actually an issue... I feel my neck and it's never really stiff or my version of stiff anyway. (Mark, SEM 8)

Early in the fourth year of his program Mark had a severe episode of pain in his left hand that lasted for around one month. This episode reportedly occurred after he put a new bridge on his cello (so that he could get a bigger sound without purchasing a new instrument). As the bridge was higher, more finger pressure was required in order to

depress each string. After a couple of weeks Mark perceived a lot of pain in the left hand when playing the cello for a sustained period of time. He said that he persevered through the pain about a month before discussing it with his cello teacher, who advised him to put the old bridge back on. This resolved the problem. Although in his opinion it was not related, he did also note that he started experiencing the pain after attending a national music camp, where he was required to play extremely long hours every day.

I wanted to come and see you... sooner than this because, over the January period, after [a national music camp]... I came home, and that was all fine... but I got a new bridge, put it on my cello, so that was... quite a lot higher... and after a couple of weeks, it really started to, cane... the palm of my hand... below the fingers... and that really was, bad news and I thought it was just that I, wasn't strong enough or something so I sort of put up for it for quite a while, like as in another couple weeks and then... in a cello class one day, it was just so bad I was playing so out of tune because it was just so painful so I said to [Teacher D] you know "What is the deal" he says "No you have got to lower that cause that's just crazy" so... I put my old bridge back on, and... since then I've been a very happy person... very interesting... to see how much of a difference it is only two mm higher... [MW: "So why did you originally change your bridge?"]... So I could get more, sound out of the instrument... instead of buying a, new cello... because... the height of the bridge makes so much difference... but... it just doesn't seem to be a, practical thing to do... that's why I wanted to come and see you... fascinating, as soon as I went to the other one no problems. (Mark, SEM 7)

It was really just when I was playing... after a, period of time it would start to hurt. (Mark, SEM 7)

It was concerning... I think I took a fairly intelligent approach to it and I... assessed all options... wondered if it was just... I hadn't been practising for a few days so I did exercises and all that sort of thing... because I had to change my hand shape a lot, for... that higher bridge... but yeah... it really was, a bit concerning. (Mark, SEM 7)

Later in the year, Mark again experienced severe pain in his left hand. This pain appeared during his end-of-semester exam and continued a little over the mid-year holiday period. Mark figured out it was because of his left hand position, adjusted his technique accordingly and the problem was apparently resolved.

So I didn't have any, problems, but then in my recital... at the end of the semester... my left hand... cramped... this is very unusual for me cause... from your previous records you will know I don't get... a lot of pain at all really... and also this is the first time, after that instance... that I had pain in my left hand as opposed to my right... but... in the Lalo concerto which, where the cellist has to play, all the time, there is no break... and I was nervous I suppose, and my hands were cramped... which was quite, irritating... and it really hurt like, it really really was bad, and I had to force myself through the rest of the concerto... and then, half a bar of suite and then study, and it really wasn't fun... I, put that down to stress and strain but then I, had that return a little bit through the holidays when I was practising... then recently, we had a Master Class with [a visiting violinist]... and she... said... not to me but to another cellist "You seem to be cramping, your thumb behind the neck of the cello, and pushing your fingers

out” and... I figured out that's what it must be, so now I'm practising with the thumb completely removed... and, life's good again. (Mark, SEM 8)

It was related to nerves, and nerves affect the fact that I grab the fingerboard so hard plus... I suppose in your performance, when you go about the piece in the wrong way... it's, really, loud, this concerto... and it's a huge amount of work it's really, tough. (Mark, SEM 8)

On reflection, Mark recalled this final experience as his most memorable and the only experience of discomfort/pain aside from when changing his bridge. He did not recall/include any discomfort/pain that he had mentioned in other body parts earlier on. “It's just that one instance, which really... irritated me because I hadn't had problems, previously to that” (Mark, SEM 8).

The focus of Mark's pain was originally his right hand, but shifted to his left hand early in his second year. As he continued he also experienced discomfort/pain in his right forearm and right shoulder as well as tension in his neck and back.

Mark claimed numerous times that he would never play through pain, but at the same time discussed several scenarios where he had. For example, when trying to strengthen his left hand through double-stop studies he talked of the importance of continuing a little past the pain in order to extend tolerance and strength. Mark also had to continue playing through some pain when he hurt his shoulder away from the cello. “I always stop... adjust... I mean, you don't play through it [pain]... because that's... detrimental” (Mark, SEM 2).

My playing itself has changed obviously, it's... constantly... changing... I'm doing a lot more practice... but, it's still staying under control because the amount of practice I am doing is keeping up with the building of my technique...

I'm constantly focusing though on when I do start to feel strain after quite a while, I... try and remember what's going on, and I'm doing a lot more... simple exercises now to keep the... progress going so I don't... cause myself pain.

(Mark, SEM 3)

Mark was one of only a few students in this study who claimed not to experience much discomfort/pain as result of Orchestra rehearsals. He believed this was largely due to his posture when sitting and the fact that he warmed up before rehearsals. Mark believed that it was better to lean forward and rest on the cello rather than leaning back in the chair during breaks.

Not really... sometimes... your legs get a bit stiff from sitting down for, three hours in a row... but nothing substantial... that you'd actually have to worry about... I find it is good just to... swing your arms about a bit before you, do a long practice session or anything. (Mark, SEM 5)

It's all about sitting properly... you'll find... if you sit in rehearsals and... when the conductor is talking you lean back... it's really not good, it's much better to lean forwards... relax on to the instrument, so... the spine stays a lot straighter... cause, the more you... slump in the chair, the worse things, really do get... [it's]... really just my own experience some other people... though, have said that. (Mark, SEM 6)

Like many other students, Mark did comment on the difficulty of Opera rehearsals however he claimed that he only experienced general fatigue as a result. In his opinion it would have been better if the rehearsals were further spread out, for example over a period of two weeks rather than one. It is noteworthy that, when he had

increased orchestral hours Mark would reduce the amount of practice hours in order to minimise the perceived effect on his physical and mental health.

The Opera is dangerous... it must be the worst for viola players, because it's just, not, safe there... [MW: "And did you have any problems during the Opera this year?"] Aside from just, general fatigue, not really... if they did it over two weeks, of... three hours, every evening... that would be way better... than like one week of, two massive sessions a day. (Mark, SEM 4)

I still swing my arms around... in the morning... in the Opera week, I usually do a bit more stretching... to... prevent problems... I find that those people that... just turn up to Orchestra... and sit down and then do a five-hour rehearsal or something, it's a bit dicey, because... you just sit down and you just automatically start playing a Mahler Symphony or something, which is, difficult... in the Opera week when it's 10 to 5 call every day, I usually still get here at about 7.30, and do my normal practice in the morning I do scales exercises, playing concertos and stuff... to have that, fluidity... and you turn up, warm, for the rehearsal. (Mark, SEM 8)

At various times throughout his program Mark spoke in great detail about changes he was making to his posture and how these may or may not have been impacting on his playing-related discomfort/pain. He also spoke about his evolving technique and how he perceived that this had helped to decrease pain and increase relaxation. Mark got very detailed during these conversations and it was apparent how analytical his mind was.

At the beginning... my bow hand... was so tense all the time... it was always sore... but then that really straightened out now and my bowing recently has

become even more fluid... which I am quite enjoying actually... and when you get to a certain level, of, relaxation you realise how, fantastic it is to relax... further and how much more sound you can produce that way... which is really quite rewarding... so I'm finding a lot now that... dropping the wrist even further from the cello... makes such a difference, and you don't have to work at all like the whole arm just sort of sits in to the bow and you don't do anything... and you think you're using the whole weight but then you really not when you, start experimenting. (Mark, SEM 6)

My left hand position, has changed a little bit, in that it's become more square as opposed to rounded, and that's... been fantastic for intonation purposes and... it's, taken a lot of strain out of the top of the hand, but I have to now learn how to relax... the lower part of the thumb... it doesn't tense up, as much. (Mark, SEM 6)

In his final year Mark did a professional orchestra internship. He claimed to find this very enlightening. After observing other people's bad habits when playing he believed that many of the players in the orchestra must have had problems with discomfort/pain. In his opinion, this could be avoided by keeping up technique work and practising intelligently, and this was what he observed in the cello section.

I think when you play in an orchestra, you... find a way, to stay as, energy-efficient, and relaxed as you can... I try to just stay fairly calm and... keep my posture good and... not slouch... but it's amazing you see these people that have just sat the wrong way for like 25 years... [MW: "Do you think they've got problems...? Do they talk about it?"] No... but they'd have to... [MW: "Do you notice any of them... ever, stretching or anything?"]... A lot of the viola players

do... cause that's like only the most dangerous instrument in the world to play... the cello section is a... technically strong section... they all, practise, intelligently, I think... outside of... the building... they do slow scales and that sort of stuff to keep technique up... because if you've got your technique up then, you're not going to be at risk... whereas if you just go into rehearsal and plough at a part, every day without warming-up or anything you are really, a bit risky.

(Mark, SEM 7)

Throughout his program Mark's main strategies for preventing discomfort/pain were practising sensibly, taking breaks during practice, working on his technique, warming-up properly, and general awareness. He consistently used the strategies over the four-year program. At various times he also commented on the perceived unhealthy habits he observed in other students.

I'm really not into this doing six hours in a row sort of, stuff because I know people that do, and they're all popping, glucosamine tablets and stuff to try and keep their joints working which is, a bit insane. (Mark, SEM 5)

Mark claimed that he always took breaks during practice as a preventative measure. At the start of his program these were every half-hour, over time this increased to every 45 to 50 minutes. During these breaks he would not use his hands at all and he commented that he did not like using the computer as he believed that it placed a lot of strain on his hands. Unlike many other cello students, he said that Teacher D recommended taking breaks every half-hour and Mark also believed that Teacher D had a sensible approach to playing-related pain. Due to his confidence, Mark was also unconcerned about losing his practice room.

I usually break about every half an hour... [Teacher D] recommends that. He says... “Definitely don't ever keep going past an hour, always stop for at least... five minutes and stretch and go and get a drink of water or whatever... and just letting your hand relax for a few minutes is really good”. (Mark, SEM 3)

It's fairly logical if you're in pain, stop... [Teacher D] takes a very sensible approach. That if your wrist or whatever is starting to cramp you stop... at once... and do something else... because... otherwise it's not safe. (Mark, SEM 4)

With regards to being worried about losing practice room:

Well no, generally not... I usually come back and say “What are you doing?”... if they are... I just, take breaks... it's more important that you, don't damage your hands... and also, for the mental concentration, you can't keep... productively working... past ... about an hour... I just try to leave my hands, very calm [during breaks]. (Mark, SEM 4)

I hate it, like typing your wrists get stiff... I'm not, really a big computer person I don't like computers... I find if you just, have your practice, go, at a fairly [pause], don't kill yourself sort of thing and... scales are the solution to everything because... playing... double stops... and really strengthening out and push yourself, a bit... it becomes easier to do that and then push yourself a little bit further, but... it's important to know how to grade it. (Mark, SEM 5)

At the beginning of his program Mark's warm-up consisted of scales and exercises, which he viewed as essential. Over time he added in a physical warm-up, which he viewed as especially important before Orchestra rehearsals. “I like just doing it to get blood circulation going and whatever” (Mark, SEM 3). “Usually... I know it sounds stupid flap my arms about a bit to like get... my muscles, moving” (Mark, SEM

4). "I make sure that it [pain]... doesn't happen... by doing traditional warm-ups and all that sort of thing" (Mark, SEM 5).

Like most students in this study, Mark's concern was in line with the perceived severity of his experiences of discomfort/pain. However, he claimed that he tried to stay calm and deal with problems as they arose. He highlighted awareness as the key factor in preventing discomfort/pain, and believed that worrying more meant that one would probably make the problem worse (as worrying would cause more tension and thus more pain). "It's constant... you don't think about the pain so much, you think about your technique and what you are doing... if you're doing that, then you are not going to experience discomfort" (Mark, SEM 3).

I deal with it quickly... because [very long pause], there's not enough time in the day to feel uncomfortable so, you've got to get onto these things immediately.

(Mark, SEM 5)

I'm trying not to worry about it... I find a lot of people here just, blow themselves up over it... they end up causing themselves more problems... so ... I try to be quite calm about it and... go about things in a normal structured way.

I'm finding that I haven't had any problems though for the last several months... first semester was very hard... that was a lot of work Internship and two other Literature subjects... but... this semester is a lot easier, because I'm only doing, cello Orchestra and Divertimenti and it's all playing. (Mark, SEM 8)

I realised how serious that could be long term, in terms of my getting a job... mind you... you don't have that in [an] orchestra as much... because you are not... playing all the time or... worrying as much. (Mark, SEM 8)

Mark was one of the few students in this research who claimed to be comfortable discussing his experiences with Teacher D. He also discussed his experience of pain during his mid-semester exam in fourth year with the examiners but perceived that the advice that they gave was not particularly helpful. It's interesting to note that he actually voiced the opinion at the following questionnaire that, had the problem persisted, he would have been able to simply go to a particular physiotherapist to have the problem fixed. "Well I talked to [Teacher D]... which would be... logical... and he... scrutinised my bow hold... because that's where I told him the pain was... and he said "Oh yeah it's because of this", and... adjusted it" (Mark, SEM 2).

I brought it up very briefly with [Teacher D] last year, but... it's not something worth mentioning, like it was just... what should I do about this, and he goes "Oh, just sort of make sure you're... loose... that's all there is to it". (Mark, SEM 3)

Try and do octaves when your hand's in agony... it's terrible... you lose concentration... which is quite frustrating... hopefully though that won't happen... again. [MW: "Are you nervous about it happening again?"]... I am trying not to be, but it's a fairly serious thing... if it does become a bigger problem just to go and see [the physiotherapist] and... have it sorted out... but... I haven't had a... trace of it... since I figured that out with the thumb... that would have been about, eight weeks ago... [MW: "So would you say that's... your most, memorable... experience of playing-related pain?"] Yeah... I don't really get the, back problems and shoulder problems... and all that rubbish that everyone else seems to struggle with which is, quite lucky for me. (Mark, SEM 8)

I didn't talk to... a physio or anything, I talked to the examiners... and they didn't seem to say very much that was very... useful... I mean [Teacher G] was pretty good... she said... “You must be, clenching the instrument or something”, and I sort of then, related it to nerves but then when I had that class with [a visiting pedagogue] I thought yes that must be... because now... I'm sure the pain all comes through the second finger because... I play very square. (Mark, SEM 8)

Mark was not particularly physically active throughout his program, although he acknowledged the benefits of exercise. For a brief amount of time he took up swimming to deal with fatigue. Although he said that this assisted him in feeling better he was unable to keep it up due to time restraints.

I'm... doing a bit of swimming now which is good... I'm feeling... a lot more energetic... than I was, and... I am now doing a lot more practice than I ever have been... most days about four hours... which is going really well... and... hasn't caused me any problems. (Mark, SEM 6)

Mark worked throughout his program as a sales assistant at various upmarket stores. At times he worked up to 17 hours a week and said that he found this difficult to manage alongside practice.

At the conclusion of his program Mark planned to do further study and ideally play in a professional orchestra. He stated that he had no interest in teaching, except perhaps in the future when he would like to teach advanced students. In his opinion being a participant in the research project had been beneficial in that it had led to him thinking more about the whole issue of playing-related discomfort/pain.

Hopefully a Masters, next year... I'd like to do orchestral work... I always wanted to play the cello... I don't really have a great deal of interest in, teaching... I

know that sort of sounds awful but... actually no... I would really like to become a teacher, in like 20 years... after I've done... quite a lot of, playing and professional work and I actually know what I'm doing... I find it really frustrating these people that, try and start teaching immediately, and they are... 16 and they don't know anything... they are just wrecking kids and they've all got bad posture and neck problems and you wonder why the kid doesn't like practising probably because they are in agony... that to me doesn't seem all that, productive [MW: "And would you prefer to be teaching advanced students?"] I think so... there are those who are really gifted with little kids... and that's fantastic and those people are worth their weight in gold but I, don't think I could do that. (Mark, SEM 8)

It certainly awakens you... to what the possibilities are... [MW: "Before you had come here had you even thought about the whole issue of, playing-related, pain or?"]... Yes and no... I suppose I always knew that... viola players as professionals struggle because that's a notoriously bad instrument... I suppose I used to get quite a stiff thumb but I never thought about it as much of an issue and then I realised it's because I was holding the bow like an idiot but, that sort of sorted itself out within about a year, of being here so... [MW: "So have you changed like your opinion as to like how many people, are affected by it...?"]... Yeah... [MW: "Did you think it was a common problem, before?"]... I never used to think of it in the magnitude that it really is... the other thing I never used to think about as much as I do now is... auditory, damage... certainly in the last few years I've become much more aware of these things... and certainly some of

them you see with your colleagues, ah some people... really struggle. (Mark, SEM 8)

In conclusion, Mark presented as a confident and logical person. These traits seemed to be apparent in the way he approached his experiences of discomfort/pain. His experiences of discomfort/pain throughout his program were relatively minor. However, like several other students in this study, he did have some serious episodes of playing-related pain during the fourth and final year of his program.

Student 17: Chris

Chris, a cellist, was a unique individual in this research project. Initial reasons why he stood out from the other students included his personality and wardrobe (backwards baseball cap, baggy clothes, techno music, extreme sports etc.). However, his experiences of playing-related discomfort/pain and his personal journey were also of particular interest. Initially I thought that I would have a lot of trouble getting him to participate in the research project however this was not to be the case.

A few months prior to entering the institution Chris sustained serious ligament damage to his right hand whilst playing football. He consulted many people (including health professionals) about this and the advice was to stop playing completely for a year. However, at the time he felt that was not possible. By the time of his Initial Questionnaire his pain had reportedly decreased from being present all the time to about four times a week.

As he progressed through his program Chris consistently perceived that his playing-related discomfort/pain was decreasing. However he acknowledged that he may just have become immune to it due to a very high tolerance of pain. Chris was very physically active and sustained an additional two dislocated fingers on his right hand from playing football in the second year of his program. He also seriously hurt his neck after sleeping incorrectly on one occasion in his third year and reported that this injury required three months of physiotherapy.

During the third year of his program, Chris missed his first interview despite my repeated attempts to arrange a convenient time with him. By the time of his next interview, he had reportedly stopped playing the cello completely and had deferred his practical courses. He elaborated on many perceived problems he had experienced within

the institution with regards to his teacher, the orchestral convenor, and other students. Chris felt that he had been misjudged and treated unfairly due to his individuality. I confess that in some ways I was also guilty of initially misjudging him. He said that being at the institution had killed his joy of playing the cello.

This was Chris's last interview as he did not continue his cello studies. His academic transcript showed that he graduated with a Bachelor of Music Studies the following year. At the time of his last interview Chris was unsure of his future and considering the maritime industry. In hindsight, he thought he should probably have taken the initial advice from health practitioners and stopped playing for 12 months when he sustained ligament damage because he believed he may have damaged his hand permanently.

Table B17

Reported Pain Experience for Student 17: Chris

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	5	5	Previous week	Right hand	20	More than 3 hours	N/A
2	4	2	Last month	Right hand	4	More than 3 hours	N/A
3	1	1	Exam last year	Right hand	4	2-3 hours	5 hours
4	1	1	DM	Right hand	4	2-3 hours	7 hours
5	Did not participate	-	-	-	-	-	-
6	N/A	N/A	N/A	N/A	N/A	N/A	N/A

At the start of his studies at the institution, Chris was recovering from serious ligament damage caused to his right hand whilst playing football. Pain from this injury used to be present all the time but, at time of questionnaire completion, was down to about four times a week. He was still regularly consulting a physiotherapist.

As he progressed through his first year, Chris noticed that his pain had decreased to around once a month. At this time he was no longer consulting the physiotherapist. From this point on, he was consistent in saying that he would only experience pain after playing one to one and a half hours without a break.

If I... play for... an hour constantly or something... without a space... after an hour and a half it starts to hurt a little bit, but... not as frequent anymore... [MW:

“And have you found Orchestra to be a problem at all, for that?”] Nup... because you get breaks and that. (Chris, SEM 2)

During the second year of his program, Chris said that he was not really experiencing any discomfort/pain related to playing any more. At this stage his discomfort/pain reportedly only occurred occasionally and he thought that playing more consistent hours had helped. However, during both interviews he revealed that, since his previous questionnaire, he had dislocated a finger on his right hand. Surprisingly, he only mentioned this at the end of each interview, almost as an afterthought. When he dislocated the finger the pain was reportedly constant and the hand was strapped up but he kept playing anyway. “I just haven't had it, anymore really I think it's... come good, since it was really bad... because I've been doing... exercises... trying to... keep my hands... really relaxed” (Chris, SEM 4).

It did hurt but I just, sucked it up. It wasn't, fingerings it was more my bowing hand so it's not as bad... but... it did hurt... I didn't actually notice for a while until one of my mates said “It's out” and I'm like, “Not again...” It was... painful occasionally but not, regularly... I knew it was going to be sore anyway... if I didn't, or did do practice so, there's not really that much different from when I was not practising it was just the same. (Chris, SEM 4)

Unfortunately Chris missed his first interview at the beginning of his third year and, by the conclusion of this year, had stopped playing the cello completely. He revealed that he had found that the atmosphere at the institution was not right for him, in particular the competitiveness and the need to conform to the expectations of staff and students. He revealed that he had felt victimised by some members of staff and said that he no longer liked playing the cello.

I just... realised it's not really what I want to do... I suppose as a career... in the... cello group... it's very backstabbing... very nasty... everyone tries to be your friend but then they turn around and do something... [MW: "And how did you find the Orchestra?"]... It was, pretty bad... I am, not very, good with [Teacher C] I don't get along with him at all... but... he did not, like me, because of my personality not so much my playing... which... was a real bummer because I would have been, way up there but, instead... it's all favouritism in the Orchestra I can't stand that that's, one reason why I didn't want to do it anymore... I would be sitting there quietly, doing nothing and he'd be like "[Chris] stop talking" and I would be like "I wasn't saying anything. Who would I be talking to there is no one to talk to"... And... if, the cello section did something wrong he blamed me. And I'd, one day he did that and I said "Well actually I can play this I'll play it right now" and I played it for him and he has just gone, "Oh well must be someone else" and it's like "Yeah well obviously you are just picking on me so, get bent" [laughs]. (Chris, SEM 6)

[MW: "So... basically the main reason you are, quitting the cello is because you don't really like it that much anymore... and also it's been, unpleasant here?"]
Yeah it's been a bit unpleasant... this place kind of killed it... I can say that honestly... [Teacher D] is good at it... but... I'm not... going to blame anyone, I mean it's, my decision, this... I could have gone a different way I could have sucked up but I chose not to... so, that's, unfortunately not the way I would have liked to have gone... didn't work out oh well [laughs]. (Chris, SEM 6)

By this time Chris said that he was only experiencing pain when overusing his right hand for example when rock climbing. Before he stopped playing his hand would

cramp occasionally about once a month however he thought that over time he just got used to the pain and no longer noticed it. "I just think because I'm practising... a lot more regularly... I've... adapted to it or something... it's not painful" (Chris, SEM 4).

Only if I overuse it, like, if I go rock climbing or something like that... I'll just be sore the next day or something... that's about it... I think it's really badly screwed but, from, what they said, 'cause I never gave it a rest... 'cause it was all torn and stuff... that's not good I suppose... so it's getting time to recover now. (Chris, SEM 6)

It either got better or I got used to it. (Chris, SEM 6)

I don't know it's the pain threshold or... it has mended itself or... the bio mechanics of my hand have gone... to a different direction to try and avoid it... but it's not, that regular, probably once a month or something. (Chris, SEM 6)

Again, almost as an afterthought, Chris mentioned that he had seriously injured his neck but this was only two weeks before he withdrew from his practical courses. He was able to play, it was just painful and he couldn't move his head in certain directions. This injury required three months of rigorous physiotherapy and, as result of it, he had to quit playing football.

Not that I can, think of... oh at the start of the year I had neck troubles but... that was due to... sleeping wrong... that was like three months [laughs]. [MW: "Did that impact at all when you were playing the cello?"] Yeah... bowing wise it did... I couldn't look up a particular angle I had to keep, on a particular level... I couldn't actually... keep my head straight. [MW: "Did that pose a problem in Orchestra?"] Yeah but I was only in Orchestra for a couple of weeks... then I, palmed it... last semester I didn't finish Orchestra and I, deferred my cello

exam... so I was supposed to do Orchestra and cello next year, for first semester... I had to do a lot of physio... it... was pretty bad, I slept on a camp bed wrong... at a friend's house up the beach... slept on the bar at the end, had obviously too much to drink... and, the next morning I just remember I was like “Oh God I'm on the bar this is going to hurt” and I moved and I'm like, “Dammit, I screwed my neck” and it was bad too... three months of, hard physio. (Chris, SEM 6)

Throughout his program Chris experienced playing-related discomfort/pain in his right hand and neck only. He was consistent throughout in perceiving that he would experience pain if he played longer than one and a half hours straight or was pressing too hard. This was one reason why he took practice breaks approximately every hour for five to ten minutes. Early on he said the breaks were not preventative but at the end of the second year said that they were taken because he didn't want to hurt his hand again. He also linked a perceived decrease in discomfort/pain to playing less and feeling less stressed at the beginning of his second year.

Can't say I do [experience pain], unless... it's, been... an hour or something of straight practice... it's... pretty intense and I'll give it a bit of a rest but it's not, that bad... I just get worried that I'm going to hurt it or something. (Chris, SEM 4)

Chris was heavily involved with physical activities, doing up to 18 hours a week of cycling and running, among others. He played football until he injured his neck in the third year. Although early on he didn't think that this physical fitness had increased his pain tolerance, he commented several times that the pain he experienced whilst playing the cello was insignificant compared to some sports injuries he had sustained. “I've been

in worse [pain]. It wasn't that bad" (Chris, SEM 4). "I'm playing football again... so, nothing bad, just... popped finger out, and... a couple of sore legs but apart from that" (Chris, SEM 3).

Chris's practice throughout his program was two to three hours per day until the first semester of his third year. During this semester it continually decreased up until Chris deferred his Major Study and Orchestra courses.

At the start of this year I was still practising pretty regularly... but... since, May it really dropped... started really badly depleting... but it, started really going bad when I decided, I didn't want to do my, exam due to, other shit going on and, I decided not to do Orchestra because of, just the way [Teacher C] was just being such an arse. (Chris, SEM 6)

His warm-up consisted of slow playing and technical exercises. He said that he did exercises for the ligament damage in the morning and afternoon, as instructed by the physiotherapist, but these were generally not related to practice.

Chris worked consistently long hours throughout his program both in a hardware store, and as a labourer for his father. Generally his work didn't cause any discomfort/pain but occasionally he would experience some back pain. "Maybe a bit sore in the back after a, long day... [MW: "... Does it just go away?"] Yeah... gone the next day, start all over again" (Chris, SEM 4).

During the third year of his program Chris became very disillusioned with the cello and the environment at the institution. At this time he deferred his Major Study and Orchestra courses and was not planning to come back next year. He wanted to either do Music Technology, an apprenticeship, or go to Maritime College. He said that he had struggled with the competitive atmosphere at the institution, particularly among

the cellists in his year: because there were so many he perceived there was a lot of vying for the top position and being the favourite.

Cello-wise I've stopped completely... I went to part-time, this semester... and decided I'm not going to do it anymore, so I might next year be going to Music Tech... to do a certificate down there for a year and then, finish off my course with Music Tech, instead... just got bored of it, I suppose... haven't played in about, oh, six weeks. (Chris, SEM 6)

I might just, quit Uni altogether and do something else... work for my dad... get an apprenticeship or something like that... or go down to... Maritime College... to do... with shipping and all that. (Chris, SEM 6)

I'm not that kind of person, I'm not, the one to suck up... never will be, which I suppose I should maybe in some areas but... not to, back stab... I'm not that kind of person [laughs]... and [Teacher D] is pretty bad... he tries to get information out of you about other... he is a, gossip queen... I'm not scared of him... if he has a crack at me I'm not, afraid to have a crack back... one day [Teacher D] had a crack at me in workshop and I, I lashed back and everyone has gone, "Jesus" even [Teacher D] was shocked it was like, I wasn't nasty or anything... I just, said my opinion... he looked at me and I looked at him and... he knew exactly that... I was just going to keep fighting back so he stopped... and... he actually said "Okay... that's fine then". And then in the lesson the next day he was completely fine. (Chris, SEM 6)

Chris was one of the few students in this study who claimed that Orchestra rehearsals had little impact on his playing-related pain. However, he did have many issues with the Orchestra course and he perceived that his different personality had

made him very unpopular with both his cello and Orchestra instructors. The two instances that really influenced his not wanting to play cello anymore were his recital at the end of second year and his Orchestra audition in the third year. After these he said that he put in a formal complaint but that nothing changed as a result of it. In his opinion there was a competitive and nasty environment that was being encouraged by certain instructors. He believed that such instructors should not be working at the institution.

You put a complaint in with staff and nothing happens, I've done it... put up a massive formal complaint about [Teacher C] and [Teacher D]... About how badly favouritism is and... how bad they treat people and even... the teachers are not allowed to talk in exam, and they just non-stop talk the whole time... you can't hear what they're saying... last year for my, end-of-year exam, I... completely nailed it... and, in my, report they said "Oh well done, but because of your mark last semester you don't get a distinction you get a credit basically..." so all that work, it was for, a lousy credit, and I wasn't too happy, [laughs] because my... pianist who is, from the [an elite institution] and all that, said "Oh, easy high distinction"... And I said "Oh it's a credit, 65"... It was only just a credit too... I was pretty annoyed... that sort killed it again. (Chris, SEM 6)

At the start of this year... auditions... I got, three bars in, and [Teacher C] and [Teacher D] stopped me saying "That's completely wrong" and I was like "Okay", they said "Play it again" so I thought to myself "Okay I will play it... exactly the same three times and see what happens" Second time "No it's wrong" Third time "That's how you do it" and I'm "Right this sounds exactly the same as the first two times..." in the end... I just walked out... said "See you

later... you guys obviously got a problem with me” [laughs]... tried to keep my mouth shut. (Chris, SEM 6)

My brother goes to [another institution]... they are, helpful and no one, bitches... and he's doing marine biology I mean not many people get a job out of that... so... if that was like here where not many people get jobs... in particular areas... but no everyone is friendly over there and he doesn't have a problem. I think, the institution really needs to clean their act up, big-time. [MW: “How do you reckon they could do that?”]... Get rid of [Teacher D] and [Teacher C]... their, time has passed... [Teacher C]... he's a rude person... he just thinks everyone else is shit compared to him. (Chris, SEM 6)

On reflection Chris said that when he came to the institution he was passionate about playing the cello. However, as his program progressed he became more and more disillusioned. By the conclusion he said that he no longer had any desire to play at all and thought that not stopping playing after the initial injury may have affected the healing process. As a result he had some concerns about the long-term health of his hand. At the time of his injury, Chris felt he had no choice as it was right before his audition for the institution and at the time that was what he wanted to do.

[MW: “So were you... really passionate about the cello when you started?”]

Yeah. Pretty passionate... I was different but, I knew that straight away... have different tastes in music... people here are very touchy with music, [laughs] especially the cello group a lot of them are just, stick to classical and standard... and... I like house music and, electro and... rock music and they are just like, “No, that's wrong”. (Chris, SEM 6)

I don't think it, made... [my right hand injury] worse... but... it didn't... mend itself... which it probably should have done so... the long-term outcome... might not be good for my hand... [MW: "In hindsight do you wish you hadn't, kept on playing like that or, you are not really bothered?"] Yeah but, then I wouldn't have got... into Uni... I would have had to delay it. They said "If you can, completely stop playing for 12 months..." that was, about two months before my audition for the institution and I just said "I can't", because I couldn't, at the time I did want to go to Uni for this so... I was sort of in a very, big corner there.

(Chris, SEM 6)

In conclusion, Chris was a unique and interesting case. His high tolerance of pain due to numerous sports injuries may have affected his perceptions of his playing-related pain. Chris's personal experiences and interactions with other students and staff within the environment at the institution (although not directly related to this research project) highlighted the difficulties that may be experienced by those who don't fit the mould of classical musician.

Student 18: Melanie

Melanie was a viola student who had been experiencing severe ongoing playing-related discomfort/pain prior to her admission to the institution. Although at first she said this discomfort/pain occurred only when playing for long periods of time she was inconsistent and said the pain was constant and present in several body parts at the time that she completed her Initial Questionnaire.

Like the majority of students in this study, Melanie noticed an initial increase in playing-related discomfort/pain during her first semester. However, as she continued and worked on her posture with her teacher Melanie perceived that this discomfort/pain decreased. She commented specifically on the Opera as being difficult in terms of playing-related discomfort/pain.

Melanie answered questions easily with limited pauses and laughed frequently throughout our conversations. She had the potential to be a very interesting case but unfortunately did not continue her program into the second year. Other students told me she was unable to continue because she failed her viola exam.

Table B18

Reported Pain Experience for Student 18: Melanie

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	4	4	Present at time, 4	Whole back, front of neck, and right arm just above elbow	6	1-2 hours	N/A
2	3	3	Previous month	Front and back of both shoulders	4	More than 3 hours	N/A

Prior to her studies at the institution, Melanie had been experiencing severe ongoing playing-related discomfort/pain. This pain was constant and present in several parts of the body (neck, back, and right arm) at time of questionnaire completion. At this time she said that she had consulted her teacher, family member, doctor, chiropractor, and a physiotherapist about her pain. The recommendation was to do stretches, use heat packs, and also use a heat rub. As a result of this advice she used heat packs and did neck stretches but only after playing.

As she continued through the first semester of her program Melanie noticed an initial increase in playing-related discomfort/pain. This reportedly decreased as she worked on her posture, made changes to the way she held her instrument, and got into a routine of stretching consistently before playing. “My teacher and I spent ages on, changing my posture so now I... don't hurt very often... there was a bit of pain when we were going through the stages of changing my posture and stuff” (Melanie, SEM 2).

By the end of her first year Melanie was also practising regularly and taking breaks during her practice (although she expressed concern about leaving her practice room for fear of someone else taking it). Melanie claimed that Orchestra was not a problem for her but she did notice more playing-related discomfort/pain during the Opera. “I was in the Opera that was a bit, strenuous, because the strings played a lot but, in Orchestra... I don't find it... too much because we generally get, rests and stuff” (Melanie, SEM 2).

In conclusion, at the time of her Initial Questionnaire completion Melanie was a more severe case of playing-related discomfort/pain. Although she noticed a decrease in pain levels during in her first year it is unclear what would have happened had she continued through her program.

Student 19: Anna

Anna was a female violist who was already experiencing serious playing-related pain upon arrival at the institution. Her problems worsened significantly over the years, to the point where she perceived that discomfort/pain was constant in various parts of the body both whilst playing and away from the instrument. Anna had to defer her Major Study and Orchestra courses twice due to severe pain.

During her program Anna consulted many different health professionals. These included doctors, dentists, specialists, physiotherapists, a psychologist, and a massage therapist. During her second year she was diagnosed with Temporal Mandibular Joint Dysfunction (TMJ) and subsequently fitted with a special jaw orthotic to change the shape of her jaw.

The reported advice from health professionals was for Anna to adopt preventive strategies such as stretching before playing and taking regular breaks during practice. However, despite claiming to be extremely concerned about her experiences Anna neglected to make any changes to her counter-productive behaviours. In fact, she perceived that receiving the orthotic gave her a false sense of security that problems would be resolved without any real changes on her behalf.

Anna's journey was made even more complex due to what she perceived as being a difficult and unsupportive relationship with her viola teacher (Teacher I). In addition to not understanding the extent of Anna's problems with pain, the teacher apparently thought her student was not technically advanced enough to be studying at the institution. At several times this teacher reportedly advised Anna to withdraw from the Bachelor of Music program.

From the outset Anna had particular difficulty with Orchestra rehearsals, in particular for the Opera. At the time of her second deferment, Anna actually wanted to persist through to the concerts in order to complete the Orchestra course. Although she knew it would not have been good physically she expressed disappointment and confusion regarding her options for completing the course. Her experiences really highlight the difficulties faced not just by students but also by staff in trying to accommodate students with severe playing-related pain/injury.

After the second deferment, Anna alone came to the conclusion that she should purchase a small instrument. Doing this decreased her pain to the extent that she felt able to re-enrol and finish the program, albeit with a dramatically reduced orchestral workload.

In the end Anna graduated at the three-year exit point with the intention of doing a Graduate Diploma in Education and becoming a classroom music teacher. Despite all of her experiences, on reflection she said that there was nothing she really could have done differently, except enrol in the Music Education strand of the Bachelor of Music program. This would have decreased the amount of time she had to play her Major Study instrument.

Table B19

Reported Pain Experience for Student 19: Anna

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	4	Present at time, 3	Both shoulders, left wrist, and neck	13	Less than 1 hour	N/A
2	4	3-4	Previous day	Left shoulder, both sides of the jaw	8	1-2 hours	N/A
3	4	4	Previous day	Left side of the jaw	4	1 hour	4 hours
4	5	5	Present at time, 1	Both sides of the jaw	4	Less than 1 hour	3 hours
5	4	4	Present at time, 2	Neck	2	1-2 hours	7-8 hours
6	1 (4)	4	Present at time, 1	Head, neck, and left shoulder	4	1-1.5 hours	6 hours
7	4	3	Present at time, 2	Head	4	1 hour	4 hours
8	2	4	Present at time, 1	Face and head	3	1 hour	1.5 hours

Prior to her studies at the institution, Anna had experienced playing-related discomfort/pain in her wrists, shoulders, neck, and lower back. The pain in her left shoulder recurred every time she played her instrument.

As she progressed through the first year of her program Anna said that she had noticed a lot more pain in her jaw and neck. She attributed this pain to increased

practice and Orchestra rehearsals. “Last year I had a lot of pain from playing but this year, because I practise more... particularly with the, Large Instrumental Ensembles... I've noticed that, I've got a lot more pain... in my jaw and... my neck” (Anna, SEM 2).

I know my jaw pain, has... increased a lot... I noticed that, during the holidays... it was just really painful even when I wasn't practising. (Anna, SEM 3)

By the beginning of the second year of her program Anna had noticed that the discomfort/pain in her jaw/back of left shoulder was becoming independent of playing. At this time she was also becoming aware of constant tension headaches and increasing tolerance of pain. She sought treatment from a doctor who referred her on to a dentist regarding her pain. The dentist reportedly advised her that she needed to wear a splint when she slept to stop her from grinding her teeth but this did not reduce the amount of perceived pain Anna experienced throughout the day.

I'm getting used to it... I've tried to, see specialists about it, but... it's taking a while, and, obviously it's a bit hard with the expenses... I just... got to... more of a mood where it's... you just have to put up with it. (Anna, SEM 3)

At the start of this year... my doctor told me to go see a dentist first, and all he did was ask me to try a splint... they thought... it was really caused because of grinding my teeth... and so, I have been wearing that sleeping but it doesn't change how my jaw feels during the day... it's probably better when I wake up, but I still get pain during the day because I don't really grind my teeth during the day... so I think it's something different... they said you could go see a jaw specialist but we haven't gotten around to it yet. (Anna, SEM 3)

By the conclusion of her second year Anna had deferred her Major Study and Orchestra courses. She was continuing to consult a number of new doctors/specialists

who had reportedly talked in some detail about the importance of prevention. Anna was now taking painkillers if it still hurt after she stopped playing and thought that her level of stress influenced the amount of pain she experienced. At this time she revealed that her Major Study teacher was expressing increased frustration with her.

Actually I don't think there has been much of a big difference in pain... it's just, become aware that, this needs to be fixed now... I, started up, this semester, just planning to do it as normal, and then a few weeks in I had a big, discussion with my, Major Study teacher, and... made a decision to just drop out most of my, courses... it's... a lot to do with stress, that's making it so irritated and inflamed... so, cutting down the courses and stuff... plays a big part in me, trying, to fix it.
(Anna, SEM 4)

I take painkillers, and then, if I'm, not doing... much physical activity, it can go, in less than half an hour, but... anything, movement of my jaw or my face can cause pain... I think it's always present, just... it depends whether I notice or not... I don't think it's ever not present. (Anna, SEM 4)

Basically, I haven't seen a jaw specialist because she [my doctor]... Liked to, do a different approach before... what they would be doing... I'm on medication... painkillers... and... I've also had a lot of sinus problems and stuff to do with my hearing, it's... all connected in the face so she has just given me some, stuff for my sinuses... and... anti-inflammatories are important too because... I grind my teeth at night... and, I have a lot of stress in my life at the moment... I have trouble sleeping and stuff. (Anna, SEM 4)

I need a... plan, to do my stretches and exercises before I, practise... she was just talking about preventing it before it happens not... having painkillers after you start... getting... pain. (Anna, SEM 4)

At the beginning of her third year Anna said that she had been diagnosed with Temporal Mandibular Joint Dysfunction (TMJ) and had an orthotic inserted into her jaw to slowly change its shape. At this time the perceived focus of the pain switched to her neck and she started taking a lot more painkillers. However she said that she thought the orthotic was going to fix her problem and so resumed practice as before with no preventative strategies. "I am starting to become immune to them [painkillers]... I don't, really see much difference at all... I still take them just in case" (Anna, SEM 5).

I think since getting the orthotic... the pain has gotten worse in my neck... but... it's got to get worse before it gets better and... the person who's done it with me, she's an expert... I trust her that it's going to work... it's just it could take, time and it's different for everyone. (Anna, SEM 5)

Perhaps unsurprisingly, at the end of her third year Anna had deferred her Major Study and Orchestra courses again because of severe neck, shoulder, and arm pain. In fact, this pain became so bad during the Opera rehearsals that she claimed that she could not physically lift her instrument up. She said that her pain had not really got much better since she stopped playing but she still seemed to be trusting the problem was going to fix itself without much action from her. Anna was no longer taking heavy painkillers and the only reason she could get by now was because she was not playing. "I haven't noticed it getting better I think it's just when I play I notice it there" (Anna, SEM 6).

My neck is the one that is causing the jaw problems and, the shoulder and, everything... my jaw is getting better... I've had to get a different, orthotic in... to help that it's getting better so, that's a positive thing... but... I haven't, played my instrument in... a month or... [MW: "... How far did you get... before you had to stop it?"]... I started Opera Orchestra, near the start of semester... [but then] Project Week... when we had all these rehearsals, six hours every day... I couldn't even, lift up my instrument after that... so I spoke to... a few people and they said that it's best for me to, just not do it... it was... when I was not playing... as well and... it was, pain that... I've never, had to experience before when I was playing... I think just, constantly holding my instrument up for a long time and, and then doing that for several hours in the day... probably more than I'm used to without... regular breaks... than if I was practising, by myself [MW: "... Is it still hurting now... ?"] My shoulder is not hurting... but, when I, lie down, in a certain position I feel... certain little spots... of pain and, my neck is causing me a lot of problems... I, have constant headaches all the time. (Anna, SEM 6)

It has gotten worse this semester... with the excess Orchestra... I had to drop out of Orchestra and my Major Study because of... my neck... shoulder and, arm and everything... I want to continue I'm, trying my best at the moment to recover... seeing the physio, and getting massages and, doing proper stretches and everything... and hopefully that will work. (Anna, SEM 6)

I haven't thought that far yet... I was going to wait for this semester to be over... after next week, I'm going to have a look at that... I just think, I need, good

advice... cause I... don't know if I can, really do the right thing for myself on my own. (Anna, SEM 6)

At the beginning of her fourth year Anna went straight back into practising again and was only able to continue for two weeks due to severe pain. At this stage she purchased a smaller viola and this enabled her to play for limited amounts of time. Although she still had a constant tension headache, she said it was now half as severe as it was previously. Anna now thought she would always have pain in everyday life.

I have a smaller viola... a full inch smaller, and it's changed a lot... it's not as heavy... so I can hold it a lot easier, and... the amount of times I get neck pain is probably... halved, or something... it was my idea... when I went to the shop, I noticed how heavy it was compared to what it should normally be... cause I got it when I was 12, and to think that... it's never really been the right size for me. (Anna, SEM 7)

I started... playing, at the start of January... I was... aiming to practise... as often as I could... for... two weeks I probably, practised every second day... and then, after a while... stopped [MW: "Was that when you had your new viola or were you using your old viola?"]... I didn't get a new one until I started this semester... I didn't even think of getting a new one back then... it just suddenly popped in my head... I was practising with my heavier one and, it wasn't, going that well because I found out that, my jaw was still sore when I practised and my shoulders just weren't... capable of, holding it for that long. (Anna, SEM 7)

If it [my pain] was mild, that would just be... me walking around every... in my everyday life... if I haven't picked up my viola that day... it's... never not present. (Anna, SEM 7)

Honestly I feel like it is the same discomfort as I'd been dealing with last year... the muscles take a while to adapt to new, positions, and, because, like I said, my viola is always going to be pushing my jaw... out of line with the natural positions, so, I don't know if it is, forever going to be, completely healed... but I do know... I'm benefiting... from the orthotic. (Anna, SEM 7)

I did at the start of semester... plan to practise every day, and... do enough... to, feel like I've accomplish something that day, but... it just, seemed to be defeating me... [MW: "It's not very nice when you've got pain, is it?"] [Laughs] No... I guess that... makes me feel quite depressed, because... I just, want to be able to do well in my course... at the moment I've resorted to just, passing and getting through just so I can finish, but I'd still like to, be able to get better at my instrument... but throughout being here at The Con... I've stayed the same level because I've always had... factors, that have prevented me from going that step, further each time. (Anna, SEM 7)

I'm pretty sure deep down... that... in the last year... I've been, thinking... I'm always going to have pain when I play [MW: "Does that make you feel a bit depressed, or sad, or?"] I guess yeah [laughs]... because you know... after all these years I, decided I'd keep playing because I really liked it and, found it enjoyable and, loved the feeling when... you play something really well and beautiful, and... thinking... if only I'd known then... what it would be like physically for me, then I would have made action then and... chosen a different instrument while I could... even if I just changed to the violin because... I never learnt that, before the viola, so I've had this ongoing... problem it's always really hard when you're young and someone's got to choose an instrument for you or

you choose it yourself you don't really know whether your body is... fit for it.

(Anna, SEM 7)

By the conclusion of her program, Anna had started seeing a specialist physiotherapist as well as a psychologist. Although she claimed that the physiotherapist did not identify the cause of her problems, Anna said that she was feeling a lot calmer and no longer thought she would always experience pain. The goal was to get Anna to play for longer periods of time. The discomfort in her shoulders was still present all the time but the tension in her head and face still bothered her the most.

I think I have noticed changes... been seeing... a physio, a different one to [the one] I had previously and, he's, exceptionally good... because my sister started seeing him... and my parents were cool to pay for it, so, that's why... he specialises in your gut... and how that seems to be related to... your neck and... I think it's really helped a lot to... calm me down a bit... and not be so tense... and so there's probably a little bit of a change... maybe not less discomfort but definitely less pain... [MW: "... What does he say is wrong with your neck or whatever?"]... He didn't really say anything specific... he is just, doing his job... to... try and help me, change, my posture, just even a little bit... I'm sure it helps a lot... I haven't seen him for the last two weeks.... but I see him once a week, and I have seen him maybe four times... so I haven't actually been there that long. (Anna, SEM 8)

I think that's what [the physiotherapist] is aiming for, to help me to play longer... that's his main goal, and, I would say that it's getting there it's not quite changed... in any dramatic way. (Anna, SEM 8)

My... body is starting to realise that I don't have to... hold up such a heavy instrument... but... obviously muscles take a while to change... I don't clench as much because I'm not... dealing with... as much anxiety, I guess... I don't know if it was the seeing [the physiotherapist]... I have changed other stuff... for example I see a psychologist... for the emotional like mental stuff, and that helps me to be more relaxed physically. [MW: "When did you start doing that?"]... Only three weeks ago... I think in the last month it's been a pretty good change, to my tension... so when I play it is... not as bad. (Anna, SEM 8)

I slouch and my shoulders go forward and they don't, get pulled back enough... so they feel tight... all the time it's still there... because I'm still learning to have my shoulders, back more... so I'm just adjusting to that I guess. (Anna, SEM 8)

I don't think I will always have pain... I know that what, I'm getting, treated... is going to help me in the long run it's really hard at the moment cause... it takes a long time for muscles to change... I do know that, it will be a lot better... some time. (Anna, SEM 8)

The focus of Anna's perceived discomfort/pain shifted several times throughout her program. In the first two years she experienced increasingly severe pain in her jaw. This pain transferred to her neck when she was fitted with an orthotic to treat TMJ. The focus later shifted to her shoulders and arms before coming back to the jaw. At times she also experienced discomfort/pain in her back (particularly when sitting), arms, and fingers, as well as constant tension in her head. At the conclusion of the program she perceived that the focus of her pain was shifting from the left side to the right side of her body. "When I play, it's, all across the back of my shoulders" (Anna, SEM 6).

My tension headache... is the most, annoying... because when your head feels really... tight, you just can't function... that's why it worries me the most out of... everything. (Anna, SEM 7)

[I've] been noticing more and more that, actually, the discomfort, is more on my right side. (Anna, SEM 8)

As she progressed through her program Anna also found that other activities could cause or start pain that would transfer to the instrument. These included sitting at the computer, carrying things, travelling, and sleeping.

I have a lot of sleeping, problems it's been getting better... but... I had bad insomnia... at the start of the year and it's getting better and so I just hope that, 'cause... the sleeping part... has a lot to do with, my neck problems and... the stress obviously. (Anna, SEM 6)

I do notice... coming to The Con with my, viola strapped on me and, my, new bag with my viola books, on one shoulder and, my handbag, usually is on the same shoulder... it... activates... the pain... in the sore spots. (Anna, SEM 7)

Waking up after I sleep, lower back pain... just the way I lie... causes a lot of pain and, also a lot of, neck pain to so I guess that carries out throughout the day, so if I'm already in discomfort, then when I practise then that is not really going to be very helpful. (Anna, SEM 8)

It doesn't matter which shoulder I have my bags on... if there is maybe a water bottle in there or a heavy textbook then... it is painful. (Anna, SEM 8)

The Orchestra rehearsals required as part of her program apparently caused many problems for Anna in terms of playing-related discomfort/pain. In addition to the pain in her jaw, neck, and shoulders, she reported that she could also experience pain in

her back, arms, and fingers during rehearsals. Participation in the Opera Orchestra was the catalyst for what she perceived as being the most severe playing-related pain she had ever experienced. At this time she commented that the pain she experienced during the Opera was completely unexpected: she thought she had already experienced the pain at its worst. “I get really bad pain I think I notice a lot more in Orchestra too because... it's not just about me it's about everyone in the Orchestra so I'm not always focusing on just what I'm doing” (Anna, SEM 4).

When I'm sitting down... for Orchestra... I always sit up straight with good posture... but, it hurts more. (Anna, SEM 5)

I'd only get lower back pain if... we're in Orchestra... sitting for ages... it is more the upper... part of my body. (Anna, SEM 6)

I did notice... in the first semester, it was getting really hard for me to play in Orchestra... but it wasn't until Opera that it got to the point where I couldn't actually hold the instrument. (Anna, SEM 6)

By the end of it [Chamber Orchestra] I feel, ready to collapse, and I... feel throbbing everywhere and, it takes a little while for it to calm down. (Anna, SEM 7)

This semester I haven't actually had to do any [Orchestra] so it's made a huge difference... it just sort of put me out of, work for... the whole week... [MW: “So do you ever plan on playing in an orchestra again...?”] I actually don't... I think I'd better not because, although it would be great for my skills... I just couldn't... cope. (Anna, SEM 8)

After being excused from the Orchestra course, Anna seemed to be very unclear as to whether or not she was able to pass the course. She felt that perhaps staff members

didn't have her best interests at heart, and that their only concern was a high standard of orchestral playing. She would have preferred to have persisted through the pain and do the concert rather than have to do a whole new program next year but acknowledged this would have been detrimental to her health.

My viola teacher told... [Teacher C], [Teacher P] and [Teacher A]... that she was worried about me so... they just said, to withdraw... I was hoping with the medical certificates that they would let me pass the course with just doing one Orchestra... that's why I wanted to continue doing the Opera because it would have nearly been over I just had to do the performances but they just thought it was a really bad idea... I figured maybe you are not allowed to do that... I thought, given the circumstances they'll let me pass... I will do the assignment and I'll do the performances for one Orchestra but I have to do two... which is... hard... because... next year even if my, injury is better... it will still be hard for me... so I'm just hoping that they can, understand that. (Anna, SEM 6)

I wanted to finish this year because it was my last Orchestra... but, my, viola, teacher pushed for me not to do it, so, I wasn't very happy about that and I understand that it would have been bad for me but I didn't have long to go anyway. (Anna, SEM 6)

I was telling them... "If I drop out now I'm still going to have to do it next year and it's causing me all these problems, I'd like to get it over and done with" but... I just wasn't given any options and... at the time didn't feel like they were... putting my best interests first... they were just thinking well... they don't want... someone who's not learning very well, in the Orchestra... my viola teacher didn't

think that I would, be able to learn, the Symphony pieces... well enough. (Anna, SEM 6)

I asked [Teacher A] if I could just be in one, Orchestra... and... pass... so I do Chamber Orchestra... [Teacher A] was a bit confused as to what I was asking but she basically just said “Yeah I'll just write that down, put you in one Orchestra...” it wasn't clear though that I was able to pass the course... or whether... I'm not allowed to until I get the other one done, so... that... worries me because, the idea of it was so I didn't have to keep doing next semester.

(Anna, SEM 7)

Anna experienced many issues with her Major Study teacher throughout the program. In addition to not finding the teacher particularly helpful, she believed her teachers only concern was that she was not doing enough practice. Over time Anna revealed that she perceived that her teacher didn't think she was technically good enough/advanced to be at the institution. At various stages her teacher reportedly advised her to quit the program and go into Education but Anna was reluctant to have the courses she had completed count for nothing and wanted to finish so she could just do a one-year diploma. “I have discussed it with my teacher... she's... been giving me a few pointers but it... hasn't really been that helpful for me” (Anna, SEM 2). “My teacher is like, ‘you have to practise anyway’” (Anna, SEM 3).

The reason why she talked to me, before I decided to take a break was more to do with it... her not feeling... I was fit for The Con... it's been really stressful in lessons with her because it... feels like she has just stopped, caring so much... she could tell that I wasn't, quite, fit to be able to have a future in... Orchestra...

and solo playing, because of the problems and because, it's hard for me to practise enough. (Anna, SEM 4)

She hasn't been very helpful... either she doesn't understand what exactly I'm going through or she just... is, one of those teachers who just treats everyone the same... I haven't had a lesson... since I withdrew from Major Study... I've been considering a new teacher for a whole year now but... I had, two options and, one, [Teacher A] didn't want me to have that teacher and the other one... from what I know of that teacher it just wouldn't have been right for me. (Anna, SEM 6)

I was going to do a teaching degree but, the one I wanted to do obviously I already needed a, degree and... my viola teacher has talked... even last year about me, dropping out and... going to another Uni and doing music/teaching course but then... it would be... the full undergraduate... three/four years again. (Anna, SEM 6)

It's just like go to my lesson... she, teaches me, the new piece, maybe write some fingerings... or I play a piece and she will, you know, teach, the way she normally does but... it's good, now. It's... like a lesson should be... there's no, outside... worries. (Anna, SEM 8)

Anna was the second female viola student of this teacher who had serious problems with playing-related discomfort/pain at least partially resolved through buying a new instrument. Both students claimed that they came to this conclusion without any advice or help in this regard from the teacher.

Another issue Anna experienced with her teacher regarded scheduling of lessons. As the teacher did not teach at the institution full-time, she reportedly tried to

arrange a schedule so that she only had to come in every second week. This meant that there would be two lessons in the one week, or one very long lesson. This really exacerbated Anna's problems with playing-related pain. It was an issue not just for Anna but also for other students of the same teacher. When they tried to discuss it with the teacher however the students perceived that she didn't appear to listen. Anna investigated changing viola teachers at several stages throughout her program, but it was apparently not possible in her case.

No it's not better, and it's not... going to change... the situation has probably got worse... she is not here every second week... so, we have a lesson... two days, in one week and no lesson, next week which makes it really hard because... after I have a lesson, I either... find it really hard to practise in between or... I experience a lot of pain.... me and [Rachel] talked to [Teacher A] about it and she, didn't know that this was going on and she, fully disagreed with it but, we have to first tell [Teacher I] that, we are having a problem with it. (Anna, SEM 5)

I think... she [Teacher I] doesn't even remember that I have this problem... a lot of pain when I still practise... I think she saw that I had this in and she assumed that it, was fixed. [MW: "Do you think you could tell her?"]... I try, it's really hard with her... we tell her things... but, it... just goes... into her head for a second and then it leaves... she cares enough to, want to give us the amount of lessons that we need and she... wants us, to pass the exam, but, if she has things she has to do. (Anna, SEM 5)

We just... act like nothing has ever happened, [laughs] or been a problem... I just need a teacher and she is a great teacher... just... personal issues.... I... have to,

accept the fact that I wouldn't be able to find a teacher who could fill those needs... in such a short period of time and the fact that there are like hardly any available... it is fine... I am learning what I need to learn... I just have to... be brave [laughs]. (Anna, SEM 7)

Anna's practice throughout her program was inconsistent. Prior to both her deferments she was practising longer hours without breaks, regardless of pain. At other stages of her program her practice was also influenced by a lack of motivation and enjoyment of playing. For example, at one stage she said that it was easier to her to practise and ignore the pain because she was now doing repertoire which was more enjoyable than technique work.

I am doing... repertoire at the moment... instead of doing technique... and because I'm doing pieces that I want to do and I like to do... I'm practising more because I actually want to practise... that's probably the other thing... I just forget about the pain, because I want it to sound nice and I just keep going... that's been a big factor for me. (Anna, SEM 5)

The reasons why I don't, practise isn't... just the pain... I'm distracted or I don't feel like it... I was a little discouraged at the start of the year because, I was trying to figure out whether, there was an option for me to have a different teacher again... but... didn't get to figure that out until the start of... semester because, [Teacher A]... wasn't able to reply. (Anna, SEM 7)

I try to practise as much as I can [MW: "... Is it still pain restricting you from doing more practice?"] Yeah... it's always been the main concern... but second to that... it's... my mental stability, to... focus. (Anna, SEM 8)

As Anna progressed through her program, she said that she was becoming increasingly concerned about her experiences of discomfort/pain. Of particular concern were the constant headaches that impacted on her ability to concentrate. She also became depressed, and found it difficult to observe her fellow students progressing whilst she stagnated due to an inability to practise. Perhaps for this reason, Anna claimed that she was not comfortable discussing her experiences with fellow students. “I’m worried about it because I... don’t want it to be there all the time, it’s limiting... how much I practise... it gives me migraines” (Anna, SEM 3). “It concerns me a lot but not so much that, you know, I can’t live” (Anna, SEM 3).

Yeah it is, still worrying me... hopefully that, will be a lot less when I have, gone through... medication and, exercises and... doing everything I need to regularly... because I can’t just do it, one day and not the other because... it doesn’t really work unless its regular. (Anna, SEM 4)

I’m very worried about... getting to a point where, it’s, closer to being irreversible... being an actual injury. (Anna, SEM 6)

It does worry me a lot actually... I knew I didn’t want to... be a viola performer, I want to do the teaching but, I do still have my heart set on getting a degree from here because... I wanted the, tutor and lecture experience here and all that... I, don’t know if I could... deal with just dropping out and not finishing it... because... I want to still do music and to get, certain qualifications I need to do certain things and... they are all going to be, just as hard as each other... whatever I, decide to do. (Anna, SEM 6)

I feel like they wouldn’t understand. Because a lot of my friends... really, have no history practising hours on end and... I have just seen them grow, over the

years since being here and... every time I've, tried to mention something... they don't understand... so... I talked about it to some people but I would never... discuss it with, other string players or other musicians... because... some things about it they understand because everyone goes through it, but a lot of... what I'm going through I don't think they understand which... makes it quite hard cause it's... like, "Oh, how can you not understand why I just get so much pain?" (Anna, SEM 7)

Considering, I don't play as much, and my viola is lighter I'm still quite worried about how much... pain there is... sorry discomfort it's not, painful. (Anna, SEM 7)

Anna consulted many different health practitioners over the four-year period. These included a General Practitioner, dentist, general specialist, jaw specialists, two different physiotherapists, a massage therapist, and a psychologist. The reported advice from early on was to adopt preventive strategies such as stretching and taking breaks during practice. However, despite the severity of her experiences and professed concern, Anna did not consistently implement the strategies at any stage of her program. In fact, consulting the specialists seemed to give her a false sense of security that the problem would be fixed without her having to make significant changes. For example, after getting the orthotic in she emphasised that the jaw specialist said it would take time to get better and just continued as she would if she didn't have any pain, taking painkillers and trusting that it would get better.

I was trying to do that [take breaks], and that was what my teacher said I should do, but... now that I am more busy... I tend to do it more in bigger blocks... it's because I'd rather get it over and done with. (Anna, SEM 3)

I think... getting the orthotic in has stopped me thinking about it it's almost made me think "Oh, you know I've got something, that will fix it now, I'm not going to stress about it". Even though the pain is still there... I've really gotten back to, practising, the way I did when I started Uni... I just practise, when I have to practise, the amount of time, that I need to and, if I feel the pain... I don't focus on it... it just passes my mind and I just keep going. (Anna, SEM 5)

I haven't got better at that, to be honest... I do... neck things moving my neck forward and back, just to get it loose... I knew I needed to do that, and... wrist rotations but I didn't do anything more than that [MW: "... But the physios have given you some stuff to do when you start playing, is that right? Or?"] Not so much... for my playing, it is more just... exercises I need to do daily... to strengthen me and get better posture. (Anna, SEM 6)

The physio is more for... my strengthening exercises... [MW: "Are you still doing those?"] I've stopped, just because I forgot... or... wouldn't have the time or the energy, even though, that's silly because it doesn't take that much... I do my neck stretches all the time... cause I always feel tense in my neck... so if I feel a pain then I will... but if I don't feel something then I will just forget to do it. (Anna, SEM 7)

I'm doing different ones that [the physiotherapist] gave me... if I do them around my practice time... if I remember it would be after... and, that's because... you feel the pain... if your, body is feeling fine I don't actually remember to do it... we are trying to do it before and after... warm-up my muscles before I play... [MW: "So how often do you... remember to do that?..."]... I do it once a day... I

think that it's putting my shoulders in a better position... that's what they are structured to help me with. (Anna, SEM 8)

I don't actually warm-up... I just start playing my pieces. (Anna, SEM 8)

The doctors apparently informed her that her ongoing sinus problems were related to the pain in her neck, jaw, and head. At times she took nasal spray, hay fever tablets, anti-inflammatory tablets, and painkillers. At the beginning of her third year she perceived that the painkillers were no longer having the same effect and that she thought she was becoming immune to them. By the end of her third year she was no longer taking them as she felt they made very little difference.

I don't think I'd get addicted it is more just I don't think it's very good for me... particularly when it's not really helping the way I want it to so... I haven't taken painkillers in a long time... and it's only been okay because I haven't had to play my instrument... if I was I, don't know how, I'd, survive without them [laughs]... [MW: "So you're coping with the pain a bit better but only cause you're not playing...?"] That's what I think... but also... I'm so used to it that I think I just, don't notice it as much. (Anna, SEM 6)

Anna did not work or exercise consistently throughout her program although she claimed that she felt better in general when undertaking regular physical exercise.

On reflection, Anna said that her worst experience was definitely during the Opera in the third year of her program. Up to that stage her pain was getting progressively worse as she did more practice. Although Anna's answers to previous questionnaires did not indicate that her individual practice was increasing, there was a significant rise in the number of hours spent in Orchestra rehearsals.

Last, year second semester when I was, doing... Opera Orchestra... I said, initially [that]... I couldn't come to rehearsals because, the pain, got that bad that, it just stayed there, so when I picked up my viola it was like I could hardly even, hold it up... and then, eventually, after I realised that, it wasn't, going away, that, I had to pull out... up until then, it was getting worse, from when I started... as I played more. (Anna, SEM 8)

At the conclusion of her program Anna was planning to do a Graduate Diploma in Education and become a classroom music teacher. Although she always knew she wanted to be a teacher, she wanted to come and have the experience of being a student at the institution. On reflection, as a result of her experiences and her teacher's advice, she no longer thought she was technically proficient enough to do this. However, she didn't think she would have done anything differently except go into the Education strand in order to play less of her Major Study instrument.

I'm applying to do my Graduate Diploma in Education... next year. [MW: "So do you just want to teach instrumental music or?"]... Classroom music, mostly... hopefully that, won't be as much... string playing... and... I would be more than happy to be, a tutor... but... my desire is to teach in the classroom... mostly for primary school younger age... I always knew I wanted to be a teacher... when I came to The Con it was, more of a decision, based on the fact that, I was accepted, and there was a bit of family pressure and, I wanted to, get better at my instrument and I also wanted, the opportunity to be in... a really top institution, so... looking back it's, [laughs] probably not the best decision I made but, I have learnt a lot while I have been here anyway... about... the athleticism of musicians and... really fully understanding... a musician's role in life... [MW:

“Would you do anything different do you think, if you could start the degree again?"] I would, probably have gone into the Education strand... and done less, of my major and more of, learning other instruments... that's all I really could have done the semesters that I deferred when I couldn't do my Major Study, well that just, it just happened like that... because I don't think I was technically ready when I came to The Con so it was always a struggle being here... to, perform and learn up to the standard... because I wasn't quite up to scratch technically and... reading music and stuff. (Anna, SEM 8)

Since being here I actually have realised what my passion is and, what I want to specialise in... and that was just through taking Pedagogy courses... if I wasn't here I wouldn't have her [Teacher J] and I wouldn't have had that course. (Anna, SEM 8)

In conclusion, Anna's experiences of playing related discomfort/pain were particularly severe and complicated further by other health problems. She was only able to complete her program after purchasing a smaller, lighter viola. Her lack of technical ability on the viola and a difficult relationship with her Major Study teacher were of interest.

Student 20: Rachel

Rachel was a viola player who reported some severe experiences of playing-related discomfort/pain throughout her time at the institution. She was very friendly and eager to help with the research although at times she did struggle to elaborate on her answers. During her first year, Rachel had to defer her Major Study and Orchestra courses due to severe playing-related pain in her back. (This pain became disabling during rehearsals for the Opera.) She subsequently consulted a physiotherapist who advised that she should do more stretching and general exercise. Rachel found that these things were helpful in decreasing pain, however, it was only with the purchase of a smaller instrument her discomfort/pain decreased to the extent that she was able to resume playing for periods of longer than 10 minutes.

For the remainder of her program Rachel continued to experience playing-related pain in various parts of the body, particularly during Orchestra rehearsals. She minimised her pain by limiting her orchestral playing, keeping her practice consistent, stretching regularly, and taking frequent breaks during practice. Rachel experienced some problems with her viola teacher that were very similar to those of Student 19 (Anna) and involved issues such as lesson scheduling and communication. However, Rachel was able to switch to a different teacher in her third year and found this much better.

At the conclusion of her program Rachel had changed her career aspirations from being a performer to being a teacher. She said that her own experiences of playing-related discomfort/pain had played a major role in this decision and that she had realized she would be unable to cope with the amount of playing required of an orchestral

musician. She planned on doing a Graduate Diploma in Education and moving into classroom music.

Table B20

Reported Pain Experience for Student 20: Rachel

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	4	Previous day, last time she played, after one hour	Both shoulders and upper right arm	2	2-3 hours	N/A
2	3	5	Previous Saturday, last time she played	Right shoulder and lower back	6	None	N/A
3	2	3	Previous day, last time she played, after one hour	Back of left shoulder and middle and right side of back	4	2-3 hours	5 hours
4	3	2	2 days ago, doing technique work, after about an hour	Left wrist and hand	3	2-3 hours	4-6 hours
5	2-3	3	Previous Friday during Orchestra	Both shoulders and both forearms	6	2-3 hours	5-6 hours
6	3	4	Last Orchestra rehearsal, about halfway through	Upper back and shoulders	5	2-3 hours	7 hours
7	3	4	Previous night during Orchestra after 20 minutes	Neck and shoulders particularly left	6	2-4 hours	6 hours

At the onset of her program Rachel had experienced playing-related discomfort/pain in her left hand, right forearm, both shoulders, left side of her neck, both sides of her back, and her lower body. Her back pain bothered her most in terms of severity.

As she progressed through the first year of her program, Rachel had to defer both her Major Study and Orchestra courses due to severe playing-related discomfort/pain in her lower back. This pain became ongoing away from the instrument during rehearsals for the Opera. Rachel consulted a doctor and then a physiotherapist who advised stretching and working out in order to build up her upper body strength. “Mainly the back [is affected]... it started... during Opera rehearsals... that’s when it became... persistent pain... I’ve had to... withdraw from Major Study... because... the required amount of time” (Rachel, SEM 2).

[The physiotherapist]... located the area of pain and... worked on... the area... and... helped me to stretch out the rest of my back which, doesn't normally get stretched... and I've started... to, work out, and... build up my, upper body strength. (Rachel, SEM 2)

At the beginning of her second year Rachel purchased a new, narrower viola (15 1/2 inches long versus 16 inches) and perceived straight away less pain when playing her instrument. As a result she felt able to re-enrol in her Major Study and Orchestra courses. Rachel noted that she came to the conclusion that she should get another viola on her own, not with the assistance of her Major Study teacher (Teacher I).

I don't get as much back pain, as before. [MW: “And you said that you thought that was, due to a new viola?”]... Yeah... it’s a lot smaller... my other one was 16 inch, my new one is... a 15 1/2, and it's not as wide... I got it... beginning of this

year... after a certain period... it [the pain] might come back but, it's not as bad as before. (Rachel, SEM 3)

For the remainder of her program Rachel continued to experience playing-related discomfort/pain, mostly during Orchestra rehearsals. However, her discomfort/pain changed focus several times, from the lower to upper back to her shoulders and neck. (She also experienced discomfort/pain in her arms and fingers.) It also shifted from being worse on the right side to being worse on the left side of her body. "I don't get much pain anymore... my back and now, sometimes my arm, when it gets stressed... only after a long duration... depends on how intense, the music is" (Rachel, SEM 4).

I find that, sometimes my hand gets a bit cramped... from... double stops and... especially... octaves. (Rachel, SEM 7)

I find that when I practise... solo stuff, my back doesn't hurt as much... but when I'm in an... orchestral setting... I seem to get pains... and, now it's... in the neck... it just gets very tight. (Rachel, SEM 7)

Rachel consistently perceived that her playing-related discomfort/pain was worse when she had to participate in Orchestra rehearsals. She noted that discomfort/pain experienced during could last for several hours after she stopped playing. If she had rehearsals on successive days her pain would come sooner and last longer. Her discomfort/pain was also influenced by intensity of music and type of chair she was sitting on during rehearsal. "Maybe, twice a week [I experience pain]... just depending on, how, focused and... intense I guess the practice, or rehearsal is" (Rachel, SEM 4).

Yeah, it, it does get less and then, I guess, for this upcoming concert we are doing *Rosenkavalier*... that's, a nightmare to play... and it's very long, as well, so [MW: "So have you been having a bit of, a problem there, practising that one?"] Yeah... fatigue and... lots of tension... it will still continue... because I take the bus here... so it's a 40 minute bus ride... if rehearsal finishes at 7 pm, it will probably last until about, 11 pm.... at night [MW: "And then the next day it will be fine?"]... Some muscles will still be a bit tense... [MW: "And what will happen if the next day you have to play a lot of hours again, will the same thing happen, or?"] Yep. [MW: "Will it happen quicker, than it did the day before?"] Probably, yeah. (Rachel, SEM 6)

Because [Teacher C] doesn't really, rehearse, he just plays through, and, a lot of us... may... not have practised... we might be like looking at the notes and then... straining and... sitting, where the stand is positioned, you might not... be able to see the music as well... so... maybe that's a factor as well... my deskie... is... a lot taller than I am... but we... have our stand down low because you have to look at, [Teacher C], so... that, is not good. (Rachel, SEM 7)

I find that... my private practice is fine but... the Orchestra rehearsals, just, kill me... because... they're so painful... in the neck... [MW: "... Does it distract you from the, music is it... all you can think about the pain...?"]... It's like a little voice in my head that... you can, hear... you know "Keep going keep going you know you have to get through this, don't stop otherwise... you don't wanna stay another semester". (Rachel, SEM 7)

Rachel expressed much dissatisfaction with the Orchestra course at the institution and thought that the frustration experienced during rehearsals in terms of a

lack of structure and productive outcomes etc. contributed to her tension and pain. She commented about another orchestra she was in, and the different atmosphere within which made it so much more enjoyable.

The way [Teacher C] structures, rehearsals... it's not, healthy for, everyone... like we... are doing the Saint-Saens *Piano Concerto Number 2* with [soloist].

Yesterday was the first time... we've played with [soloist] and is the first time we've played through the whole... thing... and so... it was incredibly messy, and... it's very draining, which isn't good. (Rachel, SEM 7)

In her final year, Rachel commented that the tension in her neck after Orchestra rehearsals could become significantly worse during the long bus journey home. At this time she also said that her discomfort/pain was influenced by having to work on the computer. She mentioned specifically the perceived difficulties of completing Pedagogy courses due to the workload on the computer.

Sometimes like after a long, long session on the computer... last year I did Pedagogy and Practicum... that killed me... I was so sleep deprived and, because you have to do... presentations and... folios and then you have to do all this extra stuff, I found... that, I was just on the computer and, I was... hunched in this one position and... it was so much work... I found that those courses in particular especially around, just the time, they are due... you are always on the computer. (Rachel, SEM 7)

Initially Rachel found her viola teacher (Teacher I) to be helpful and sympathetic with regards to her injury. However, as time went on Rachel expressed growing dissatisfaction. Issues included scheduling of lessons, delivery of material, and personality. Her experiences were in line with the other female violist student of this

teacher (Student 19, Anna). Luckily Rachel was able to change her teacher in the third year. Rachel did discuss her experiences of pain with this new teacher, and perceived that she had better solutions to problems. Also, lesson scheduling was reportedly much better which helped to reduce stress and therefore discomfort.

Yes, she's [Teacher I] been very helpful... because I guess she knows all about the body and, back and... I've got bad technique, and all the muscles have... all cramped up... and... she has told me... to do some stretches and, not to hurt myself... while I practise. (Rachel, SEM 2)

I find it much better... my old, other teacher [Teacher I]... she has, suffered... from pain... and I found... she was very concerned about me but... wasn't getting anything done... but with, my new teacher [Teacher H]... cause she has also had injuries... from playing... she is a lot more direct and to the point and, she knows how to fix it, straight away. (Rachel, SEM 6)

I was in... two lessons consecutively... and so it would be a pain... in the, week that she wasn't there, to try and practise for two lessons... [MW: "So did you find that would, lead you to have more, pain, because you'd have to do so much in one day?"]... Maybe not pain, but stress. (Rachel, SEM 6)

I learn from [Teacher H]... I like her...[Teacher I] is a more... organic teacher... but I found that... the way she explained things you could say it... in a quicker way so... learning from her... it takes a long time, to... develop or achieve anything... whereas [Teacher H], she is... more common sense... and so... I find that I learn, faster, with her... she is empathetic as well, but she has got more... practical... solutions, and... I can see where she is coming from because she... doesn't blabber on. (Rachel, SEM 7)

Rachel's concern about her experiences of playing-related discomfort/pain was in line with perceived severity. Initially she was extremely concerned and very down about her future. By the end she was much more optimistic, and said that she felt she had experienced her pain at its worst and that she now had the tools to deal with it if it became that bad again. By the conclusion of her program Rachel had gotten into a habit of giving herself a mental pep talk about how she needed to get through any pain so that she could complete her Bachelor of Music program. "I really want to keep going... because I love... the atmosphere I love, like everyone here... after... the injury happened, I, I was thinking that I don't want to be a cripple... when I'm... 30" (Rachel, SEM 2).

It [my pain] used to be, a huge, issue for me but now, I have... overcome that and, I know how to... build past that. (Rachel, SEM 4)

I guess, I've had probably the worst... injury in first year and I, I know that... it probably won't get as worse as... back then, and... I also know... a lot, more about myself and, playing and, the body to... help alleviate pain. (Rachel, SEM 6)

In Orchestra... you just, give yourself positive thoughts... like... "You can get through this, only another hour you can do it". (Rachel, SEM 7)

Rachel was consistent in reporting throughout that she did stretches/slow technical work as part of her warm-up. However as time went on she revealed that she mostly stretched afterwards and commented several times that she did not stretch before Orchestra rehearsals. This was both due to embarrassment and a lack of time, as rehearsals often started directly after a class finished. She perceived that this may have been one reason why she experienced more discomfort/pain within these rehearsals. For the majority of the program, Rachel took regular breaks when practising, generally

every 20 to 30 minutes, and claimed that she stopped playing whenever she felt pain.

“Whenever I start to feel pain... I take a break” (Rachel, SEM 3). “I do a few [stretches] before I play and then... I do, them after I play as well” (Rachel, SEM 6).

It’s also hard, to warm-up for a rehearsal if... your class finishes at 4 [pm]... and then you have to go to the orchestral, hall. (Rachel, SEM 6)

I think, when I do private practice... you are able to give yourself more time and more flexibility... so if it does start to hurt... then you might stop but I find that, if I practise for, maybe, I don't know, 30 minutes I won't get, the same pain as I do... in Orchestra. (Rachel, SEM 7)

In Orchestra you don't, tend to stretch... it's not intimidating it's embarrassing... [MW: “... Does anyone at all stretch?”]... Some people but... not everyone and... it’s a bit weird if you see. (Rachel, SEM 7)

After her initial injury a physiotherapist told Rachel of the importance of exercise and building up her upper body strength. Rachel said that this was extremely beneficial in reducing pain and consistently cited this as being a major strategy for preventing playing-related pain (although she became unable to keep up the exercise as her program progressed due to a lack time). She also attended a Project Week session taken by a physiotherapist at the beginning of her second year and claimed that she adapted his strategies for waking-up her muscles prior to playing. She perceived that this was very beneficial in terms of reducing playing-related discomfort/pain. “I do a lot... more exercise... weights... [MW: “And do you notice that that helps to reduce your playing-related pain?”] Yeah and I feel a lot... stronger as well” (Rachel, SEM 3).

Just stretch a lot more... after I play... I went to the... physio, session in [Project Week]... and so, I use some of his, techniques... to wake-up the muscles... [MW: "... Have you found that helps?"] Yes, so much. (Rachel, SEM 4)

I would like to get fitter because... obviously when I exercised... I felt, I had more stamina... to practise. (Rachel, SEM 6)

Throughout her program Rachel worked consistently teaching five to six hours a week and claimed that she got great enjoyment from doing this. Although she originally wished to be a performer, by the conclusion of her three-year program she had changed her career aspirations to teaching. At this time she was planning to do a Graduate Diploma of Education in order to become a classroom music teacher. Rachel acknowledged that her experiences of playing-related discomfort/pain were a deterrent to completing a fourth year. She also expressed reservations about becoming an instrumental teacher because she didn't feel she had the qualification and experience to teach instruments other than her own. She herself started learning in a group situation at school and felt this contributed significantly to her later issues with playing-related pain and injury.

I think if I got, really bad pain, before my exam this semester, I think I would cry... I'd probably defer my exam... if that were to occur. But... I was thinking over the Christmas holidays... do I want to stay for another... three semesters... and... I can only handle another semester... I think... were I to continue and do fourth year I think another, two semesters would just... be too long... I really would like to do... [a] Graduate... Diploma of Education... and hopefully become a teacher. (Rachel, SEM 7)

I don't feel that I'm, ready or capable to... enter a... school education... instrumental... system because I did Pedagogy last year, and... it opens your eyes out to... what it is... I might be the only string teacher so then I'll have to teach... all the instruments... and don't, know how to play the cello... the bass... and I don't want to teach a child... if I can't play the instrument I don't, want to inflict, harm... I guess... because I came from... school system and, were I to start with a private teacher I might not have... some of the... injuries that I have had. (Rachel, SEM 7)

What's happened, to me and... what I've learnt, I don't want to, happen to other children... so I'm, considering classroom music... I've changed my mind I... actually in Grade 11 I watched this documentary about... ACO and I saw... their lifestyle, and how... they played this beautiful music all over the world and, I was like "Wow, that's what I want to do" and, I came here and it was such an eye-opener because you realise... so many people... want the same... position and... I know that I'm not, as good as... some other people. (Rachel, SEM 7)

On reflection Rachel said that she didn't know anything about injury or prevention before she came to the institution. She thought that she wasn't technically or emotionally ready for the program and that it would have been better if she did a Certificate program first. She was not sure about the incidence of injury among string players, but said that she knew there was a very high incidence of injury among female viola players. She said it had been beneficial being in the research project, even if just to talk to someone about her experiences.

I wasn't, ready... musically and... mentally... at how... demanding... this degree is... I was very naive... and ignorant as to... how it was and... because I had

[Teacher I] and... she is not very... strict... but... she can make you feel guilty... just some words she uses that... can make you feel, bad, about yourself... so, I think, if I could have had... done, a Certificate course... before. (Rachel, SEM 7)

[MW: "Would you say, do you think most, of the other string students' experience, some kind of pain at some stage when they're playing? Or?"] I know violas, do, maybe not so much the guys but... the girls... we're not built to play these instruments... I'm not sure about violinists, um, or cellists, or basses...

[MW: "...Would it surprise you to know that a lot of students in the study are experiencing pain? Of all the instruments? And that some of them have it very badly...?"]... I guess... you're aware of it you don't really, discuss. (Rachel, SEM 7)

In conclusion, Rachel's perceived experiences of playing-related discomfort/pain were quite severe. She was only able to resume playing after purchasing a smaller, lighter viola. Her difficulties with her Major Study teacher were of interest and in line with other student of this teacher.

Student 21: David

David was a violist who switched to the instrument from the violin at age 16. Although he was easy-going and willing to participate in the research project, he was one of the students who frequently missed appointments we had made. David was unique in that he was very physically active, running 50 to 60 k m a week. At various times throughout his program he also participated in cycling, long boarding, kayaking, and lifting weights. For the most part he was also diligent with doing a physical warm-up away from the instrument and taking breaks during practice.

Initially David reported that he experienced very little playing-related discomfort/pain. However during the first half of his third year, he experienced a sudden increase in pain in his right wrist. (This was the only semester that he did not take part in data collection at all.) At this time he had greatly increased his practice to five hours a day and had stopped stretching as a part of his warm-up. He was also under a lot of stress due to his father being very ill and subsequently passing away.

Unlike many other students, once injured David said that he consulted and followed the advice of a physiotherapist almost immediately. With a regular program of stretching etc. he was able to return to playing quickly. However David did continue to experience some discomfort/pain whilst playing, mostly when sitting down and playing at the tip of the bow. Over time he perceived that this discomfort/pain evolved to being present when doing other activities away from the instrument such as heavy lifting and using the computer.

Unfortunately, and despite being largely able to resolve his discomfort/pain, at the conclusion of his program David was uncertain whether he wanted to continue with music as his career. He perceived that the competitive nature of the music industry in

general went against his personality and as a result of this he claimed that he no longer really enjoyed playing.

Table B21

Reported Pain Experience for Student 21: David

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	3	*	*	*	Less than 1 hour	N/A
2	2	2	Previous day during Orchestra	Left shoulder	3	2-3 hours	N/A
3	0	0	N/A	N/A	0	1-2 hours	6-7 hours
4	2	2	2-3 weeks ago during Orchestra	Right wrist	4	1-2 hours	6 hours
5	DNP	-	-	-	-	-	-
6	2	3	Previous week during Orchestra	Right wrist	4	1-2 hours	5 hours
7	2	2-3	Previous week during Orchestra	Right wrist	6	1-2 hours	4-6 hours
8	1.5	2	That morning during lesson	Right wrist	5	0.5-1 hour	4 hours

*Data discarded as I later realised that he described his most recent experience of general pain whilst exercising, rather than playing-related pain.

At the onset of his program, David had experienced playing-related discomfort/pain in his left shoulder and the left side of his neck. This discomfort/pain was present as aching when playing for long periods of time.

As he progressed through the first year of his program, David managed to resolve the pain in these locations with the help of his teacher. However, he did begin to experience sore joints in his arms when playing for long periods of time. “My teacher... I was getting a sore neck... for a while, and he just... fixed up some things with my, shoulder rest... and, stuff like that, and fixed it up” (David, SEM 2). “If I’m playing for a long, period of time, I get sore... joints in my arms” (David, SEM 2).

Early in his second year, David perceived that he was no longer experiencing any playing-related discomfort/pain. At this time he had just come back from a total break from playing, and was practising one to two hours per day. However, by the conclusion of this year, David was experiencing discomfort/pain in his right wrist during orchestral rehearsals. This discomfort/pain went away as soon as he stopped playing.

I don't really have any... discomfort playing now... I think because... I... sorted out a few things in my technique...the instrument, it was on the wrong part of the shoulder... that has made a big difference. And I've got a new shoulder rest now, as well... which is really, much better. My other one was pretty uncomfortable. (David, SEM 3)

The only thing, that has really developed is in orchestral playing, in particular because it is that long period of time I get... wrist, cramps... in the right hand... that happens, generally after... a pretty extended period of time... it’s a pretty new thing it’s just... maybe playing too hard or something. (David, SEM 4)

During the third year of his program David experienced an increase in pain in his right wrist. (As noted above, this semester was the only one where he did not participate in data collection.) This pain occurred at a time when he was reportedly practising five hours a day. When it occurred, he discussed it with his teacher at the time (Teacher A), whom he said straightway referred him on to a specific physiotherapist with experience treating musicians. David believed that the discomfort/pain was related to the ulna nerve and caused by tension in his hand. However, the physiotherapist said that the pain was coming from the shoulders and had nothing to do with his wrist.

Last semester I started... getting... a pain, which I thought was the ulnar nerve or something... going down that side... and... it was a mixture of bowing technique, that was doing it, it was just way too tight in the wrist and stuff... well, that's what I thought... but in the end... [the physiotherapist]... thought my shoulders were... hunched forward a bit when I played... and that, as a result, was travelling down my arms... which was pretty... weird in a way, because it goes to show that... even though the pain was here it had nothing to do with anything I was doing... around here, so... it would be really hard to figure out by yourself... what was actually going on... he gave me... a set of stretches to do, every time before and after I play... and, he just... used to massage my muscles and... he used to do all these special stretchy things... but after a few sessions... I found that... it pretty much just disappeared... mind you, if I don't stretch... it still sometimes, I think the stretching is really important for me. (David, SEM 6)

When the pain occurred David said that he stopped playing almost immediately, because he perceived that it really impacted on playing (particularly at the tip of the bow). He claimed to be feeling very paranoid and worried at the time, due to his father

being very sick and subsequently passing away. Both he and his mother thought the stress due to his father's illness may have been what brought on the pain. However, Teacher A reportedly said that she thought that it had more to do with David greatly increasing his practice to five hours a day. During this particular interview David claimed that he had never had any pain in his right wrist before. However he had actually reported some during the previous year.

I was pretty... paranoid about the whole thing... as soon as the pain started happening, it... started pretty quickly to.... interfere with... my playing a bit... mainly when I was at the tip of the bow, and when the wrist was... right around... and it started getting difficult to play like that, and I didn't really waste any time... I spoke to [Teacher A] about it first, and then... she put me on to [the physiotherapist]... I was pretty worried for a while... but he... straightened out straight away that it wasn't anything too serious... he said it could possibly turn into something worse, if I didn't do anything about it, but... I found, that after I started the stretches... it cleared up pretty quickly. (David, SEM 6)

I mustn't have thought much of them back then... that's interesting. [MW: "I wonder when it changed...?"] I think part of it was a psychological thing, because my dad got very very sick... and I went through a phase... where I was... constantly second-guessing my own health as well... and... I think it just... turned into a little bit of paranoia... so that's probably why I was so quick to act on it that time round. (David, SEM 6)

I think... it was because of... mental anxiety... I've just been a lot more tense generally speaking... because of what happened to dad and things like that. (David, SEM 6)

Actually, I just remembered... I was doing more practice when the pain started as well... at the beginning of this year I was doing about five hours a day of practice... I was really into it then, and... [Teacher A] thought that that might have played a role. (David, SEM 6)

Although he perceived that the pain resolved for the most part, for the remainder of the program David continued to experience some playing-related discomfort/pain in the right wrist, more so when he didn't stretch. He said that in the fourth year he was practising much less and so it was difficult for him to judge whether there was any improvement. By the conclusion of his program he reported that the discomfort/pain in his right wrist was also present to a degree when doing other activities such as heavy lifting and using the computer. "I've been, around the same I haven't really had any issues... with playing-related pain but I haven't actually been practising as much as I was either... I've slackened off a bit" (David, SEM 7).

It... starts off as something I can... feel in the back off my mind... and then, gets a little more prominent, but... it doesn't get too... bad [MW: "Is that because you stop before it does...?"]... Yeah usually when I feel it's coming, even in Orchestra I'll try and... give it a rest for a while, or even just play in a different part of the bow. (David, SEM 7)

I haven't actually being playing a whole lot of viola lately... certainly not as much as I was, so... I haven't really noticed a whole lot of... change. (David, SEM 8)

It generally makes, some sort of appearance when I'm, playing, but it's... never really concerning sort of thing. (David, SEM 8)

I get... little aches and pains in there that feel quite similar to what they were but sometimes they come up, just at work or something like that... and I think it's more... a general strain sort of thing... where if I'm, straining it in some way then, it just starts to happen... sometimes even when I'm at the computer or something like that... it might just even be if I'm, holding it a certain way... but I don't generally notice it very often. [MW: "Did you ever use to get that before... any kind of strain?"]... No I don't think so. (SEM 8)

As he progressed through his program, David mentioned the perceived impact of Orchestra on his playing-related discomfort/pain many times. Early on, this was because of the length of rehearsals and lack of breaks. Later, he perceived that Orchestra was more difficult because he had to sit down when playing. Despite this, on reflection he said that the Orchestra activities were the most enjoyable aspect of his program.

It depends how, intense the practice is if, we are not getting many breaks in between... it can be pretty annoying, but, usually, I have... periods where I can recover... little breaks and stuff, so it's not really that annoying. (David, SEM 2)

It was really just in Orchestra but it happened... a few times... in different orchestral rehearsals... it could be a sitting down thing. (David, SEM 4)

Sometimes in slower pieces, if I have to hold it up, and it's like lots of long, slow bows... I get a bit of discomfort in this shoulder, but... that doesn't happen if I'm doing much, like if I am playing something fast... it's usually just... sitting there... but I've talked to people about that as well, and it's... just a fatigue thing... I don't think it's... anything about me specifically because I think everyone... feels like that. (David, SEM 6)

The biggest thing I think I've, got the most out of was probably Orchestra... I almost wish that, the actual, performance degree was, just, solely about, performance...I'm thinking of asking [Teacher C] if I can just come in and play in the Orchestras next year. (David, SEM 8)

David was also consistent in perceiving throughout that his discomfort/pain was greatly influenced by the type of playing, as in the part of the bow and speed. He perceived that it was worse when he had to play at the tip of the bow, do long sustained bows, or play with lots of energy/tension. When he experienced discomfort/pain he said that he tried to either have a break or play in a different part of the bow. Generally speaking, as with most of students in this study, David's experiences of playing-related discomfort/pain seemed to be in line with perceived severity.

It [my pain] worried me the first couple of times... but... it, ended up going away pretty quickly... and I think it could have even been in particular, passages... the music or something that might have just been... particularly strenuous. (David, SEM 4)

I think it depended more on the piece we were playing... if it was playing a piece that was forcing me to... stress certain things. (David, SEM 6)

It's nowhere near as intense as it was... it actually usually, depends on what I'm playing, if I'm... at the very tip of the bow where, my wrist is... under a bit more duress then I, tend to notice it more. (David, SEM 7)

David remained very physically active throughout his program, reportedly running a minimum of five kilometres every day and cycling to the institution. At times he also did long boarding and kayaking. At the conclusion of his program he had started

doing weights at the gym in order to give him a more rounded workout. It was then that he perceived that the pain was occurring during other everyday activities.

For the duration of his program David claimed to be diligent in taking regular breaks during his practice every 15 to 30 minutes. During these breaks he would do some type of light physical activity and stretching. During the first year of his program he was also stretching as part of his warm-up, but in the second year he stopped. However, at the beginning of the third year, after experiencing an injury in his right wrist, his physiotherapist stressed the importance of stretching before and after playing. David, unlike most students, took this advice on board and from that moment on claimed that he always stretched before playing, whether it was private practice or Orchestra. “Usually just if I don't stretch... I always do anyway, but if I'm... picking it up for a second, just to play through something quickly... there is just... a little hint of discomfort there... but it's... nothing serious” (David, SEM 6).

I always do them [stretches] before I practise, I'm meant to do them after as well... but sometimes I don't... in fact quite often I don't... which is kind of bad because he actually said that the more important time... to do them is afterwards... so I should really get into the habit of doing them. (David, SEM 6)

I still always stretch before and after playing... [MW: “... Do you do it before... Orchestra and stuff as well?”] Yep, just any time before I play viola, really... [MW: “... Do you find that... some of the other students say they are embarrassed to do it during?”] I was at first, but... I don't care anymore... because I think everyone... respects the necessity of it now... I've got a few friends that stretch, before playing. (David, SEM 7)

It [discomfort/pain] doesn't, worry me nearly as much as it did usually, I just notice it and then go and do some stretches or something... and that's, generally it. (David, SEM 7)

I stretch pretty much every time before I pick up the viola... just trying to... maintain a good habit for that. (David, SEM 7)

By the end of his program, David was no longer sure whether he wanted to pursue music as a career. Over time he said that he had come to realize that his personality was not really suited to the competitive nature of the music industry. As a result he claimed that he no longer really enjoying playing. He was planning on having a year off to try and decide what he wanted to do in terms of his career. David said that he thought there were other students at the institution with pain but that, as a general rule, it was not talked about much.

Next year... [I am] having a bit of a break from study... going to do some work and... have a bit of a year off I think... I'm working as a referee at a paintball, place... and... I'm really enjoying that... and I might do some teaching... during the week or something like that... [MW: "... Do you think you want to, do music as your career...?"]... At the moment I'm unsure, that's why I think I need a year off just to... think about what I want to do... [MW: "And has that changed a lot what did you want to do when you came to The Con?"] Definitely, orchestral playing... it is almost like I have come to this, feeling that I'm not the sort of person who is, really good at, locking myself in a room all day and just practising all day... I don't have the attention span... and I think to really, get into the industry you... need to have that, quality so... just not sure my personality is suited to it... [MW: "When was it that you started thinking that, music might not

be, the career or Orchestra playing at least?"]... I was on and off about it, since the beginning of this year... I... spent a lot of time, trying to convince myself that it was... still what I wanted to do but... it was only really recently that I... haven't given up on it... but I... acknowledge for the time being that I do need at least a break from it. (David, SEM 8)

I feel like The Con has... sucked the enjoyment of music out of it for me... I don't think The Con could really do anything about it... the thing that I react to most is... the competitive aspect... the fact that everybody is in a sense competing with each other even, though no one would say that... it's... the unsaid... thing... if you actually want to get a job at the end of this you have to be the best... so... I just don't like the competitive aspect and, I've just found that while I have been focusing on that... I start thinking more about that than more about just enjoying the music and that... ruins the whole thing for me. (David, SEM 8)

I did Pedagogy 1... and I considered the idea of doing a Dip.Ed. but... the thing I'm quite keen on looking into is the Music Therapy... course, over at [another institution]... I like the idea of doing something... service oriented but... I still want to, think that my Music degree... meant something at the end if I don't choose to pursue music. (David, SEM 8)

I don't hear a whole lot about it... but I think some people, have some discomfort sort of thing [when they play their instrument]. (David, SEM 8)

On reflection, David said that, throughout his program, his main strategies for preventing playing-related discomfort/pain had been stretching and awareness. He said that there was only one point when his experiences really concerned him and that was when the perceived injury occurred.

The stretches were definitely, something to counteract it... and I guess... when I am playing I'm a bit more aware of how my bow arm is and whether there is a lot of tension there because I... felt for a while that it might have just been to do with a lot of tension in my bow arm. (David, SEM 8)

[There] was only one real, point where it was really bothering me and that was... last year... when I did go and see [the physiotherapist]... and then it... eased off, and then since then I haven't really, had any issues with it but... I don't know what, brought it on it might have just been something in particular that I was doing with my technique at the time... or... I wonder... as well whether it was just a stress-related thing. (David, SEM 8)

In conclusion, David's case had many contributing factors in common with others in the study. However, he was unique in that he sought (and followed) professional advice as soon as he noticed a significant increase in pain. His high level of fitness due to long distance running was also of interest.

Student 22: Eve

Eve was a violist who originally played the violin. At the onset of her Bachelor of Music program she had been playing the viola for less than 12 months.

Prior to her studies at the institution Eve said that she had experienced playing-related discomfort/pain in her left fingers, left wrist, left hand, left shoulder, and neck. The discomfort/pain in her left fingers recurred when she played for extended periods of time. However her left shoulder pain also recurred and this pain bothered her most in terms of severity. Eve said that she noticed a change in her pain levels (specifically, tension in her left shoulder and a sore neck) when she began playing viola.

Eve had the potential to be an interesting case study. However, she withdrew from the Bachelor of Music program after completing one semester and did not continue her involvement in the research project.

Table B22

Reported Pain Experience for Student 22: Eve

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	3	Previous day during practice	Left shoulder and neck	9	1-2 hours	N/A

Student 23: Frank

Frank, a double bass player, was the only student in this research project to indicate in the Initial Questionnaire, Section 3, that he had never experienced any playing-related discomfort/pain. Frank was also the only student who arrived late to the scheduled Orientation Week session during which students completed the Initial Questionnaire. As a result he did not hear the background to the research project or the explanations as to how to answer many of the questions. (Despite being around 15 minutes late Frank was still the first student to finish his questionnaire and asked to leave straight away.)

By indicating in Section 3 of the Initial Questionnaire that he had never experienced any playing-related discomfort/pain Frank was able to avoid answering many questions. It seemed possible that this was his motivation as he was inconsistent – in Section 4 he said that he had experienced General Stiffness of Joints, and that it was Mild at its worst. Of course, it was also possible that he had just misunderstood the question in Section 4 and thought that he had to give an answer.

After the Orientation Week session several attempts were made to contact Frank in order to ask him to clarify these points however he did not respond. Unfortunately, despite remaining enrolled in the Bachelor of Music program for three semesters before withdrawing he did not participate any further in the research project.

Table B23

Reported Pain Experience for Student 23: Frank

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	1	N/A	N/A	N/A	1-2 hours	N/A
2	DNP	-	-	-	-	-	-
3	DNP	-	-	-	-	-	-
4	L	-	-	-	-	-	-

Student 24: Gary

Gary was a violinist who started learning through the Suzuki method at a young age. He was one of the more advanced students in the Bachelor of Music program and his reported experiences of playing-related discomfort/pain were minimal. He was friendly and open, attended workshop, and was one of the easiest students with whom to arrange research appointments.

Gary said that he had two occurrences of pain in his left wrist during the first year of his program. Apart from this, he only experienced occasional muscular tension in his shoulders and upper back. This tension was worse when he had to play long hours, perform, or wear a suit and tails and generally Gary only became aware of it after he stopped playing. He practised up to five hours a day but he did so consistently and with regular breaks. By the fourth year of his program he was also reportedly stretching regularly as part of his warm-up. He perceived that this was very effective in helping to reduce his playing-related discomfort/pain.

During the third year of his program Gary had a session with a physiotherapist as part of his internship with a professional symphony orchestra. She advised him that he had mild scoliosis and gave him specific exercises to do. Gary believed that many of the musicians in that orchestra were having problems with playing-related discomfort/pain, but said that it was not a common topic of conversation. Similarly, he believed there were a lot of students at the institution with problems but not to the extent that they couldn't play.

At the conclusion of his program Gary was working as a casual with two professional orchestras and wished to do this long-term. His only criticisms of the learning environment at the institution were that he believed that some of the staff were

not honest with students about their abilities and the likelihood of them getting work; and that the Orchestra rehearsals were not very well structured.

A technical error occurred during Gary's final interview and as a result there was no recording. A transcript of his responses to each question was compiled immediately after and subsequently approved by Gary. However, there were no direct quotations from this interview.

Table B24

Reported Pain Experience for Student 24: Gary

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	5*	5*	2 weeks ago during an orchestral rehearsal*	Left wrist*	7*	2-3 hours	N/A
2	2	2	Previous week	Left wrist	6	3 hours	8 hours
3	1	1	Previous week during orchestral rehearsal at the end of the day	Right shoulder	1	4 hours	7-8 hours
4	1	1	Previous day	Right shoulder	2	4 hours	7-8 hours
5	1	1	Present at time, 1	Left shoulder	3	4-4.5 hours	7 hours
6	1	1	Previous week during an orchestral rehearsal	Shoulders	1	5 hours	8-9 hours
7	1	1	Previous week	Shoulders and upper back	3	4 hours	9 hours
8	1	1	3 days ago, towards the end of a recording session	Shoulders	3	4 hours	8-9 hours

*Misunderstood the question: described most severe experience of discomfort/pain, this reportedly occurred two weeks prior to questionnaire completion.

Prior to his studies at the institution, Gary had experienced playing-related discomfort/pain in his left wrist, neck, and back. The discomfort/pain in his neck bothered him the most, and recurred when he played for long periods of time. However, his most severe experience of pain occurred when he cracked his left wrist two weeks prior to questionnaire completion. After this he was unable to play for two days.

As he progressed through the first year of his program, Gary noticed a decrease in discomfort/pain. Although he had two more occurrences of pain in his left wrist, both of these were preceded by him cracking it. Generally speaking, he claimed that he was only experiencing stiffness in his shoulders and upper back.

I had a little pain in my in my wrist at the start of the year, but, that's only come once, this whole year... last week... I don't think it's actually... playing-related I think it's just because I crack my wrist... and... playing probably aggravates it a little bit more. (Gary, SEM 2)

The first time it happened at the very start of the year it was... two days maybe [that I couldn't play]... and this time it was, much less, sore... probably only a day and a half, a day maybe. (Gary, SEM 2)

By the second year of his program Gary had stopped cracking his wrist and this particular discomfort/pain had disappeared. At this stage he said that he didn't experience any discomfort/pain apart from muscle cramps and tension in his shoulders and upper back. From this point on Gary was fairly consistent in saying that his playing-related discomfort/pain was more likely to occur when performing or playing long pieces.

If I'm practising long hours I'll still, maybe get... muscle, muscle cramps and stuff but... there is pretty much no pain, except for maybe a little bit of tension

sometimes... after a long practice session [MW: "... Does that also happen after the Orchestra?..."]... I think maybe I have improved my posture a little bit it's not so bad in Orchestra anymore. (Gary, SEM 4)

During the third year of his program Gary increased his practice to five hours a day. Although he was still experiencing occasional muscle tension in his shoulders, he perceived that this was decreasing as a result of regular stretching. Gary said that he only became aware of discomfort/pain once he stopped playing. "Occasionally it's... getting better I'm doing more, stretching before I play now... it's working well. [Laughs]... I'm doing [it] every time... which is good, it's helping a lot" (Gary, SEM 6).

By the conclusion of his program, Gary was referring to his shoulder tension as soreness. However, he still only noticed it once he stopped playing and it was usually gone by the next morning. During his final semester he had a single massage when he was sore. He said that he found this helpful but he did not follow through with more.

Depends how much practice I've been doing... in Chamber Camp we were playing up to about, some days nine hours a day so at the end of that I'd be... pretty sore but I'd be okay by the next morning I just needed to have a bit of a stretch and... take it easy for the night... [MW: "You've never actually said to me before, the word sore, ever."] Haven't I? [MW: "No, so that kind of, stands out to me."]... I don't really get sore I guess I'm lucky [MW: "... Do you feel as though it... sticks in your mind a little bit more this time, than it has in the past...?"] Not really, just because... it was recent [last week]... and... because... that amount of playing in a day was pretty intense. (Gary, SEM 7)

Gary perceived that his discomfort/pain was more likely to occur when he was playing long hours. As he progressed he elaborated further, noting that it was worse

when he had to play long pieces or perform, particularly when having to wear a suit and tails. Generally speaking, he only became aware of his discomfort/pain after he stopped playing. “I think if I do, a really extended practice like, three hours in one go then I'll probably start getting cramps... after that” (Gary, SEM 3).

We've [Teacher A and I] been talking a bit about... obvious tension in my shoulders so I think just, relaxing, is going to let it go I don't think it's any... length-related issue or anything. (Gary, SEM 4)

I don't notice it, really when I'm actually playing... it's just afterwards. (Gary, SEM 7)

From the onset Gary did an elaborate technical warm-up of up to one hour. At the end of his second year he began to incorporate stretching but did not get into a routine of stretching until the third year. He claimed to notice significantly less discomfort/pain when he stretched. By the fourth year he was doing a regular warm-up of five-minutes stretching each morning. Although Gary practised up to five hours a day throughout his program, he was reportedly fairly consistent in taking regular practice breaks. “I try to but I don't, often remember [to stretch before playing]... going to class this morning and doing it really you realise... how much... a difference it makes if you do... some” (Gary, SEM 4).

Sometimes I do... four blocks [of practice] in a row but with... half-hour breaks in between each one. (Gary, SEM 6)

I do probably, five minutes of, stretching before I play each morning... if I've taken an extended break then maybe I will do a couple of stretches but, generally just, the first time... it just... warms me up away from the instrument, which is good. [MW: “And did you do... that when you were... on [an orchestral tour] and

all that...?"]... Yeah I think I would be in a lot more, pain or discomfort if... I hadn't. (Gary, SEM 7)

Gary was consistent in saying that, when he experienced playing-related discomfort/pain, he would stretch and give himself a massage. He perceived that this was effective in eliminating the discomfort/pain. His main strategies for preventing it happening were awareness, stretching, and taking breaks during practice. "Stop if it hurts, I guess [laughs]... I think, the key to playing is always just, trying to be as relaxed as you can" (Gary, SEM 4). "Give myself a little, massage or get somebody else to give me a massage or, have a stretch" (Gary, SEM 5).

Towards the end of his program Gary started working as a casual player with two professional symphony orchestras. As part of one internship he had the opportunity to speak with renowned music physiotherapist, Bronwen Ackermann. She advised him that he had mild scoliosis and gave him some specific exercises to do. Gary expressed the opinion that a lot of players in that orchestra had problems with playing-related discomfort/pain, although they didn't discuss it specifically.

I had a session with Bronwen Ackermann... she, just gave me some stretches to do... I was doing the [orchestra internship] program and that was just... part of it. [MW: "... What did she have to say?"]... I've got a bit of scoliosis she reckons, [laughs]... maybe... that affects my, shoulders or something I dunno... [MW: "Do you think there were many people, in [that orchestra] who have got issues?"] Yeah I reckon there's heaps of people who, have got issues but they probably didn't have the education that we've, had... [MW: "... Do they talk about it, or not?"] No. [MW: "You're just assuming?"] Yeah. (Gary, SEM 6)

Gary also thought that there were quite a lot of students at the institution experiencing discomfort/pain but not to the extent they couldn't play. After observing the other students he perceived that those who had experienced injury took better care of themselves and were much more aware of the issue of injury. Generally speaking, it was not something that they spoke about, although he noted that during a national orchestral program, it was sometimes mentioned after a long day. "I guess people at the end of each day... might say 'Oh' you know 'I'm a little bit, bit sore or uncomfortable' or something but, we'd kind of just give each other massages and deal with it [laughs]" (Gary, SEM 7).

Although he expressed some concern about the discomfort/pain in his left wrist early in his program, Gary was not concerned about the discomfort/pain in his shoulders and upper back. This was because it went away after an hour or two, and in his opinion was not particularly bad.

I'm not so concerned about... upper back pain because I think if you are sitting in any position for a long amount of time it's going to happen anyway... but... the wrist... if it happens again I probably should speak to somebody I guess. (Gary, SEM 2)

I don't feel it's a really big problem... it's not, really hurting or anything... after I do a few stretches or something it will stop. (Gary, SEM 4)

Gary remained reasonably physically active during his program, playing squash at least once a week. At the conclusion of his fourth year he was also doing some bike riding and gym work up to three times a week depending on his schedule.

On reflection, in regards to the Orchestra subject at the institution, Gary said that he didn't think the rehearsals were well structured including in terms of reducing

playing-related discomfort/pain. He didn't notice people stopping and stretching during Orchestra, nor did he think this would have been well-received. However, he said that he did not feel embarrassed to stretch before Orchestra rehearsals.

No I think I have been, handling pain and practice pretty well so I haven't had much pain at all... I've, started stretching... [MW: "... Do you do it before Orchestra as well or?"] Yeah a little bit before Orchestra... [MW: "Do you find that embarrassing? I'm only saying because some people, say they won't do it because it's embarrassing]... No, I don't think so... I'm not embarrassed by it... if I was I would, go into a practice room or something. (Gary, SEM 5)

At the conclusion of his program Gary was unsure what he was going to do next year but he wanted to play professionally in an orchestra. The only criticism he had of the Bachelor of Music program was that he thought some of the staff members were not always honest with students about their ability.

In conclusion, Gary's experiences of playing-related discomfort/pain throughout his program were minimal. He appeared to display a sensible approach to prevention.

Student 25: Steve

Steve was a violinist who experienced increasing playing-related discomfort/pain throughout his Bachelor of Music program. He was one of the students who consistently didn't show up for scheduled appointments however he became extremely apologetic and distressed when reminded. From the outset Steve's perceived discomfort/pain was severe enough to stop him playing his instrument and persisted after he stopped. However, the focus of the pain changed several times (from his back, to neck, to neck and shoulders). During the third year of his program Steve's pain became constant and at the conclusion of the fourth year he was experiencing symptoms of Temporomandibular Joint Dysfunction (TMJ) and waiting for a splint.

Steve was unique in that he claimed to do a relatively small amount of individual practice, even though his total amount of playing time was extremely high. At times he reported playing up to 11 hours a day due to his involvement with Chamber Music and orchestral ensembles. The amount of playing-related discomfort/pain he experienced was heavily influenced by the repertoire, his enjoyment of playing, and his position in an orchestra (up the front of the section rather than down the back).

At many stages Steve spoke of his concern and his perception that he needed to consult someone about his discomfort/pain. He also asked for advice many times and I referred him to various books and, at one stage, a physiotherapist. Like many other students in this research, he didn't ever get around to looking at the books I recommended. However he reportedly did consult someone about his playing-related discomfort/pain when it became very severe, at the conclusion of his third year.

As he progressed Steve provided a lot of inconsistent information regarding the severity of his experiences, the impact of orchestral playing versus private practice on

his pain, the benefits of stretching etc. In fact, he commented to me several times that he was aware of these inconsistencies! Steve perceived that he was an extremely anxious person and he believed that his personality had a large impact on the amount of playing-related discomfort/pain he experienced. However, as the researcher it was quite difficult to understand how someone who presented as so extremely worried about their pain appeared to immediately forget everything discussed (as well as his good intentions) upon leaving the room.

Steve was definitely one of the more interesting cases in this research. Refreshingly, and despite his experiences of playing-related discomfort/pain, at the conclusion of his program he was still confident that he wanted to be a musician full-time and he was planning to go on and study at a national music school. On reflection, he was one of the few students to say that he found the Orchestra course at the institution beneficial in preparing him for his professional working life.

Table B25

Reported Pain Experience for Student 25: Steve

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	5	Present at time, 1-2	Middle of back and shoulders	3	More than 3 hours	N/A
2	4	5	Present at time, 2	Back	8	Less than 1 hour	N/A
3	2	2	Previous day	Back	5	Less than 1 hour	11 hours
4	4	4	Present at time, 2-3	Both sides of neck	11	1-3 hours	8 hours
5	3-4	3-4	Present at time, 2	Middle and left side of neck	6	1 hour	10 hours
6	4	4-5	Present at time, 1	Left side of neck and left shoulder	14	2.5 hours	8 hours
7	2	5	Present at time, 1	Left shoulder	6	1-2 hours	11.5 hours
8	2-3	2	Previous Friday	Neck and shoulders	10	1.5-2 hours (but up to 7)	7 hours

Prior to his studies at the institution, Steve said that he had experienced playing-related discomfort/pain in his fingers, hands, wrists, shoulders, neck, and back. His back and neck pain bothered him the most, and recurred when he was sitting down during long orchestral rehearsals.

As he progressed through the first year of his program, Steve said that the intensity of his pain was the same but it was worse because he was playing more frequently. Steve was finding orchestral rehearsals particularly difficult and was also noticing that his back pain was aggravated by his posture whilst sitting at the computer. “It’s... more frequent... because I’m playing more... it was pretty bad to start with and... it’s still pretty bad” (Steve, SEM 2). “Also note that, I have terrible posture when I’m sitting, at the computer... I spend, probably, half of my waking life at least on the computer” (Steve, SEM 2).

Steve reported that he noticed a decrease in pain early in his second year after the Christmas break. However his discomfort/pain worsened again in the second half of the year and switched focus to his neck. At this stage Steve stated that it was just that he wasn't paying attention to his pain earlier in the year not that it was any better.

I'm doing more practice and it's gotten worse... I don't notice it sometimes... I think that was the thing earlier on in the year as well, it was more I just wasn't thinking so much about it... and therefore it wasn't a big issue. (Steve, SEM 4)

By the time of our next questionnaire at the beginning of his third year, Steve was again stating that his pain was much better. This was despite having been unable to practise the three days prior to questionnaire completion due to severe neck pain. Steve believed this neck pain was caused by sleeping position, and noted the impact of other activities on his playing-related discomfort/pain. By the end of this year he was experiencing constant pain in his neck and shoulders. At this time he discussed his pain with his violin teacher who recommended Alexander Technique.

I haven't been playing for a few days because my neck is just, screwed up... I think it's just from sleep... but, playing made it worse, initially... so I, I've had a

couple of days off... I... tested the waters this morning, and it hurt a bit... but then I thought... I want to practise now so I played anyway, [laughs] later on and actually, I think because of my attitude... it wasn't a problem. (Steve, SEM 5)

I've got a lot of... neck and, shoulder pain... over the last couple of weeks... because I am practising a really technically difficult piece and, I'm getting really tight in my shoulders... I think it was better for a while I was, trying to do the Alexander Technique stretches... and that was working well for me, but now...

[Teacher A] has actually... said to me "You need to go and, do Alexander Technique probably again..." My whole body doesn't feel strong. (Steve, SEM 6)

I'm going to go to a professional, and get it, fixed, pretty much as a matter of urgency... [Teacher A] knows an Alexander Technique person who specialises in string, playing... so sounds perfect to me. (Steve, SEM 6)

Over the Christmas break, Steve did six sessions of Alexander Technique and reportedly found them very helpful. As part of an orchestral internship he also had a consultation with renowned music physiotherapist Bronwen Ackermann. After this, Steve perceived that his back pain had virtually gone, but that his neck and shoulder pain was still present all the time and in some situations was actually worse. "I have had about, six sessions of Alexander Technique, which have been great... my back pain has gone completely... and on [a national music camp] it was really, not very much discomfort... and that was immediately afterwards" (Steve, SEM 7).

[MW: "Would you say... the neck and shoulder stuff is worse than it was at the end of last year...?"] It's about the same... with really extended, periods of playing, it's worse but... it calms down... it's not... excruciatingly painful when

I'm not playing... it immediately gets better when I put the instrument down, to some extent... but I'm still aware of that area... there's still some tension there.

(Steve, SEM 7)

I had a session with the physio in, in [another city] actually, when I was doing the [orchestral internship]... she thought that my set-up was really good. (Steve, SEM 7)

By the conclusion of his program, Steve was experiencing constant tension in his neck and symptoms of TMJ. He believed these symptoms were triggered by a different chinrest. He had to consult the dentist about this and at the time of his final questionnaire was waiting to get a splint.

It's gotten a little bit better... generally everything is okay... if I, move my head back I can feel the tension there... so... there must be some sort of long-term thing going on but... it's not like... it's, hurting, pain all the time... it's... something that's always present but so subtle... generally it's just sort of a bit of, tightness... which isn't so concerning. (Steve, SEM 8)

I got a new, chin rest... it's really tall... and then... not long after getting it, I started to have a lot of jaw problems because I didn't adjust my shoulder rest right and it, was pushing my jaw to the right and I've still got TMJ issues... as a result of that so, there are sort of all these funny jaw things that are going on now... but... I am not sure how playing-related that is, because my dentist says it is just from... gritting your teeth in your sleep... I probably don't really get that much pain, I just get other things, that I think worry me, and I associate them with pain... like clicking and... grinding when I open and close my jaw. (Steve, SEM 8)

As he progressed through his Bachelor of Music program, the perceived focus of Steve's pain shifted many times between his back, shoulders, and neck. He highlighted orchestral rehearsals as being a problem for him very early in his program. However, he said that his pain during rehearsals was linked to his enjoyment of playing and actual position in an orchestra. When he was enjoying the music and/or he was up front he sat with good posture and forward on the chair and experienced much less discomfort/pain. However if the music was boring and he was up the back he was more likely to slouch right back and relax. "I've been doing all... the [outside orchestras], and...Con, Chamber Group... but... I sit right to the front of my chair because I love the music, and I'm not... sitting back and getting tired... it's good fun" (Steve, SEM 3).

Isn't it, true that the way we think is that whatever the most intense area is the area that we concentrate on... so even if it hurts everywhere if it's much worse in one spot that's all you think about. (Steve, SEM 6)

If there is like a *fortissimo* passage on the G string... up really high... obviously, there's a certain amount of, shoulder tension that is involved... that's just what happens... I mean... those the great violinists that don't even play with shoulder rests, they have to, grip... surely when they go up there. (Steve, SEM 7)

At the moment I have been sitting, in, positions where I can't slump... I have to sit up and concentrate... that has always been a, a significant thing... if I am concertmaster or something then I have got to sit forward on my chair... whereas, if you are sitting at the back then you sort of... slump. (Steve, SEM 8)

Like many of the students in this study, Steve noticed an increase in perceived discomfort/pain during and after attendance at various national camps and orchestral programs. He was also consistent in noting that repertoire had a big effect on the

amount of discomfort/pain experienced during both orchestral situations and private practice. Of particular difficulty were long slow passages and technically difficult pieces.

I think repertoire has a lot to do with it actually... the piece I have been practising a lot in the last week, which is when the pains really gotten worse, is, the *Introduction to Rondo and Capriccioso*... so... every time I get to a run or something I... tighten up. (Steve, SEM 6)

We've had even more intense camps... The one I've just been on... that's probably the worst... there was some points where... I was... putting my instrument down every time I had rests... just... to give it a break. (Steve, SEM 7)

I have just got back from a chamber music camp we had... 11 hours of rehearsals every day so... it was ridiculously exhausting, way too much work but... it's not like super painful like, I have to stop playing but it's... pretty... concerning. (Steve, SEM 7)

Steve's practice seemed to be very erratic and at one stage he admitted that it could vary from one up to seven hours per day. Breaks also varied depending on level of pain and concentration. However his total amount of playing time remained very high throughout the whole program, at times up to 11 hours per day. At several stages he was able to link his level of perceived pain to the inconsistent amounts of private practice. After playing 11 hours, he found that "My playing... was great... [it] really paid off, playing that much in the day, but... I was... so exhausted... I was very sore the next day" (Steve, SEM 3).

Steve's pain could also be influenced by whether he was sitting or standing when playing. Originally his pain was more severe when sitting down and playing. However, by the end of his program he was noticing far more pain when standing up practising, even when his total playing time was the same.

My parents have told me that I stand out in orchestras because... I've got terrible posture because, it just hurts so much, and I would really like to be able to sit up... and I like to move around a lot and maybe that's... contributing to the pain... because I do really get stuck in. (Steve, SEM 2)

I'm getting better at sitting up, for, longer periods of time in orchestral playing... which is good. (Steve, SEM 6)

Steve's playing-related discomfort/pain could also be affected by computer use, sleeping position, carrying items, and working (particularly if he had been practising beforehand). As he progressed Steve tried various different chairs at the computer including a saddle chair. He reportedly found it very beneficial in helping him to keep good posture at the computer. Interestingly, during his final questionnaire he said that carrying items had never been an issue for him. Further on during this interview when discussing contributing factors I mentioned carrying things and he then remarked that it would have been beneficial if I have brought this up earlier! This was one of many inconsistencies present in his answers.

If I'm writing music which is what I spend most of my time doing... at the computer these days, it's, got all of my concentration and I'm not devoting any to how I'm sitting... when I get up from the computer I'm just like "Ow, my back is really sore". (Steve, SEM 4)

I try and be really conscious of how I sit at the computer... I, alternate between two chairs and one of them is this one that you, kneel on... and your feet go on a separate thing... but it still supports your bum... it's good from time to time but then... things feel a bit strange so I then get back to my other one. (Steve, SEM 5)

Well the thing with gigs is, you can't take a break very often... and it depends on who you're working with... because I don't, personally, organize any of them myself... but... I did a gig once... and, it was three hours, without a break, and I was absolutely exhausted by the end of it. (Steve, SEM 6)

Sometimes... my neck pain annoys me when I'm in bed... trying to lie on the pillow. [MW: "So do you often wake up, and your neck's sore after sleeping or?"] In the mornings sometimes... it depends on... how I sleep on my pillow and all that sort of stuff... I don't even know if it's my pillow that's making my neck sore in the first place and it's just that I notice it when I'm playing my instrument. (Steve, SEM 7)

I think that [carrying items] may be part of it... because... I've got like a little, side bag that... I, used to wear it over one shoulder and I think I used to lift my shoulder to keep it on the shoulder so it would not fall off. (Steve, SEM 7)

[MW: "Do you find that carrying things can aggravate it, or not really?"] Never really thought about it. I don't think so. (Steve, SEM 8)

I wonder if having this kind of interaction would have been helpful earlier, because now you have reminded me... carrying heavy stuff over my shoulders... did have an effect... which probably goes back on something that I said earlier I don't know... I think generally it is not too much of an issue because I tend to

switch shoulder to shoulder and that was something that... [the Alexander Technique teacher] told me to do... but again, being someone who is really sensitive about these things, as soon as I feel the slightest bit of discomfort, I switch it... or I hold it in my hands in front of me or something... because... I am a very “preventative” kind of... person so, which goes with the anxiety territory. (Steve, SEM 8)

With the exception of his fourth year, Steve perceived that his playing-related discomfort/pain was worse in the second half of each year. However, he acknowledged that at times he was just not aware of or thinking about his pain and that is why he thought it was not as bad.

Always after a rehearsal you are sort of there going “Man I've really got to do something about my back...” and... then you forget that you, planned on doing something about your back and so, then you are at the next rehearsal and it hurts. (Steve, SEM 2)

Generally speaking, when he experienced playing-related discomfort/pain Steve would stretch or crack the various joints. This usually made it a bit better and he would then continue to play until he perceived that it was bad again. It was only on very rare occasions that he would stop playing completely. “I get my brother to, crack my back and he has the same problem... it works, but... I'm sure it's unhealthy and, it's not the right, solution” (Steve, SEM 2).

If it [my pain] is so extreme that it's excruciating I'll stop playing... just listen but... that doesn't really happen very often... I normally just persevere, or... take it easy... support my, [laughs]... my arm on my knee or something. (Steve, SEM 7)

Steve's main strategies throughout his program for preventing playing-related discomfort/pain included stretching, awareness, and more consistent practice. For the most part, he only stretched when he was already experiencing discomfort/pain and his warm-up was not regular. He began stretching regularly during a music camp at the beginning of his third year. However, he stopped doing so much as he went through the year. He perceived that the various stretches took too much time and that he played worse afterwards. "Normally I only do those stretches if... I'm... hurting from a previous practice or something" (Steve, SEM 4). "Just doing more stretches, doing... more consistent practice so it is not in bigger chunks... at least I'm picking up the instrument every day" (Steve, SEM 5).

Just relaxing... because often, a tension in one place... causes tension in my other shoulder. (Steve, SEM 7)

I'm still doing Alexander Technique stretches but, I don't... know if the... other things that I was doing was really giving me that much benefit... I always played worse after doing them and that was the main thing... it was not a discomfort thing so much as... I just felt like I spent so much time stretching because I would spend... half an hour three quarters of an hour... and... it wasted a lot of time... so it was at the expense of my practice as well as when I actually started playing I felt like I'd already been doing a whole lot of work for a long time so I wasn't fresh... [MW: "Why did you do so much...?"] ... The [national orchestral] programs... give you a thing... and to do all those stretches properly it takes ages... maybe you're not supposed to do them every single time you practise but, I thought it might be useful [laughs]. Maybe I overdid it. (Steve, SEM 6)

Steve's reported concern about his discomfort/pain was in line with the severity of his experiences. During our first interviews he presented as extremely worried about his pain and I was sure that he would consult someone about it but at the next interview he had not followed through with it. He did speak about it with his teacher, parents, an Alexander Technique teacher, and a physiotherapist at various times. However, for the most part he acknowledged that he forgot about his pain and good intentions as soon as he stopped playing. "I think there's more I can do, for myself... I just need to make sure I do the things. These talks are good because it... reminds me again of the things that... I need to... do" (Steve, SEM 4).

I think it is the worst, although, I remember... being really concerned about the back pain... because that was... really bad at times.... but... I feel like this could be more long-term and... I am just really worried... and I see people around me... getting injuries and stuff and... I really don't want to do that because if I get an injury... it costs you time and, money. (Steve, SEM 6)

I'm worried about it, but [laughs] I'm scared to address it... because if I go to a professional I think they're going to be... "You... have do an hour of stretches and, twisting and... jumping up and down... before you actually play" which is really frustrating because if you don't have much time to practise... [MW: "Would you [say you are] more... or less worried about it now?"]... Probably... my worry for it increases as the pain increases. (Steve, SEM 6)

Steve was not particularly physically active at any time throughout his program. The most exercise he did was when he cycled to the institution with his violin on his back every day during his second year. At this stage he thought this may have been assisting him to improve his posture by pulling his shoulders back. "The straps on the

violin, pull my shoulders back and I'm not sure if that does me good, but I think it might... although it does hurt a little bit" (Steve, SEM 3).

On reflection, Steve didn't think he'd grown more tolerant of pain; rather that he'd become more sensitive to it. He commented at several stages throughout his program that he believed that his personality and anxious tendencies contributed significantly to the amount of perceived discomfort/pain he experienced when playing and during everyday life. "I am a very, high anxiety person so, I, tend to hold all my tension, physically in my body as well as mentally" (Steve, SEM 8).

I think there are some people who are much more in tune with, what is going on in their bodies than other[s]... I'm aware of everything... it's actually quite debilitating and, frustrating... I get panic attacks and stuff just from, stupid things. (Steve, SEM 8)

Steve recalled his most severe experiences of playing-related discomfort/pain as happening during the first half of his program. He was surprised when I reminded him that he said his discomfort/pain was the worst it had been at the beginning of his final year. Further on he then said it was during his most recent orchestral program, the Opera, that he had his most severe experience, but once again acknowledged his inconsistency. In relation to his most severe experience he said:

Just times when... I have had to stop playing, right in a rehearsal or something because I'm just like "No this hurts so much that I can't play anymore..." but that hasn't been for the last couple of years... [MW: "Would it surprise you to say that last term you said that you thought that it was the worst it has ever been...?"] Yes. [Laughs] I don't remember, it's terrible... I mean, when I was in high school I think it was the worst, of what I can recall. (Steve, SEM 8)

Opera is bad, actually, [laughs] I should have mentioned that earlier... Opera, I think, causes issues, for everyone... because it is just so relentless and day after day... in fact... I think Opera was almost an all-time, high for the level of discomfort, and that [MW: "This most recent one?"] Yeah because I have only done one Opera ... it wasn't that bad actually, [pause] I'm so useless, I can't remember [laughs]... it's probably not the worst that I have ever had here but it was pretty bad... I could still keep going when... other people... were taking breaks in rehearsal... they actually had to stop playing. (Steve, SEM 8)

At the conclusion of his program, Steve said that his opinion as the incidence of playing-related discomfort/pain had changed since he came to the institution. Before he didn't think it was very common, but now he thought there were a lot of students who experienced playing-related discomfort/pain. Steve said that he could tell this from their behaviour when they finished rehearsals. He claimed that there was not a great deal of discussion about the issue of pain but there was a fair amount of complaining about the Orchestra course at the institution.

I see them coming out of rehearsals and rubbing their shoulders and necks and arms and... because I have been making a lot of announcements at the start of rehearsals... for Symphony Orchestra... a couple of people suggested that I, make an announcement that people should, make sure that they stretch before we start rehearsal... I didn't actually make that announcement because I... thought, the people who are, sensible enough to do it are already doing it and the people who aren't, are probably not going to do it... until it's too late... [MW: "So, is there much discussion amongst everyone of the whole, issue or, something you keep to yourself?"] Discussion, probably not, complaining, yes...

if I ever hear of anyone with back pain, I explain what a semi-supine stretch is and I tell them to go and do it... but it is hard to get through to people. (Steve, SEM 8)

I think everybody does [get pain] to some extent. [MW: “And did you think that before you came to The Con?”] No not really... there didn't really seem to be any. (Steve, SEM 8)

At the conclusion of his Bachelor of Music program Steve was hoping to go on to a national music school and in the long-term wanted to be a chamber musician. He said he was not really keen on being an orchestral player because he found it frustrating that there were the same problems in every orchestra with certain people dragging it down. However, in his opinion being in the Orchestra program at the institution had been beneficial in preparing him for his working life.

[MW: “So what... is your, long-term career what do you want to do?”]... To be in a chamber ensemble or... a string quartet or... group or... even just be... in an orchestra... but it would have to be... a good orchestra... because I get really frustrated with... people just not trying enough, or, if they do not want to put in that much effort, then they need the natural, ability... for it to... come to them naturally, and it doesn't... so, the output is not as good... I think, more than most people I'm... quite switched on to, what is going on, in the rest of the orchestra. (Steve, SEM 8)

It [Orchestra] used to, be really tiring, when I was started... but I think it's, become more normal now... it is good training for... your professional life because... the timings are about the same. Three hour call, you know with a break in the middle. (Steve, SEM 8)

In conclusion, Steve's experiences of playing-related discomfort/pain were at the more severe end of the scale. He was prone to experiencing discomfort/pain during everyday life and claimed to suffer from a very high level of anxiety. However Steve's responses contained many inconsistencies and so he was a complex and confusing case to analyse.

Student 26: Melissa

Melissa was a violinist who had some severe experiences of playing-related discomfort/pain throughout her program. She was one of the easiest students to arrange interviews with because she regularly attended workshop. My first impression of her was that she was very confident and “cool”. However, over time it became evident that she was a person who was prone to experiencing discomfort/pain in everyday life, a tendency that she linked to her anxious personality.

At the onset of her program, Melissa had experienced discomfort/pain in her left fingers, left hand, right wrist, right forearm, neck, and back. As she progressed through her program Melissa continued to experience discomfort/pain in these areas as well as her shoulders and jaw. For the most part the focus of her discomfort/pain was the neck and shoulder area.

Melissa's most severe experiences of pain occurred in her third and fourth years and involved her left hand. Unlike many other students in this study, Melissa acted straight away: she stopped playing and openly consulted teachers etc. for advice. After the second occurrence she also reportedly consulted a physiotherapist and discovered that the cause of the severe pain in her left hand was actually the shoulder. After three appointments she reported feeling much better.

From the outset Melissa appeared to have a fixation with her chin and shoulder rests. She seemed stuck on the idea that they were the cause of her pain and had changed them again virtually every time we spoke. She named another student in this study, Caitlin (Student 5), several times as having given her advice and there seemed to be many similarities between them. For example, in her early interviews Caitlin also talked in detail about her chin and shoulder rests and how she thought they were the

cause of all her problems. (Interestingly, over time she realised that was incorrect and that the cause of the problems was a lack of support in her lower back.) In addition, the two girls shared a clearly similar body type (tall and thin), a reportedly upfront, open approach to their experiences in all environments (with me, students, teachers), and presented as extremely confident although they admitted to a lot of anxiety.

Melissa's answers were usually concise and showed that she was increasingly thinking about her pain outside of the interviews. She identified things that were aggravating her pain including playing for extended periods, sleeping position, carrying things on her back, computer use, cramped conditions, and type of chair. She also took a proactive stand by getting a petition going to get the theatre chairs in other venues. (This was denied.)

In general, Melissa's interviews were significantly shorter than some and did not contain as many inconsistencies. She didn't have a tendency to elaborate greatly on answers and did need to be asked more direct questions. At the conclusion of her program Melissa said she was unsure what she wanted to do in the future and she had comparatively little to say on reflection.

Table B26

Reported Pain Experience for Student 26: Melissa

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1-2	2	Doesn't specify when	Back right side of neck and right middle of back	3	1-2 hours	N/A
2	2-3 (was 4)	2-3	Present at time, 1	Back and shoulders	2	2 hours	5 hours
3	1-2	3-4	Present at time, 1	Back	1	1-3 hours	5 hours
4	1	1-2	Last week during Orchestra	Left shoulder	2	2 hours	6 hours
5	1-3	1-2	That morning during lesson	Thumbs	3	1.5 hours every day or 2	7 hours
6	1-2 (was 4)	3	That morning	Right shoulder	3	1.5-2 hours	8.5 hours
7	1 (was 3-4)	3-4	Previous day	Left shoulder and neck, right side of back	3	2 hours	6-7 hours
8	1-2 *	1-2	Previous week	Left shoulder and neck/jaw area	2	2 hours	7-8 hours

*On reflection 5 at worst

Prior to her studies at the institution Melissa had experienced playing-related discomfort/pain in her left fingers and hand, right wrist, forearm, neck, and both sides of her back. Her discomfort/pain occurred every time she sat a certain way but she said it was not ongoing.

As she progressed through the first year of her program Melissa noticed increased pain, most notably in her fingers and going up her arms. At this stage she was reportedly also experiencing discomfort/pain in her shoulders and back, particularly during orchestral rehearsals. Her discomfort/pain persisted at other times such as whilst using the computer and standing up working.

A couple weeks ago... I was practising a bit more... I noticed, may be slight RSI or something in... fingers and stuff... probably because I increased practice a lot... probably, accentuated by my use of the computer... I occasionally could still, feel... aching... in my hands... even when I hadn't been practising for, a while. (Melissa, SEM 2)

Usually during Orchestra... we played Bruckner which went for, an hour and a half... and my shoulders, really began to ache... the whole time so... woke up the next day, everything was just aching. (Melissa, SEM 2)

Early in her second year the perceived focus of Melissa's playing-related discomfort/pain shifted to her neck and shoulders and she had a severe experience during an Orchestra rehearsal. She also began to notice her discomfort/pain when carrying her bags, violin etc. and this continued for the remainder of her program. At this stage Melissa started a cycle where her discomfort/pain worsened and she changed or adjusted her chin and shoulder rests. As a result, it got better for a period of time before worsening again. By the end of this year Melissa's pain had eased somewhat but

continued to be affected by what she carried, her sleeping position, and hours of playing.

A couple of weeks ago... we had a concert, on... I had been playing lots and lots that week... I was getting lots of pain in... my neck and... shoulders... and... one of my friends... she's got a raised, chin rest... she told me have a play with that and it was actually a lot better so I've... raised my chin rest... with a little bit of cork... and, mucked around with my shoulder rest... and it is actually a lot better.

(Melissa, SEM 3)

I think I changed my, shoulder rest a little bit, and that... started it [the pain].

(Melissa, SEM 3)

My shoulders are still, pretty tight... but it doesn't, hurt any more... I think it... probably depends on how much I've been playing and... if I've been sleeping right but... generally it's pretty good. (Melissa, SEM 4)

Melissa's first really severe perceived experience of playing-related discomfort/pain occurred in the second half of her third year when she hurt her left hand shortly before the Opera. At the time she thought she pulled a tendon doing a chord that required a large stretch. As a result of her discomfort/pain, Melissa had to stop playing for a couple of days and just sit through rehearsals. Although at this stage she did not consult a health professional, Melissa did discuss her experience with a teacher, fellow students, and orchestral instructors. She also purchased a new, lighter violin case and said that she found this helpful in decreasing pain. Interestingly, Melissa didn't even remember this severe experience until the end of our interview.

Actually, I completely forgot I hurt my, left hand... right before we started

Opera... so I took a couple of days off just sort of sat there... I pulled, a tendon...

doing a chord, because my hand is small... and then, it felt all right the next day so I turned up for Divertimento rehearsal and, played for about, five minutes and could not stand it... it was... really painful, and... so... I... put on it some muscle relaxant... and I strapped it up too... that, took about two and a half, three weeks for it to be fully healed.... I talked to the conductor, about it and he said “yep that's fine if you need to sit out...” so that big week of rehearsals... [I] sat out for the first... day and a half... and I... started playing lightly. (Melissa, SEM 6)

I got a new case, I got a BAM... very nice and comfortable... so up until, last couple of weeks that shoulder has been fine... just... I've gotten slack with, my, right hand in playing, and it's been tense so that's been affecting my shoulder a bit. (Melissa, SEM 6)

Early in the fourth year of her program, Melissa hurt her left hand again whilst playing a scale. Saying that “obviously it never healed properly”, this time she consulted a physiotherapist. Melissa said that she stopped playing immediately and rested for a week before she was able to schedule an appointment. To her surprise, the physiotherapist said the problem was in her shoulder and got her to adjust her chin and shoulder rests again. He gave her some stretches and did some acupuncture which she perceived was very beneficial. Melissa consulted the physiotherapist three times and this seemed to fix her problem.

I hurt my, hand... ended up going to the physio... I did it last year from doing a huge chord... obviously never healed properly... but... I rested it for a week... before I could get an appointment, and then... he said it was my shoulder placement it was a nerve-related thing, my shoulder had been down and... that had... put everything into a slightly weird position... he did, some stretches,

worked on my shoulder a bit as well because it was... permanently down a bit... and then, did a little bit of acupuncture on it... it really hurt afterwards but then it... felt a lot better afterwards... and so I just saw him... the next two weeks after that... and it's been fine since. (Melissa, SEM 7)

By the conclusion of her program Melissa's pain had calmed down somewhat. The main problem now was discomfort/pain in her jaw, shoulder, and neck and this was being influenced by the chinrest sticking into her jaw. Melissa credited a decrease in the amount of playing-related discomfort/pain experienced to increased awareness although she did note that she usually experienced some sort of discomfort/pain every time she played. "I guess just about every time there's something... even if it's really minor... usually I don't really notice it it's only when it gets really sore that I... realise" (Melissa, SEM 7).

After I had problems with my hand earlier in the year... I've... noticed that, I am a bit more aware of... making sure my shoulders in the right place as opposed to really forward like it was so... everything is a lot more relaxed now which is good. (Melissa, SEM 8)

Melissa appeared to have a spike in discomfort/pain shortly before she completed each questionnaire. In her opinion her shoulder rest and chin rest were the main cause of the discomfort/pain she experienced in her shoulders and neck (and eventually in her jaw) and she was constantly changing them throughout her program. "I think, stuff has gotten better... I have... been adjusting my chin rest, a bit... so it is a bit higher, and I think it's good for the time being" (Melissa, SEM 4). "For a while it was my shoulders because of my shoulder rest but... only changed my shoulder rest last week and it's gotten, better, since then" (Melissa, SEM 5).

I've been having, some problems because... my shoulder rest... will need a more centred, chin rest... and at the moment I've got one that is a bit more, side-mounted... so I've got... a new one on order. (Melissa, SEM 8)

Melissa was consistent throughout in perceiving that her discomfort/pain was more likely to occur during orchestral rehearsals or when playing for extended periods. From the outset she identified that some of the chairs used at the institution really aggravated her pain and that the cramped conditions and repertoire could also affect it. Melissa took a proactive approach in getting a petition to have the adjustable chairs in all venues. Unfortunately this was not successful. "It depends how I, sit on the chair... sometimes it's fine if I can get, the right position... but... sometimes it is quite sore if... we are a bit, squashed in or something" (Melissa, SEM 3).

If I'm practising for an extended, period, without a break... at least an hour... and I feel that in Orchestra as well because... sometimes we go for... an hour and a half hour and 45 minutes sometimes, without a break and, you can tell that everyone is feeling really, sore. (Melissa, SEM 5)

I was the first desk of the seconds, and we were really squished in at the front so I had to turn... funny so that... I didn't, hit anybody either side of me. (Melissa, SEM 6)

It depends on what chairs we have... the ones in, the theatre... we asked about it they won't let us use them anywhere else... I'm trying to get a petition up to... get them to, put them in the, orchestral hall as well. (Melissa, SEM 7)

What would be nice is... different heights of chairs... because... the ones they have got in there are slightly too short... we did have a, petition to try and

get...the, chairs they use on the stage... in there but they wouldn't let us.

(Melissa, SEM 8)

As she continued through her program Melissa also commented that she experienced back pain most of the time when she was sitting down and that it could be influenced by sleeping position, work, and computer usage. "I have to wear sports shoes [when working]... joggers, and, my feet are, absolutely, cramped... and because I've been standing up for so long... my back and stuff hurts as well" (Melissa, SEM 2).

For the duration of her program Melissa also experienced discomfort/pain in her shoulders whenever she had to carry items. When her neck/shoulder pain worsened in the second year, she purchased a backpack to wear on both shoulders to try and minimise this. Early in her third year, she also purchased a lighter violin case and noticed an immediate improvement. "I actually... bought the backpack recently because I was using shoulder bags and that was really hurting my shoulder... so that might have contributed to it all as well" (Melissa, SEM 3).

Melissa's strategies for minimising her playing-related discomfort/pain didn't really change throughout the four years and included stretching and stopping/having a break. Generally speaking, she only stretched when already experiencing discomfort/pain, even after she learned specific stretches from the physiotherapist. When she had to play long hours of orchestral rehearsals Melissa reportedly cut down the amount of private practice she did in order to minimise discomfort/pain. As she progressed and had more experiences of discomfort/pain, she commented that she was much more aware of it now and would act on it quickly. "I think I'm a bit quicker to act, on, feeling pain... I tend to stretch a bit more... in the middle of practising as well"

(Melissa, SEM 3). “If I'm feeling stiff at all... I will do some, some brief stretches but... not a lot” (Melissa, SEM 6).

I'm trying not to... aggravate anything, so if I have a day where I've got... a ... concert or... rehearsal in the morning and then, concert in the evening, I might do a little bit of practice but not as much as I otherwise would... normally.

(Melissa, SEM 7)

Well I guess I know, now that, my main problem is my shoulder... and I know I have a tendency... especially when I'm sitting down in orchestras, to put my shoulder... down and forward, and, that is when everything starts to get really sore so, a bit more aware of what my body is doing... what... stretches I can do to fix it. (Melissa, SEM 8)

Melissa's concern about her playing-related discomfort/pain was in line with severity. She acted quickly to address any experiences of playing-related discomfort/pain perceived as being severe. However, the everyday discomfort/pain she experienced did not concern her so much. After her first severe experience she stopped playing completely for a few days and didn't play in orchestral rehearsals. The next time she also consulted a physiotherapist. “It was concerning me when I was getting... a bit of, pain in my fingers... but, it's gone away so... I'm not so concerned about that any more” (Melissa, SEM 2).

I was worried... because for the first, week or something it didn't seem to be getting better at all and I thought “Okay well... I might go and see a physio if it hasn't got better in the next couple of days”, but then... I noticed that I had more movement... without it hurting so... I, just took good care of it and it's fine now.

(Melissa, SEM 6)

If I feel anything, unusual... I'm just going to get it checked out straight away but if it's, just... general stiffness it's... nothing I will... be worried about. (Melissa, SEM 7)

It did [concern me], a lot initially... to the point where if it recurred... this could be really bad, what if it doesn't heal... but... it's healed pretty quickly and, [the physiotherapist] has done some good work on it... and so now that I know that something like my shoulder can cause, something in my hand, something that I thought was unrelated... it's made me a bit more aware, of what, things can, trigger. (Melissa, SEM 7)

As she progressed through her program Melissa discussed her experiences of discomfort/pain with her teachers at the institution, a physiotherapist, and her friends. Unlike many other students she said that she was completely upfront with the Orchestra instructors and had no trouble arranging to sit out some of the rehearsals.

I have, been recommended, by friends to, go and see a physio... I might... look into it... there is one guy who's, been recommended, by a couple of friends... one... said... she went to see him... last week and... she was pain free for the first time in... years. (Melissa, SEM 5)

I cancelled my lesson, I missed, Divertimenti and then [another orchestra]... and then the week after... I also had, Symphony tutes... and I went to them, but... didn't play much. [MW: "And was that a problem... getting out of playing for them...?"] It wasn't too bad because I was just missing one and... because Divertimenti is with [Teacher B]... he's pretty... good with... injuries... and, [Teacher E] is pretty good with that because it happened last year right before a

concert... and, he was fine with me... just sitting in, on the rehearsals and not playing. (Melissa, SEM 7)

We were talking, through Opera, because everyone was... finding it a bit hard... [MW: “So, in your opinion do you think most of the students, at The Con are experiencing, some kind of pain when they play...?”] Yeah... lots of them are... I mentioned it to, Sally [Student 33], during Opera about my shoulder... because she mentioned she had a sore hand... and, she said it helped, just trying to fix her posture... I think... lots of the students are... having a bit of trouble. (Melissa, SEM 8)

For the majority of the program Melissa was not physically active. However, in her final year she did take up yoga and said that she found this very beneficial in relaxing her shoulders. During the first half of the program she worked in retail for 10 to 15 hours per week and did also experience some discomfort/pain in legs and feet from this. “Cassie [Student 6], has started yoga... I went to the first session last week and that was really good, so, I'm hoping that continues” (Melissa, SEM 7). “I've just finished a six-week yoga course... I found that's really good and it has really... relaxed... my shoulders” (Melissa, SEM 8).

On reflection, Melissa said that she didn't know much about pain when she came to the institution and so just accepted it as being normal. Her most severe experiences were the two that involved her left hand. Now she was more aware of pain and what she could do to fix it (mainly adjust set-up and posture). In her opinion, the main reason that people experienced pain was that they continued to play when they were not comfortable.

I guess originally I didn't really know much about it... then I realized there was... problems with my set-up... and I became a lot more aware of, pain... and then how to fix it so I think now I am on the, "fixing" end of things... which is good. [MW: "And is there... one particular experience that really stands out in your mind as being, the worst, while you were here?"]... When I hurt my hand, well the two times actually... [MW: "So before you came to The Con, did you have any kind of pain or...?"]... I think, things were a bit uncomfortable but... it wasn't really painful it was more just... general tightness... it wasn't till I started at The Con that I realized that I could fix, things up. (Melissa, SEM 8)

I remember when you first came... during Orientation Week and said you were going to be doing the study I thought, "oh no there won't be much that affects me", but... [laughs] I've been through a lot. [Laughs] [MW: "... So... while you've been here, what are the, biggest changes... noticed in your own playing...?"]... One big thing which is, quite related... is always had the habit of, my violin being, quite on a, down angle... and I think it's, partially to do with, the position my shoulder was in and, chin rest/shoulder rest as well... and it is, slowly getting better. (Melissa, SEM 8)

I think, lots of people try to play, through, "uncomfortable", feelings... often... you see people playing and you can tell where, they feel... uncomfortable... they, don't seem quite relaxed. (Melissa, SEM 8)

At the conclusion of her program Melissa was still unsure whether she wanted to do further study or look for work. "I'm, trying to decide whether to do, my Honours... but I'm not really sure I want to study next year so... I think I will just be, hanging around trying to get some work [laughs]" (Melissa, SEM 8).

In conclusion, Melissa was a student who seemed to be prone to experiencing discomfort/pain with everyday activities. Her experiences of playing-related discomfort/pain were at the more severe end of the scale compared to other students in this study. However, she was fairly unusual in that she was reportedly willing to talk openly about her experiences to fellow students, teachers etc.

Student 27: Melinda

Melinda was a violinist who also played the viola. Her experiences of playing-related discomfort/pain throughout her program escalated before peaking during her fourth year. Melinda's discomfort/pain was influenced by factors such as the instrument she was playing, practice time, Orchestra rehearsals (particularly Opera), stress, repertoire, carrying her bag and violin, and sitting at the computer.

Melinda's main strategy for preventing her playing-related discomfort/pain was taking breaks during her practice. However, like many others in this study, at times she did not take breaks because she felt pushed for time or was worried about losing her practice room. She perceived that she was far more likely to experience discomfort/pain under these circumstances.

My initial impression of Melinda was that she was very studious, friendly, and eager to help. As she progressed, I also found that she was quite laid-back with a good sense of humour. In the first year of her program Melinda was easy to arrange meetings with because she regularly attended workshop. Later on she didn't attend as often and did break a few scheduled meetings with me. This made more sense to me when I found out that, during the third year of her program, she had to deal with her disabled sister being very ill and passing away.

Subsequently, and after several months of reduced practice, Melinda said that she went straight back to two to three hours of practice a day. As a result, the playing-related discomfort/pain in her shoulders, back, and neck escalated significantly. (She also had one severe experience in her left wrist but fortunately this resolved within a week.) Melinda's discomfort/pain then peaked in the fourth year before it stabilised. Despite this, on reflection she recalled her second and third years as being the worst in

terms of playing-related pain. Melinda also recalled her prior experiences as being significantly more severe than she indicated at the time.

At the conclusion of her program Melinda was planning to do a Graduate Diploma in Education in Instrumental Music Teaching. She was one of the few students in this study to say that she had really enjoyed the Orchestra course at the institution.

Table B27

Reported Pain Experience for Student 27: Melinda

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	5	Previous week during an orchestral rehearsal	Back	4	Less than 1 hour	N/A
2	2	4	4 days ago during an Orchestra concert	Back	2	At least 2 hours	N/A
3	2	3	That morning during lesson	Left shoulder	4	2-3 hours	6 hours
4	2	2	Last time she played (yesterday)	Left shoulder	2	2-3 hours	7 hours
5	1	2	Present at time, 1	Neck	1	Less than half an hour	5-6 hours
6	1*	2	Previous night during an Orchestra rehearsal	Back	2	2-3 hours	6 hours
7	2	2	Previous day during Orchestra	Left shoulder and neck and upper right side of back	6	2 hours	5 hours
8	2**	3***	3 days ago during an Orchestra concert	Back of left shoulder, middle of back, and back of right shoulder	3	1.5-2 hours	6 hours

*Was 2 in left-hand. **On reflection, 4. ***On reflection, 4.

At the onset of her program, Melinda had experienced pain in her left hand, shoulder, and forearm; her neck, and her back. Her back pain bothered her the most, and recurred when she was sitting down for long periods during orchestral rehearsals.

During the first year of her program Melinda's pain continued to focus in the back, lasting around two hours after she stopped playing. At this stage Melinda perceived that she was now more aware of her pain and of the importance of taking breaks during practice.

Through, all the workshops, that happened in Project Week... [I am] a lot more aware... of problems... beforehand, I would just ignore it... but now... if I notice, my back is hurting... like it usually does I'd stop... and then, take a good break. (Melinda, SEM 2)

I have definitely noticed, my neck is... stiffer... than it was last year... maybe... for about an hour after, I practise. (Melinda, SEM 2)

As she continued through her second year, Melinda said that the pain had eased. However it was now reportedly affecting her left shoulder and neck as well, and lasted around 10 minutes after she stopped playing. She initially claimed that it only happened during Orchestra, after three to four hours. However she was inconsistent on this point, as she said that her most recent experience happened during her lesson after she had been playing for one hour. "I'd say it's got, better, if anything... only if I play for a really long, time [MW: "So, in Orchestra?"]... Yeah, it goes away pretty fast... usually only 10 minutes, and then it's, good... on my left shoulder" (Melinda, SEM 3).

It was after playing the Bach, *Prelude E Major*... because it's the same, the whole way through... the last page I was thinking "Oh I wish I could put my

violin down now”, because that's what usually I, do when I am practising.

(Melinda, SEM 3)

Just my left shoulder... it hasn't changed... only after a few hours of playing...

like if I have been playing for a whole day... maybe, once a week. (Melinda,

SEM 4)

At the beginning of her third year Melinda perceived that her pain had almost disappeared, because she had not been doing any practising. However, she noted that the tension in her neck was always present and that it could be affected by carrying her violin and bag, as well as sitting at the computer. At this time her sister was very ill and in hospital. “Actually it's got better... I have been playing a lot less lately though... even in Orchestra it's not that bad and I'm playing viola” (Melinda, SEM 5).

I [have] still got, tension... right at the back of my neck... but I think that is a mixture of, sitting at the computer, as well... [MW: “Do you notice that, in your neck a lot of the time...?”] Yeah... I kind of ignore it... it's not painful... but, I can feel the muscles are tight. (Melinda, SEM 5)

Unfortunately her sister passed away shortly after. Melinda said that she then waited only one week before resuming her full practice routine of two to three hours a day. Perhaps not surprisingly, her playing-related discomfort/pain escalated and she had a severe experience in her left wrist. This occurred when she was practising a technically difficult piece with lots of work high on the G string. As the pain resolved after about a week she didn't discuss it with anyone (although on reflection she recalled this as her most severe experience). She also continued to experience discomfort/pain in her left shoulder, back, and neck.

For a week... when I was shifting... into high positions, mostly on the G string... I... had this... weird, pain in my wrist, but it only lasted... a week and then it went away, and it hasn't happened since... I just... stopped, playing it for a bit... and went on to something else... I didn't even, bother telling my teacher about it or anything. (Melinda, SEM 6)

I still have tension in my neck... I'd say mostly, after, a big day. (Melinda, SEM 6)

Maybe only, a few times a week... not even all the time when I'm playing. (Melinda, SEM 6)

During the fourth year Melinda said that she had noticed an increase in pain. It was now present in some form or other every time she played (in her back, both shoulders, and/or neck), and lasted around 15 minutes after she stopped playing.

It's good if I, take regular breaks... but... lately I have found, if I'm, playing for a long period of time... an hour... you can... really feel it in my shoulder... I think it's... been progressive... over the years... it's not as if I... have to stop... and defer... it's just... I can... feel it and I notice it a lot more. [MW: "And do you notice it... when you are carrying your bag...?"]... Yeah I do... I try not to carry my violin, too much, anywhere... but, it's mostly because... I'm carrying it after I've been playing for a long time... I don't think the bag really causes it.

(Melinda, SEM 7)

By the end of the year it hadn't got any worse, and it was mostly the left shoulder that bothered her. Generally speaking, it didn't last after she stopped playing, although her pain continued to be affected by carrying her bag and violin. "It hasn't got any worse... and, I don't, experience any pain when I'm not playing... I guess that's an

improvement... just mainly a... sore left shoulder... probably, every time I play for... over an hour” (Melinda, SEM 8).

It’s a little bit there. [MW: “... Is it... there when you're not playing the instrument as well?”] Yeah... but I don’t notice it because it is not that sore... [MW: “... Does carrying things make it worse or?”]... A little bit so I’ve tried to... lighten my bag up which has helped a lot. (Melinda, SEM 8)

Melinda was consistent in perceiving that Orchestra rehearsals had the most impact on her playing-related discomfort/pain. Her back pain generally only occurred when she was sitting down playing for long periods of time and could be affected by factors such as seat position, having to twist to see the conductor, and whether she was playing the viola or violin. In her fourth year Melinda highlighted the Opera as being particularly difficult. In her opinion her discomfort/pain was also related to a high level of stress, practising longer hours, and repertoire. “I’d say especially, in Orchestra, I noticed it, actually, the most over the Christmas holidays.... I could really feel it when I started back... with Uni Orchestra” (Melinda, SEM 2).

When, we are not playing I try and, sit back and relax... when the conductor is not looking [laughs]. (Melinda, SEM 3)

My back is usually okay unless I'm sitting down, playing... I'm doing viola in Orchestra now... I really noticed it I was thinking “This thing is so heavy...” After a three-hour rehearsal I could really feel it in my back... I don't get that from violin. (Melinda, SEM 7)

Opera Orchestra week was, worse, because... it was just longer hours and, sitting down, your posture... isn't as good. (Melinda, SEM 8)

Melinda's main strategy for preventing playing-related discomfort/pain throughout her program was taking breaks during practice. Generally speaking, these were taken every 30 to 40 minutes. However, there were circumstances under which she did not take breaks. These included when practising at the institution (because she was worried about losing her practice room), or if she was pushed for time. Melinda was consistent in saying that her discomfort/pain was more likely to occur under these circumstances. Towards the end of her program she was doing the majority of her practice at home in 20 minute blocks. At this time Melinda said that her new strategies were playing in shorter bursts as well as doing her practice at home without the stress of keeping a practice room.

I, don't usually leave [the practice room], sometimes I will go for a walk... not very often... because... once you leave... someone will take it... and I don't want to leave... my instrument... I am scared that, it will get stolen. (Melinda, SEM 2)

I usually just stop, give up [if I experience pain]... I used to just, play through 'cause I didn't want to give up the practice room. (Melinda, SEM 5)

Usually I'll, practise for... 20 minutes or half an hour... it helps... a lot more if I... play in really short... good-quality practice [MW: "So which you say that's your main strategy now?"]... Yeah definitely... also because I'm, practising at home a lot more... I used to practise here... you know how hard it is to get practice rooms and everything... at home it's a lot easier to take breaks. (Melinda, SEM 7)

Melinda's warm-up throughout her program consisted of scales. Afterwards she would occasionally bend over and stretch out some muscles if she was already sore but she didn't do it as a warm-up because she didn't find it effective in preventing pain. Her

concern about her experiences was in line with severity and she was more concerned if her pain interfered with her practice. Melinda did not undertake any other physical activity and did not discuss her experiences of playing-related pain with anyone else. “I don't think it worries me, because I know that, it's really common... it more concerns me because I'm, running out of practice time” (Melinda, SEM 2).

It's not... a chronic thing... it's only, violin-related. I'd be more worried if I was walking around, with it, even though I wasn't playing. (Melinda, SEM 3)

When I first started at The Con... in my first year... I... was a little more worried... because I never really, used to get much pain in playing, and, I all of a sudden started practising a lot... but now I'm kind of used to it... it was mostly just in Orchestra playing... on the train home... my back was really sore... but now it is not. (Melinda, SEM 5)

Afterwards... I might bend over a few times and... stretch out those muscles... I haven't really found that stretching prevents it... so I don't bother. (Melinda, SEM 8)

As she continued through her program Melinda increased her teaching work from less than five hours to one and a half days a week. Although at times she had 15 students in a row with no breaks, she said that this did not affect her in terms of discomfort/pain, because she tried to keep good posture.

I have about 15, students in a row... I do them all on, Saturday, and because it's a music store... you can't just, say... “Oh, I'll have a break here” they, put them all in together... but I try and have, really good posture, and... that's the main thing that I try and... teach them first. (Melinda, SEM 4)

It's [teaching] more mentally draining... than physically. (Melinda, SEM 5)

Melinda's career aspirations did not change throughout her program: she said that she had always wanted to be an instrumental music teacher and planned on doing a Graduate Diploma of Education. She didn't want to do the Bachelor of Music Education because she wanted to focus on the Music part without distractions.

I'm going to go into Dip Ed... [MW: "Do you enjoy the teaching a lot?"] Yep... [MW: "Did you always want to do teaching?"] Yep... I decided when I was in primary school. [MW: "... Is there any reason why you decided to do, the four years here and not the Bachelor of Music Education?"]... I wanted to do the Music part really well... didn't want to be focusing on that [Education] when I could be putting all my focus in to a Music program... with a Dip Ed it is still a five-year, thing and, I do more Music and less Education which is what I wanted, in the first place. (Melinda, SEM 8)

On reflection, Melinda viewed her discomfort/pain as a bell curve. To the best of her recollection, in the second and third years of her program it got worse before easing back in the fourth. (Her answers at the time indicated clearly that her discomfort/pain escalated through the third year before peaking in the fourth.) Melinda recalled her discomfort/pain as being Grade 4 in the first three years (the most she ever indicated at the time was Grade 2).

It sort of did a bell curve... in the beginning... it wasn't really noticeable, and then... as I got, to... second and third year, it... got worse... peaked and then I've noticed in fourth year, I just haven't, I guess because, I have more time... I am not, always in a rush to do things... and, I am not practising for... the intensity... I am really a lot more comfortable if I can, spread it out. (Melinda, SEM 8)

I think, it's been, Grade 4, probably at its worst... in... the previous three years.

(Melinda, SEM 8)

Prior to study at the institution Melinda had heard about playing-related injuries but hadn't met anyone affected. As a result, she didn't think many people had discomfort/pain when playing. However, during her time at the institution her opinion changed. Although other students didn't really talk about it she said that she could tell they were experiencing discomfort/pain from their behaviour. In her opinion people experienced discomfort/pain when they played because they didn't take breaks and/or they had poor posture. Melinda thought a lot of people practised without breaks because they were worried about losing their practice room at the institution and/or were under time constraints.

I had heard about it [playing-related injury], but... I hadn't really met anyone, who had any problems. [MW: "Did you think that many people had pain when they play?"]... Not really... and now I do... before I came to The Con I didn't... know that many people who... played for a long time... but... now... I know that... I am not the only one... there are a lot of people who experience the same things. [MW: "... Do they ever talk about it or are you just assuming...?"]... You wouldn't have conversations but, you... know... they will come out of rehearsal and go "Oh my back hurts"... things like that. (Melinda, SEM 8)

It could be, poor posture... if you are hunched over a bit... but... people with perfectly good posture still... get playing-related pain... the other thing is, playing for a long amount of time... not taking, the correct amount of breaks that they should. [MW: "... Do you think a lot of people practise without taking breaks and stuff?"] I think so... because, if you are at The Con... you lose your

practice room... if you leave... and... if you are time short... you have just got to get work done, before your lessons. (Melinda, SEM 8)

Unlike a lot of students, at the end of her program Melinda said that she had enjoyed the Orchestra course. In terms of discomfort/pain; she didn't see what could be done differently except having an additional break and rehearsing smaller sections. In relation to the whole program, she thought that the Music Literature courses should be sequential to make more sense in terms of music history.

I've really enjoyed being in the Orchestra... they are really fun... in terms of the pain, I, don't think there is really anything you can do about it... they do have a break... maybe they could, split it into two breaks... maybe they could rehearse some, smaller sections a little more... it... seems like we skim over, a few things. (Melinda, SEM 8)

The only thing that I... didn't really like was... our Lit subjects [Music Literature courses].... it would be good if they were in chronological order... to have a continuation so that you can... see where it all fits in. (Melinda, SEM 8)

In conclusion, Melinda's experiences of playing-related discomfort/pain were mid-range compared with the other students in this study. She had one particularly severe experience of playing-related discomfort/pain and highlighted many common contributing factors.

Student 28: Natalie

Natalie was a violinist who was enrolled in the Advanced Performance strand of the Bachelor of Music program. She was friendly and dedicated and practised long hours on her instrument. Generally speaking her experiences of playing-related discomfort/pain were not particularly notable. However, in the third year of her program Natalie did have one severe experience after which she consulted a doctor.

Natalie was consistent in perceiving that her discomfort/pain was worse when she participated in orchestral rehearsals or concerts, practised longer hours, or took less frequent breaks during practice. She found stretching very beneficial and noted that she was not comfortable doing this during Orchestra rehearsals because of the perceived attitude of the conductor. At various times Natalie noticed her playing-related discomfort/pain could also be influenced by other activities such as exercising, sleeping, sitting down, and carrying items.

Generally speaking, Natalie's experiences did not concern her. It is interesting to note that, on reflection, she did not remember consulting a doctor. This was one of the many inconsistencies present in her responses over the four-year period. During her final semester Natalie also consulted a massage therapist but said she had no specific reasons for doing this.

At the conclusion of her program Natalie wanted to undertake further study with the aim of becoming an orchestral player and teacher of advanced students. Despite wishing to teach she had not taken any Pedagogy courses throughout her time at the institution because of the perceived extensive workload.

Table B28

Reported Pain Experience for Student 28: Natalie

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	2	During an orchestral rehearsal	Lower back and shoulders	2	N/A	N/A
2	1-3	2-3	During Orchestra last week	Back	2	3-4 hours	8 hours
3	3	2-3	After lesson 2 weeks ago	Upper right arm	2	At least 3 hours	8 hours
4	1	2-3	Previous week during lesson	Right shoulder	3	3 hours	10 hours
5	2-3	2-3	Previous week	Jaw, neck, and back of left shoulder	3	4-5 hours	10 hours
6	1	3	Present at time, 2	Back (from sleeping)	3	4 hours	10 hours
7	1-2	2	That morning during lesson	Left shoulder and right thumb	1	4-8 hours	10 hours
8	1	2	During the Opera	Back of neck and upper shoulders	2	4 hours	8-9 hours

Prior to her studies at the institution Natalie had experienced playing-related discomfort/pain in her shoulders and lower back. She said it was not ongoing but that it had affected her practice 10 to 15 days in the past six months.

As she progressed through the first two years of her program Natalie began to experience more discomfort/pain in her back and shoulders. She perceived that her discomfort/pain was aggravated by Orchestra rehearsals and long hours of practice. “Sometimes in Orchestra, I can feel a bit of, back pain... my shoulders get bit tense... that's usually... when we have, lots of rehearsals just before a concert” (Natalie, SEM 2). “When I practise... more than... three hours or, four hours... it starts to get a bit, tight” (Natalie, SEM 4).

Early in her third year Natalie noticed an increase in playing-related pain in her shoulders. She linked this increase to taking less frequent breaks during practice. Although her discomfort/pain was not always present, when she experienced pain it could last up to two to three days. Around this time Natalie also had a muscle spasm in the neck and jaw which she believed was caused by an anxiety attack. After this experience she reportedly stopped practising for several days and consulted a doctor.

Actually I've been having, lots of, pains, like in my shoulders... it... got pretty bad so, I was gonna go see a physio but... it... got, better... probably the reason why I was getting... pains was because I wasn't taking, enough breaks. (Natalie, SEM 5)

I had something really funny happen to me... last Wednesday. After Orchestra... I... just had a really stressful day I hadn't drunk any water... and I yawned, and my... jaw, something funny happened like a muscular, spasm or something... and I couldn't open my mouth, and then I had a panic attack and couldn't breathe,

and I was driving and it was, really scary... my neck felt really tense... for... the Wednesday and the Thursday... it hurt to swallow... and it was just really strange but... went to doctors and they... told me it was just a muscular spasm and... a panic attack... but it went away... I stopped practising for... four days. (Natalie, SEM 5)

However, by the next interview her playing-related discomfort/pain had eased and was mostly a transfer from other activities such as sleeping. For the remainder of the program Natalie continued to experience tension in her neck and shoulders but it was not particularly severe. In her final semesters she linked a perceived decrease in discomfort/pain to the purchase of a new chinrest and a decrease in Orchestra rehearsals. "I actually haven't had any pain since I last, spoken to you... only just recently but that's because I slept on the floor... but nothing from my playing" (Natalie, SEM 6).

That new... chinrest it's helped a lot... I feel like I spent like my whole degree trying to find the right set-up... with shoulder rest and... I think... I'm finally happy. (Natalie, SEM 8)

I haven't really had, very intense rehearsals so... it's been good. (Natalie, SEM 8)

Natalie was consistent in perceiving that her discomfort/pain was worse during Orchestra rehearsals, in particular the Opera. She commented directly on the perceived negative impact of scheduling two competitions the week following Opera for which she felt she had to do additional practice. Generally speaking, Natalie would notice more pain towards the end of the day. The complexity of repertoire and chairs provided could also have an effect. "If we always had those adjusting chairs that we have in the theatre, that would be good" (Natalie, SEM 4).

We had Opera and, that was really intense and I was, getting... a really sore back... during that... we did... six hours and I had to do practice as well, on top of that... because... we had... two competitions, straight after, Opera, so, I was... staying back... after... and practising... three, four hours. (Natalie, SEM 4)

Throughout her program Natalie regularly said that she stretched before playing. However, upon further questioning, like most students in this study, she revealed that she often forgot! She found her teacher's Tuesday morning class very beneficial because they spent around 30 minutes stretching and doing various exercises. Natalie never stretched during Orchestra rehearsals and thought that this may have been why her discomfort/pain was worse in this situation. Part of the reason that she said she did not stretch during Orchestra specifically was that she perceived that the conductor did not like them to move around during rehearsals. Despite this, at the end of her program Natalie was one of the few students in this study who said she actually enjoyed the Orchestra course.

In... violin class, she got a... physio, and she... does yoga and stuff... she was really good and she taught us lots of, stretching exercises and, somebody... drew pictures of them and took notes so... we all have a copy of that... I've been doing some of them... just... when I remember... it always feels really, good and I feel... more flexible... I think it really does help, if you can, find the time for it... and remember. (Natalie, SEM 5)

Sometimes [Teacher C] gets angry if we are stretching... so... we don't... he doesn't like us moving around very much... especially when, we are in the theatre... for dress rehearsals, he doesn't, even like it when we adjust our chairs. (Natalie, SEM 7)

It's [the Orchestra course] been helpful... he [Teacher C] is sometimes a bit moody... a bit unpredictable but... we get breaks... at a good time... [MW: "Do you think a lot of, players have problems with pain during Orchestra or?"]... Maybe... when I look around I can always see people... stretching a bit and moving around... [MW: "Does [Teacher C] ever... get annoyed when people do that or?"] Yeah sometimes... he really doesn't like it when we move our chairs around. (Natalie, SEM 8)

The perceived focus of Natalie's pain shifted several times between her back, neck, and shoulders, and from her left to right side. At times her upper arms and fingers could also be affected. Natalie could experience pain from other activities such as commuting on the train, carrying items, sleeping, and exercising (she was doing regular gym work from her second year onwards). This discomfort/pain could also transfer to playing the instrument. "Sometimes I get a sore back, from... the, chairs on the train... they're not very, comfortable" (Natalie, SEM 5). In regards to string Quartet work:

Usually it's just like weddings and things so they don't go for too long... probably, two hours is... but... every now and again we get... longer ones... three-five hours... and they are painful [laughs]. (Natalie, SEM 4)

Natalie's main strategies for preventing playing-related discomfort/pain included awareness, taking breaks during practice, and being aware of posture and tension. Generally, when she experienced discomfort/pain she would try and stop as soon as possible and relax/stretch.

I think... to make sure that I take regular breaks [is a good strategy]... cause, it's when... you practise... for three hours straight or something... that I start to feel... and... the next day... tight. (Natalie, SEM 4)

Being more aware, about my posture, when I'm playing... practising in front of a mirror, is, really helpful. (Natalie, SEM 5)

Recently... I can, hear it in the sound when, I'm really tense and so, I tend to be more... conscious of it and, to try and relax more so... it's been much better.

(Natalie, SEM 6)

Depends on the circumstances if it's... in Orchestra I can't really do much about it... so I do keep playing. (Natalie, SEM 8)

Throughout her program Natalie discussed her discomfort/pain with her teacher and also with other students during Orchestra. Early in her third year she was considering consulting a physiotherapist but didn't because the pain in her shoulders eased. She did however consult a doctor regarding the muscle spasm in her jaw. At this time she was particularly stressed and highlighted a link between her anxiety and pain. On reflection she recalled this as being the most severe experience however she could not recall consulting a doctor about it. During the final year of her program, Natalie also consulted a massage therapist but said that she had no particular reason for doing so. The therapist reportedly told her that she had minor scoliosis.

I... went and got a massage pretty recently, and... he said that I have... a little bit of, minor scoliosis... not too, bad he said, lots of violinists have it... but he suggested that I do some... rowing at the gym... to build up muscles in my back.

(Natalie, SEM 8)

Last year... around this time of the year... stressful... I... did, way too much practice and, had like a panic attack or something on the way home... it was really weird... lasted... a couple of days... [MW: "Did you go and see anyone

about that?"] No, I was I was going to... but... it went away after about two or three days. (Natalie, SEM 8)

On reflection, Natalie said that she thought that her discomfort/pain had gradually decreased (although her responses indicated it increased before declining in the final semesters). Generally speaking her experiences of discomfort/pain didn't concern her because she perceived that they were not particularly severe.

I know people that have... bad problems, with their back and... can't play... but, it's not to that, extent... it's, discomfort... but, I can still play... it just means that, because it hurts... I'll have to take more breaks... try and massage myself and... stretch and stuff. (Natalie, SEM 8)

It's [my discomfort/pain] barely there now... [MW: "So if you look back over the four years, would you say it's been... a general, decline or...?"]... It's kind of hard to say because I was never really, aware of it when I was at school... I didn't realise I had tension, until [Teacher A] pointed it out... in my first year so, I feel like it's... declined, I think. (Natalie, SEM 8)

In her opinion, being involved in the research project had helped her to become more aware of her tension and she thought that this may have been why she was experiencing less discomfort/pain than other students. Natalie was of the opinion that everybody experienced a bit of discomfort particularly during Orchestra. However, it was not discussed specifically unless it was really serious and she mentioned three specific cases (not in this research project). Long-term Natalie wanted to play in a professional orchestra and teach advanced students (it is noteworthy she didn't take any Pedagogy classes because she had heard how much work they involved).

Most people get... minor... discomfort and stuff... in Orchestra... You can always tell because when you stop playing everyone's... stretching... people try to be as subtle as possible because... [MW: "... He [Teacher C] can be a bit temperamental.] Yes. (Natalie, SEM 5)

[MW: "So... do you have any ideas as to why... you might be experiencing less pain than other students?"]... I think it's just, being aware of, when you have tension... so, you don't get into bad habits. (Natalie, SEM 8)

Everyone always talks about when they are sore... and... come out of rehearsals being sore... but... apart from the really serious ones I think most people... feel a bit of tension... nobody is completely... (Natalie, SEM 8)

It's been good... it's been interesting... for me to fill out these questionnaires... it's the kind of thing that the more you are aware of... the more you think about it... you know what it's like, to not feel the tightness and... before that... I didn't know. (Natalie, SEM 8)

In conclusion, Natalie's experiences were not particularly severe however she shared many contributing factors with other students in this study.

Student 29: Liam

Liam, a violinist, was friendly and open throughout our interactions. He was happy to elaborate on his answers with very little prompting. Like most of the students in this study, Liam highlighted Orchestra rehearsals as being particularly difficult. The level of playing-related discomfort/pain experienced during was increased to due to scoliosis and hypermobility. He noted that he had been reprimanded for sitting back and trying to relax/stretch during rehearsals.

Liam provided some interesting comments which were in line with the emerging themes from this research. These included general inconsistency, implementation of preventative strategies once already experiencing pain, and injury during sport and work. However, he withdrew from the Bachelor of Music program and thus the research project at the conclusion of his second semester.

Table B29

Reported Pain Experience for Student 29: Liam

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	3	That morning	Upper left arm	6	1-2 hours	N/A
8	2	2	Previous night	Left hand	2	1-2 hours	7-8 hours

Prior to his studies at the institution Liam had experienced playing-related discomfort/pain in his left forearm and left hand. The discomfort/pain in his left forearm bothered him most. Liam stated that this did not recur but then said that for the past 12 months it had been ongoing whenever he played for longer than two hours.

As he progressed through the first year of his program Liam also began to experience some playing-related discomfort/ pain in his right arm. When this persisted he started stretching before he played however he stopped doing this as soon as the problem resolved.

When I had, this arm really hurting I'd... do some arm stretches and just, get it warmed up, instead of just... practising straight away... [MW: "Do you still do the stretches now... that it is not so bad?"] No, I don't need to. (Liam, SEM 2)

By the end of this year Liam said that he had noticed a recent improvement in playing-related discomfort/pain. However, he still had constant tension in his left hand. He believed this may have been a result of his being double-jointed.

I only really had, one or two things that are bothering me... and they are getting better. I mean, one of them is still pretty bad... tension in my, left hand... I don't know why, I've been trying to fix it for years... my hands are... double-jointed... that's... one of the reasons that I, thought it might be. (Liam, SEM 2)

Liam said that his experiences concerned him because they restricted his playing and he was very keen to get rid of the discomfort/pain. He had discussed his experiences with his teacher and a family member (also a professional violin teacher) and spoke in some detail about their advice. "The left-hand tension concerns me because I know I could, do... a lot more things... easier... I, wouldn't have to practise certain things as much" (Liam, SEM 2).

I'm so keen to just, get rid of it, but, my old teacher, [Teacher M]... He always said... "A tension in your hand comes from like, your whole body..." So I was always thinking that it was... just, ending at my hand maybe... but I don't know it's just so many, possibilities. (Liam, SEM 2)

I do a couple of exercises... my grandma actually taught me these exercises... where... you hold the back of the... base of the violin and... reach over and just... tap... the wood on the other side of the fingerboard and... it really does help a little bit. (Liam, SEM 2)

Liam was very physically active, playing a lot of ball sports (rugby). He expressed some concern about injuring his hands, but this was mostly regarding his job doing physical labour for 12 hours per week. During his first year he said that he hurt his back lifting something incorrectly but that the pain did not transfer to playing.

I am most worried about my fingers at work actually, because I, dropped a... 50 kg box on my hands the other day... and it was just like, "Ow", so... that's what I am most worried about, but I was always worried... because... playing ball sports... you can hurt your hands, pretty badly. (Liam, SEM 2)

However, further into his interview, (after stating many times that he did not experience any pain when playing, including during Orchestra), Liam mentioned that he had severe back pain when sitting during Orchestra. He believed this was due to mild scoliosis. He said that he found Orchestra rehearsals particularly difficult because he perceived that he was always getting in trouble for relaxing and sitting back whenever he was not required to play.

Sitting up straight, hurts my back... because... I've got a, curved, spine... bit of mild scoliosis so I, sitting up straight... in Orchestra... for... 7 hours is just... painful. Even... Orchestra practice, sometimes it's painful... that's why I get in trouble for... sitting back in my chair a lot, from [Teacher C]. [MW: "Does it help sitting back in your chair?"] Yeah, definitely... I know that's not the right way to play. But... in a concert I will sit up straight the entire concert... that's

what they're worried about I think... and that does look terrible when people do that in a concert... but... sometimes I just... sit back and give my back a rest...

[MW: "That just sounds like a sensible thing to do doesn't it?"] Yeah I know, but there's no... telling [Teacher C] that. (Liam, SEM 2)

In conclusion, Liam had the potential to be a very interesting case. It was unfortunate for this research project that he withdrew from his Bachelor of Music program after his second semester.

Student 30: Tina

Tina was a violinist whose experiences of playing-related discomfort/pain throughout her program were not particularly remarkable. She was friendly and spoke in a fast manner that required limited prompting. Tina was one of the participating students who was consistently interested in the research findings of the project.

Throughout her program Tina said that she experienced playing-related discomfort/pain in the right side of her neck and right shoulder. This generally appeared after she had been playing for around one hour. She was consistent in saying that this discomfort/pain went away within 5 to 10 minutes of stopping playing. On reflection she said that the intensity of her discomfort/pain remained consistent.

Tina perceived that her playing-related discomfort/pain was more likely to occur during Orchestra rehearsals, particularly during the Opera. Like many of the students in this study, her discomfort/pain came on more quickly as the week of Opera rehearsals progressed. However she commented that she found her second Opera experience less taxing as she had built up her stamina.

Tina's main strategies for minimising playing-related discomfort/pain included keeping her practice consistent and taking regular breaks. She found Pedagogy classes very helpful as she reportedly learned the importance of awareness and stopping straight away to fix any problems. Early on she indicated that she stretched (but only when she was already feeling discomfort/pain) however by the end of the program she had stopped doing this as she didn't find it beneficial.

Tina worked consistently long hours in fashion retail throughout her program and decided to leave the Bachelor of Music at the three year exit point. At this time she

said she was considering other career options such as fashion and design but that she would like to be involved in music in some capacity.

Table B30

Reported Pain Experience for Student 30: Tina

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	3	Practising for audition	Right side of the neck	6	1-2 hours	N/A
2	2	2	Last practice (yesterday)	Right side of the neck and right shoulder	2	3 hours	6 hours
3	2	2	That day	Right side of the neck and right shoulder	4	3 hours	6 hours
4	2/3	2	2 weeks prior	Right side of the neck and right shoulder	5	2-3 hours	7 hours
5	2	2	Last practice (yesterday)	Right shoulder	3	2 hours	5 hours
6	3	2	Last practice (yesterday)	Right shoulder	3	3 hours	7 hours

Prior to her studies at the institution, Tina said that she had experienced playing-related discomfort/pain in her left forearm, left shoulder, right side of her neck, and right shoulder. The discomfort/pain in the right side of her neck and right shoulder bothered her the most and recurred after she had been playing for around three hours.

As she continued, Tina consistently perceived that the discomfort/pain in her right neck and shoulder area bothered her the most. This pain recurred whenever she played for extended periods without a break (she drew a parallel to playing sport). However Tina did notice that it was worse when she came back to practising after holiday periods and that the discomfort/pain eased as she got used to playing more. In her final semester she noticed that the painful area would now become numb and that it was focused in her right shoulder only. “It wouldn't, force me to stop... I just figure that, it's been working so it's like, after, playing sport I guess, you get tired” (Tina, SEM 2).

I... noticed the change once we go into holidays and then I slack off a little bit and come back but it's kind of the same thing that I try and... get used to it after a while and... figure out how to, control it in a way. (Tina, SEM 6)

The pain kind of changes [as I continue to play], it goes a little bit numb. (Tina, SEM 6)

Tina perceived that her playing-related discomfort/pain was more likely to occur during Orchestra rehearsals. She participated in the Opera twice and, like most of the students in this study, found this difficult. During the Opera rehearsals she also reportedly experienced discomfort/pain in her left hand, both shoulders, and back. As she continued through the week of rehearsals each day the pain came more quickly. During her second Opera, she perceived that she was better able to withstand the intense rehearsals and play for longer before the discomfort/pain appeared. “I still get... pain in

my... neck... but I think it's just from, lengthening practice... mostly it's in rehearsal actually, in Orchestra rehearsal... if I slouch over” (Tina, SEM 2).

That [the Opera] was a test... I could feel myself... building a general stamina to... doing 10 am till 5 pm in rehearsals every day but, it was okay by the end... getting used to it... it was good taking the breaks... because we got, frequent breaks throughout the whole time. (Tina, SEM 4)

Well I kind of found that, the pain would come, sooner, towards the end of the week... the first rehearsal I'd be able to last longer and then, the next day... within an hour I would start to feel sore. (Tina, SEM 4)

Before the holidays I was in the Opera as well... I found by the end I could go for longer without it hurting. (Tina, SEM 6)

Tina's practice throughout remained consistent at 2 to 3 hours, 5 days a week. As she progressed she tried to spread the practice throughout the day in one-hour blocks and perceived this was very beneficial in minimizing playing-related discomfort/pain. This became her main preventative strategy. Tina commented consistently that her playing-related discomfort/pain began to occur at the end of one hour of playing and generally went away within 5 to 10 minutes of stopping playing.

I take regular breaks in my practice now and it, helps a lot... just to, stretch it out a little bit... [MW: “So when did you start taking the breaks?”]... Probably the start of this year... [MW: “And was there any particular reason...?”]... No... I just needed to increase my practice this year so, decided... it might make it easier if I take breaks. (Tina, SEM 3)

If I don't take a break, it [discomfort/pain] happens... so I just take breaks now and it doesn't... hurt any more. (Tina, SEM 4)

Tina only stretched when discomfort/pain persisted after playing. Early on she just didn't remember to do it, however towards the conclusion of her program she said that she did not find stretching before playing beneficial. "Usually afterwards but oh, sometimes before, to make it a little bit better, it usually works" (Tina, SEM 2). "Well I found that the breaks work well so I pretty I don't really need to do anything else" (Tina, SEM 4).

"With the pain I didn't really feel that... warm-ups helped it was just mainly the length of time I was practising" (Tina, SEM 6).

Although initially she was exercising regularly, by the middle of her second year Tina said that she no longer had time for this. She did not perceive a link between her playing-related discomfort/pain and exercise.

Tina worked consistently as a sales assistant throughout her program, increasing from 6 to 10 hours per week prior to 25 hours per week by the end of her third year. She said that she could get tired from standing long hours but that she experienced no other discomfort/pain when working.

Tina was not concerned about her experiences at any stage: her discomfort/pain resolved quickly, her strategy of taking breaks was effective, and her teachers reassured her some discomfort/pain was normal. She perceived that taking Pedagogy courses was very helpful as she had learned the importance of awareness and stopping straight away to fix any problems.

How she learned her strategies: "From coming to lectures and things like that like I do Pedagogy and things... so, it is a mixture of everything, really" (Tina, SEM 3).

I've... figured out how to deal with it and I've found a strategy that works... just probably taking breaks... and stretching it out, moving around... go do something else for five minutes and come back. (Tina, SEM 5)

No [my discomfort/pain] doesn't concern me... I've spoken to my teachers about it and they just think it's a normal thing to have because, holding the violin up like that is a bit of an unnatural [laughs]... you have to get used to it. (Tina, SEM 6)

At the beginning of her third year Tina said that she noticed an initial increase in discomfort/pain when she started at the institution before a gradual decrease. She didn't have any idea as to how the initial increase could have been minimized as the reality was that it was a competitive environment. However, she later said that she did not recall any increase in discomfort/pain at the beginning of her program, just that it now went away faster after she stopped playing, increased after holiday periods, and was progressive. To the best of her recollection, her most severe experiences occurred during the Opera rehearsals.

I guess it's... the competitive environment that you're in, so... even if your teacher tells you "You don't have to be doing that much [practice]" I don't think it would, matter... cause you'd be like "Well if my peers are doing this much, so, I want to keep up". (Tina, SEM 5)

[My most severe experience of discomfort/pain] would probably be... the Opera last year... one of those, rehearsals, because... especially the first one I wasn't used to doing the whole... seven hours, rehearsals... [MW: "So just in general during the Opera?"] Yeah, just in general... it never gets, like excruciatingly painful... so I can't say that it ever stood out really. (Tina, SEM 6)

[MW: “Would you say... you've become more worried or less worried about it through your time at The Con?)]... Probably less worried... [MW: “So has it, increased or decreased in general would you say, while you've been here?)]... Probably the, time it takes to stop hurting once I stop, playing, is shorter... so I guess in that sense it's decreased, but it's still the same it hasn't increased in pain levels. (Tina, SEM 6)

Over the years, Tina discussed her experiences with her violin teacher and family members, who advised her to stretch, take breaks, and have hot showers. On reflection, she says that she had also discussed her experiences with some other friends studying at the institution. However, they generally didn't talk about it unless it was severe and she was not sure how many people suffered playing-related discomfort/pain.

I, talked to my teacher about it... when I was doing the Opera and stuff... I still have my lessons during, Opera and things like that... so I was getting sore shoulders and, he was just like “Yeah make sure you just stretch it out” and, he said to “Have... hot showers... because it... loosens your muscles and things like that”. (Tina, SEM 4)

I assumed, people, had it [discomfort/pain] as well... it hasn't ever, stopped me from playing or anything like that so I haven't been overly worried about it... I guess I have it better than other people other than, you know, things wrong with their hands and stuff... [MW: “Do you think many of the other string players are having, problems with pain or?”)]... I'm not sure... unless, it stops them from practising I don't really hear about it... everyone... deals with it in their own way I guess. (Tina, SEM 6)

[MW: “Since you came to The Con... have you, discussed it much with other people... playing-related pain and have you learnt anything really?”]... I have talked to a couple of people about it I found especially with my hand, a lot of people do get the tension in their thumb, because one of my friends has... tendinitis or something... in her thumb and she can't, practise for long, so I've talked to her about things like that but... everyone just says you know... [MW: “... That's what happens get used to it?”] Yeah [laughs]. (Tina, SEM 6)

As the years progressed Tina became unsure of what she wanted to do in the future. At the conclusion of her program she was planning to move overseas and was thinking about undertaking further unrelated study. However she said she would like to be involved in music in some capacity.

I'm hoping to go overseas next year, if I can save enough money, hopefully. [Laughs]... Just take time off... work a little bit... have some family over there so just go stay there... [MW: “And are you hoping to continue with your music after that?”] I'm not sure. I'm going to see... [MW: “Have you got any idea what else you might do?”]... Maybe something fashion-related, but... it depends... I'm not sure what I need to do for that, Business degree or something... [MW: “Has that changed what did you want to do when you came to The Con?”]... Initially I wanted to join an orchestra... and just, travel around like that but, travel has... been the main, motivation to do it so, I don't know just, kind of lost the love for it a little bit, during my degree [laughs]. I don't know... maybe I... just need some time off or something, went straight from school and stuff like that so... I don't know. (Tina, SEM 6)

It's not that I don't want to do it [music] anymore it's just I'm not sure what, aspect I want to do it in... I've heard lots of different things... the person who is managing [a professional group]... used to, play herself and... didn't want to do that anymore... but... I just don't know... what I want to do I don't want to be a solo performer, so I just have to think about what, aspect I want to do it in...

[MW: "Do you think they could focus more on other things here... like teaching or...?"]... In a way... but... everything is, pretty much accessible... like you can do Education if you want to. (Tina, SEM 6)

In conclusion, Tina's experiences were not particularly severe however there were many contributing factors in common with other students in this study.

Student 31: Leah

Leah was a violin major who was enrolled in the Education strand of the Bachelor of Music program. During her interviews she was very open and elaborated in detail with little prompting. However, she was difficult to get hold of and broke several appointments we had made.

Generally speaking, Leah seemed prone to experiencing a high level of discomfort/pain in everyday life. She suffered from mild scoliosis and said that she experienced back pain whenever sitting or undertaking strenuous activity. As a result, she experienced a great amount of pain during Orchestra rehearsals at the institution. Leah also experienced pain in her arms, neck, shoulders, and hands whilst playing. Her playing-related discomfort/pain may have been exacerbated by the fact that she rarely practised outside of Orchestra rehearsals.

One of Leah's course requirements was that she learned and sat an exam on two alternative string instruments. Her first selected instrument was viola and she perceived experiencing significantly more pain when playing it, particularly when having to shift into higher positions. She also experienced pain when carrying the instrument. Leah learned from the same teacher as the other two viola students with chronic problems.

During the first year of her program, Leah also had to go the chiropractor for treatment after an Orchestra rehearsal. She said that he told her that she had a slipped vertebrae and that it had to do with scoliosis and alignment. By her second year, Leah had realised that she needed to pace herself better and asked to be let out of some Orchestra rehearsals.

Leah acknowledged that she did not take very good care of herself. In the period before she entered the institution she suffered from glandular fever and said that she was

still struggling to regain her health two years later. Unfortunately, from the fourth semester onwards I was not able to get hold of her and in December 2010 she was "dismissed" from the Bachelor of Music program for academic reasons.

Table B31

Reported Pain Experience for Student 31: Leah

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	4	3-4	Present at time, 1	Right side of neck	8	Less than one hour	N/A
2	3-4	4-5	Last week	Back and front of both upper arms	2	About 40 minutes	3 hours
3*	DM	DM	Last night	Whole back	7	DM	DM

*A problem with the electrical equipment meant that only part of the interview was recorded. As a result, data is missing for some items.

Prior to her studies at the institution, Leah had experienced playing-related discomfort/pain in her left hand, right wrist, left and right forearms, both sides of her neck, and her back. The discomfort/pain in her upper and lower back bothered her the most and recurred every time she played.

As she progressed through her program, Leah's back pain continued to bother her the most, particularly during Orchestra. At the beginning of her first year she said it was particularly bad because she was trying to sit up straight at the front of her chair. (Her teacher subsequently advised that it was okay to lean back which helped somewhat.) At this stage Leah was also experiencing playing-related discomfort/pain in both of her arms and her fingers.

In Orchestra... it still hurt... when I was doing Symphony and Chamber... but then... my teacher said if you want to lean back... I found that helped a lot... but... my back kind of got real stiff... sitting there... for... 3 hours... also... when I stand up and play... I find it is worse if I haven't practised for a while... some muscles in my arm actually seize up. (Leah, SEM 2)

Halfway through her first year, Leah had to consult a chiropractor after experiencing severe pain during an Orchestra rehearsal. The chiropractor reportedly told her that she had a slipped vertebrae and that it was related to scoliosis and alignment. It required treatment but healed quickly. Leah had also been to a chiropractor in the past, and had been given orthotics to help with scoliosis.

I had a vertebrae slip in my back... you know when you lean forward to look at your music better... I was playing and then I felt... a piercing thing in my muscle and... sat back up and then went to the chiropractor and he said... "You've got a bit of muscle damage in there, because your vertebrae... slipped slightly out of place", which was also to do with my scoliosis and the fact that it wasn't aligned properly, so he had to straighten that up... it was, about halfway through this year... I could still continue playing I missed... one rehearsal... it was leading up to the concert and I think I missed the, rehearsal the day before so I could play at the concert... it's [since] gotten better... my feet had fallen arches, so I was wearing orthotics... and that... helped, a lot with my posture. (Leah, SEM 2)

During her second year, Leah was required to learn the viola as part of her Music Education coursework. She said that she experienced significantly more discomfort/pain in her neck, shoulders, arms, and hands when playing this instrument. Of particular difficulty were working in high positions and playing double stops. The

teacher reportedly advised her that she must leave her thumb below the neck of viola and extend over despite pain. Leah also experienced pain when carrying the instrument.

With the viola... I actually have a lot of neck pain when I play, because it is so big... because I am holding it with my head my whole neck just feels like it's going to fall off... there's a scale that I have to do for my exam and... it hurts, to actually reach up. (Leah, SEM 3)

My teacher... was... like... “You can't bring your thumb right up because when you come back down, your thumb is not going to be, in a position... where you can get back down...” So, I had to... stretch my hand over and that was... hurting. (Leah, SEM 3)

If I have to carry my viola and my bag, I find my back, muscles get sore... at the top of my... shoulder area. (Leah, SEM 3)

Generally, the only pain I seem to have with violin is if it's in Symphony... if it's... really slow, or if I'm sitting in a locked position and viola it's when I have to play double stops. (Leah, SEM 3)

Leah was consistent throughout her interviews in stating the perception that her playing-related discomfort/pain was related to repertoire, whether she had been practising, and length of playing time. She commented specifically on performing and rehearsing the Bruckner Symphony, which went for one and a half hours. She found the long slow sections particularly painful. Leah also experienced back pain when working and sitting down in other situations such as whilst commuting. She said that sometimes she was actually more aware of her discomfort/pain when she was lying down and resting.

We had to do... one of the Bruckner Symphonies... in the first semester and that took like an hour and a half to play... and... it really hurt, [laughs] to play because... the beginning was slow, and then towards the end it got really demanding and I found that was, when my back hurt the most... it wasn't so excruciating that I couldn't play, but I found it really really difficult, to maintain... my full concentration in playing, because I was just thinking about my back going "Hurry up and finish". (Leah, SEM 2)

When I was doing Orchestra... it was actually, slightly easier... in the second semester but I still found... leaning back on my chair to release some of the tension it still kind of seized up... but... I also have... mild scoliosis and that in my spine so that's probably, didn't help. [MW: "... Because of that scoliosis do you... get pain at other times?"]... I do if I have to stand up for a long time... it just... aches, like I just need to sit down and rest... I find I get that when I work... sometimes, I notice it more when I'm lying down... because my, body is... resting... and my back still remains rigid... violin is similar as soon as I stop playing it's fine... but I find... if it's hurting a lot... during one rehearsal the next rehearsal it will hurt... straight away. (Leah, SEM 2)

I think it's just long periods of time... because my back is, locked... but I've noticed it more so when I'm... on the train... when I was just sitting dead straight... I find that if I sit in any, sort of locked position my whole back tends to seize up. (Leah, SEM 3)

From the outset Leah acknowledged that her practice was sporadic. She consistently said that her experiences of discomfort/pain were a sign that she needed to do more practice. She did not warm-up or take breaks during practice and said that she

had a tendency to start cramming shortly before an exam. “I’m not concerned about it [the pain] because I know it’s... either from not practising enough or it’s just... that, I’m getting back into... solid practice and... my body is... responding to it” (Leah, SEM 2).

It’s kind of the same thing... if I practise heaps I notice that... from stamina... lack of, practice my arms tend to get sore, but once I... get used to it... muscles settle back in and it’s like “Okay, work now”... I, don’t have time to be tired and it... gets used to it... it’s... a... lack of... practice thing... like if I was running I would get puffed... all I need to do is stretch them a bit and have a 10 minute break or something... but.. it, still, does get to the point. (Leah, SEM 3)

Leah reportedly also suffered from ongoing ill health as a consequence of glandular fever. At the beginning of the second year of her program she fainted for no apparent reason. After this she began taking multivitamins and iron tablets. Leah was generally unable to do any exercise and suffered ongoing fatigue. By her second year she had realised that she needed to pace herself better and asked to be excused from an Orchestra rehearsal. However, she said to the instructors that this was because she needed to teach on that particular day, not because of the physical difficulties.

The beginning of this year, I actually fainted, for no, apparent reason, [laughs] and... I started taking a multivitamin and iron tablets... after a week I was... not getting sick, and I had a lot more energy... and now I think I’m just, pacing myself, like, last night, I made up that I had to teach so I could, only go to half of Symphony because I was that tired that I thought if I go tonight, for the whole night and then I go, tonight as well... and then tomorrow and then have my concert tomorrow night and then have to get up early to teach on Saturday, I will end up sick... I’ve learnt to listen to my body now and if it means, having to

pretend that I'm teaching, for an hour [laughs], when I should be at Symphony... I think if I... rest, when I need to, I don't get as sick and I find that, if I rest when I am playing, it doesn't hurt as much instead of just trying to push myself. (Leah, SEM 3)

In conclusion, Leah's experiences were more severe than most. She had the potential to be a very interesting case and it was unfortunate that she withdrew from the Bachelor of Music program.

Student 32: Donna

Donna, a violinist, was one of the more severe cases of injury in this study. For the duration of her program she experienced playing-related discomfort/pain in her neck, back, shoulders, and arms, particularly during orchestral rehearsals. Early in her second year she also started experiencing constant discomfort/pain in her left thumb and developed a lump that sat between the joint and tendon. Once this injury occurred, Donna said she was unable to play more than 10 minutes at a time and reported that all every day activities utilising the thumb were affected.

Over a period of years, Donna sought treatment from many different health professionals including general and specialist doctors. The diagnoses ranged from tendinitis to a cyst, and at one stage the advice was to have an operation to remove the lump. This did not go ahead, and Donna's problems did not resolve. Shortly after the injury to her left thumb Donna also developed a problem with warts on her feet which were very painful and affected her ability to walk and exercise. Despite treatment these did not go away or heal. (Whether there was any relationship to her playing-related issues is unknown.) Before she came to the institution Donna also spoke with an Alexander Technique teacher about a small lump she was developing on her neck. This went away and was not painful.

Over time, Donna said that she became better able to tolerate playing for longer periods. Initially she adopted strategies such as stretching and frequent breaks to minimise her discomfort/pain. However she soon realised that the only way she could prevent the pain from occurring was to not use the thumb at all in activities outside of violin playing.

From the outset Donna came across as a loud, confident, and happy person. She managed to maintain a joking and light-hearted demeanour throughout her interviews even when she was talking about the stress and anxiety she was feeling as a result of her injury. She required little prompting and was happy to talk at length. (Donna did not participate in an interview during her fifth semester. In the subsequent interview it was clear that this was a particularly difficult time for her with regards to her injury.)

Despite initially being open with her Major Study teacher (Teacher A) about her playing-related issues, as time went by Donna downplayed her problems. She only deferred her Major Study course once and insisted on participating in Orchestra each semester. As a result of this she perceived that Teachers A and C demonstrated increasing frustration with her.

Donna's main concern was not the pain itself, but the effect on her career. Although she worked long hours as a violin teacher throughout her program, she spoke many times of only ever wanting to be a performer. She expressed a lot of anxiety about the future and demonstrated an awareness that the stress and anxiety regarding her situation may have been having a negative effect on her pain levels. At the conclusion of her program she was still hopeful of resolving her problems and continuing as a performing musician.

Table B32

Reported Pain Experience for Student 32: Donna

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	2	During an orchestral concert before Christmas	Back of the neck and front of both shoulders	5	Less than 1 hour	N/A
2	2-3	2	Tuesday, after five hours of playing	Back of neck	4	2-3 hours	8 hours
3	4	3	That morning, when brushing teeth	Left thumb	2	10-20 minutes	N/A
4	2-5	4	Present at time, 3	Left thumb	10	None	Less than 1 hour
5	DNP	-	-	-	-	-	-
6	4	4	Present at time, 2	Left thumb	4	30 minutes	3 hour Orchestra rehearsal
7	DNP	-	-	-	-	-	-

Prior to her studies at the institution Donna had experienced playing-related discomfort/pain in her left wrist, both shoulders, and neck. Her neck pain bothered her most, and recurred after periods of intense playing.

For the duration of her program, Donna continued to experience discomfort/pain in her back, shoulders, and neck, particularly during orchestral rehearsals. She also

experienced discomfort/pain in her arms and left thumb. However the focus of her pain shifted from the neck to the left thumb early in her second year. At this time she began to experience tendinitis in her left thumb. This came on shortly after she started back after the Christmas holiday and the pain effectively stopped her playing. Donna consulted a doctor after two to three weeks and was told that her problem should resolve in one month. At this time an occupational therapist also gave her a split and exercises to do with putty.

The only thing I would say is just after... Orchestra rehearsals... especially when you do a few of them in a week, I... get... sore shoulders and... sore back... I... have to stretch it out... stretch my muscles and get them, breathing. (Donna, SEM 2)

I have tendinitis in my thumb... I, noticed my, thumb was like, clicking... and then I went to the doctors... end of March... beginning of April... for a little while I was like, "Oh I'll just be sensible and I'll just relax"... I think it was like two or three weeks, and then I was like, "Okay, this is driving me nuts, I'm going to go". (Donna, SEM 3)

He [my GP] tries to be helpful and he goes... "Look you've just got to do the right things and it should fix itself up"... He gave me a month to begin with... that's come and gone... so... I need to go find a hand specialist and, talk to him. (Donna, SEM 3)

However, by the end of that year, her problems had worsened to the point that a lump had formed between the joint and tendon at the base of the left thumb. X-rays and scans showed that this was a cyst. At first, the advice was to have an operation to remove it however the wait time of such an operation was extensive and Donna was

apprehensive. In any case, whilst waiting, other doctors gave the opinion that an operation would be pointless. (Note: around this time, she also started getting warts on her feet. These were very painful and severely restricted her ability to walk.)

For the remainder of her program Donna perceived constant pain in her left thumb, particularly if she touched or bumped it. Many other activities were also affected and she said that at times the thumb would lock-up and she would be unable to move it at all. Once that happened she would have to take some days off playing. The pain remained mainly in the thumb, however when she overused it all the muscles in the left hand locked-up and the whole hand was very painful. She was also unable to get rid of the warts virus.

When I use it heaps... my doctor says... that it stresses out the tendon in my thumb which causes my thumb to get stressed and then once my thumb locks up and gets stressed the rest of my hand gets stressed... that's why the rest of my hand gets sore... it doesn't even matter if I play the violin or not it is, whatever I do it, hurts. (Donna, SEM 4)

As mentioned above, originally Donna's main strategies for preventing playing-related discomfort/pain included stretching, taking frequent breaks/practising in short bursts, and remaining calm thus reducing tension. (She was not comfortable stretching before Orchestra rehearsals.) However, by the conclusion of her program she had found that the only way to prevent her pain was to not use the thumb at all. "Whenever I'm practising at home I do, but I don't... when I'm at rehearsals... because I mean you can imagine... look a bit stupid stretching [laughs]" (Donna, SEM 2).

I can't really do anything I take anti-inflammatories... like Nurofen and stuff. I rub arthritis cream in it... to, ease the, swelling... but basically the only thing is prevention so I just don't use it. (Donna, SEM 4)

Before she began experiencing tendinitis in her left thumb, Donna spoke a little about a consultation she had with an Alexander Technique teacher prior to her studies at the institution. At this time she revealed that she had had a small lump on the back of her neck but emphasised that she was very good with prevention and always took great care of her posture. She talked in detail about the importance of sitting on the edge of her chair with a straight back and highlighted tension as a big problem for her.

I did, Alexander Technique I think last year... it was really helpful she just talked about making sure that... you... tuck your chin in a little bit more... because I was getting a little bump, I still have a bump on my neck... and I was like “I don't want to be a hunchback” and she was like “No you won't be a hunchback but you just need to keep your chin in and, make sure that you really do keep your shoulders opened out and stuff... and that should reduce any pain that you might feel as a result of your tight shoulders”. (Donna, SEM 2)

I have always been taught to sit on the edge of my chair back up straight... so I've always done that so I don't think it's [discomfort/pain] got to do with that. (Donna, SEM 2)

I make sure I look after my posture so I get really frustrated, when I get sore shoulders I'm like, “Why?” [Laughs] But... [MW: “Do you think that makes it worse?”] Yeah, definitely, because I tense up even more. (Donna, SEM 2)

Once she started experiencing tendinitis in the left thumb Donna also consulted many other different health professionals. Her main problem with playing was shifting,

because the thumb would get bumped when it moved around. She took her violin to one of her appointments to demonstrate but most of her doctors just told her to stop using the thumb, and she perceived that they didn't comprehend the implications. "Don't get me started on my sad little saga, my tale of misery and woe at the moment as I tell everybody, [laughs] I've been, jumped from this doctor to this doctor to this specialist to this one" (Donna, SEM 6).

It's all rather confusing I'm not going to lie... went to all these other specialists and stuff, and... they didn't think the operation would do anything... so I had... all these, scans and... they just were like, "Oh it's pointless because we can't see anything in there anyway it's just fluid", and I am like "Well where is it coming from" and they are like "We don't know". (Donna, SEM 6)

I took my violin to one of them and I just showed him I was like "the reason, it's hurting it, is not because of my pressure but because, the pain the place where it gets the most sore is right in here... where I go up, when I am shifting and stuff so, when I'm shifting and I'm not actually thinking about my thumb and I'm thinking about shifting and I'm thinking about what I'm doing, in relation to the music, I always like bump it on my way up I'd do something, and... it just goes downhill from there". (Donna, SEM 6)

I am playing, I'm very naughty, I play lots [MW: "So is it very painful for you?"]... I've learnt how to manage it much better. I know the warning signs, like when it's going to go and stuff. So, I'm just really sensible and if I can feel it going... I don't do anything I don't pick up anything with it I just don't use it, at all, and then it... gets a bit better. (Donna, SEM 6)

Early on, Donna discussed her problems with her teacher, who reportedly also had no idea of the cause of pain, and later she gave one of her interviews with me while another student was in the room. This was interesting to watch as the other student often interjected and answered, confirming various points such as Donna discussing with other students in detail. However, as time went by, Donna did not keep her teacher informed of the extent of her injury, and as a result Donna perceived that the teacher became increasingly frustrated with her.

Neither of us have any ideas... we've both, discussed, I'm not very tight in my left hand... occasionally like you know how sometimes you'll get tight... when you are doing double stops and stuff but, as a general rule I am actually a very relaxed player, so we are trying to discover what the, cause of, inflammation was. (Donna, SEM 3)

I've talked about it a bit with [Teacher A] I think she's kind of given up on me a little bit I don't blame her... and I'm a bit distracted anyway, because I, get upset when I, have to sit in lessons and play violin but... I don't really, practise that much and then [Teacher A] gets upset with me because I am not practising, and I get upset with me because I'm not practising but then I can't and then, it's like a vicious cycle. [MW: "Does she know, the extent of the problem or have you downplayed it a bit?"] Of course I downplay it a bit, [laughs]... I hate people who are dramatic. (Donna, SEM 6)

From the onset, the tendinitis was severe enough to restrict her playing to less than 10 minutes per day. Towards the end of the program Donna had attempted to resume regular practice of around 45 minutes per day, but still experienced severe pain when playing. She commented many times on her increasing pain tolerance and

growing acceptance that pain was now part of her life. “I am getting used to... I kind of learnt to accept it... it's just a part of everyday life now... it's just part of, who I am. My pain” (Donna, SEM 4).

I don't even notice it sometimes, and then I get to a point when I'm like “Oh actually that's hurting whoops”. (Donna, SEM 6).

I always never practise past half an hour and when I do I always regret it, so... I have a little bit of a break, I shake it out, if it is, if I can feel it tensing up, then I put like a hot water bottle on it, and then I will go back [MW: “... And it will be all right for you to go back?”] Oh it will be all right... [MW: “And can you do another half an hour or?”] Possibly, but that's the thing finding, the time to, have half an hour, and then, look after it and baby it and then go back again. (Donna, SEM 6)

Donna only deferred her Major Study course once and tried to persist through the pain, expressing a sense of achievement when she did this. She also insisted on participating in Orchestra each semester. This caused many problems for her, both physically and with the convenors. Donna felt that she didn't get any understanding from Teacher C. She felt very uncomfortable being questioned by him if she had to stop and rest because of the pain. “At present I am refusing to defer, I'm that kind of person... it's been a tough semester for me” (Donna, SEM 3).

[MW: “So when you did your Major Study exam, was that very painful for you?”] My hand it was very very painful yes. But... I was pretty proud of myself... and I played in a concert last week, was very proud of myself, I went along to all the rehearsals, and most of the rehearsals I just sat there, so I kind of

learnt all the music through... listening... I, almost played all the notes in the, what's it called? The, *Rosenkavalier*. (Donna, SEM 4)

After the... concert?... Well to be honest I was a bit out of it, because I was very very ill and I had a sore hand and I had a sore, foot and... specifically my thumb... it was very tight very swollen... because I was very... worried about everything and stressed, I did get a little bit of back pain... that was my fault because I was tensing, and... favouring my thumb so I was... holding my violin a bit awkwardly. (Donna, SEM 4)

They [the Orchestra convenors] are not very nice, I'm not going to lie, and... [Teacher C] hasn't been very helpful. [MW: "So you have talked to him?"] I, I've talked to him, yeah... at the beginning of the semester they, left me off the Orchestra lists... which I got really angry about, so I sent a very angry letter, and [Teacher C] got angry at me, and I was like "Well, you shouldn't forget about me". [MW: "So he's not keen for you to just do some of the rehearsals or?"] No and if I just do some of the rehearsals and sit there he gets, a bit narky. (Donna, SEM 6)

He's [Teacher C] not too bad, but, I just don't appreciate his attitude or, the way that he conducts things and... then they put on all these extra rehearsals and... change the day from Thursday to Wednesday, I didn't know, and so I put work from Thursday to Wednesday so I could have Thursday's free, for the Orchestra and then I got in there and they were like... "You need to be there for every single rehearsal" and I was like "Well, I've just told my work three times to change so I'm not changing them again they will fire me". (Donna, SEM 6)

Over time, Donna had to make many changes to the way she completed tasks. For example, she no longer washed dishes, and had to take extra care when changing gears whilst driving. She also worked long hours (up to 22 hours per week) as a teacher and had to adapt her teaching style so that she no longer used the instrument. “I just, have a rule, I am not allowed to use my violin [when I’m teaching]... so I don’t take my violin anymore to lessons” (Donna, SEM 4).

I don't play, when I'm with my students anymore... so when I am teaching and stuff I try to minimise my playing, and... when I play for my kids I make sure that I never have my thumb on and I am never pressing. (Donna, SEM 6)

I don't do washing-up anymore as silly as that sounds, because... the process of, getting plates and actually supporting it with my hand, doesn't work and it takes me forever anyway so I just said to my housemates “You do that, and I'll do something else”. (Donna, SEM 6)

When I'm driving I've, changed the way that I change gears, so I'm not using it, so just all sorts of like little things that I do subconsciously now which I had to get out of habits... even when I am carrying things like I have, I am just sensitive sensitive about it so when I pick things up I don't use it. (Donna, SEM 6)

Donna perceived that her problems with pain and injury had a deep psychological impact on her. As she got more stressed and worried this fed back in to and increased her pain. She identified as a perfectionist and as such found it very difficult to watch her marks going down (although she always maintained a joking and light-hearted demeanour throughout her interviews). As time went by, she also found it particularly difficult to observe the other students progressing.

I'm kind of a perfectionist, if I don't get anything over a Credit I get a bit upset, in all my subjects. And because I've been so emotional and stressed all my other subjects are like going down. You know how it is, and so then I'm, just dreadful, I'm a terrible student. (Donna, SEM 4)

It's affecting everything that I love and that I want to do so it's, that's very stressful, and frustrating, for me... I get very frustrated. (Donna, SEM 4)

It's been much worse this week because I've been very stressed. I fall apart my body falls apart when I'm stressed I can't be stressed. (Donna, SEM 6)

It's very tough having to come in here and watch everybody else, get to play. (Donna, SEM 3)

Donna said many times that her main concern was for her future career, that she had only ever wanted to be a musician and she was not very keen on becoming a teacher. During her final interview she was still hopeful of fixing her problems and being able to continue her career as a performing musician. "This is my future it's all I know how to do... music is my life, and it always has been... so there's really nothing else that I want to do" (Donna, SEM 3).

It's a little bit depressing... but, you've got to stay positive otherwise... I will allow it to get to me and then I will be, sad and grumpy and then it will get worse because I'm sad and grumpy because... that's what you do because your brain tells yourself, anyway I'm just preaching to myself here. (Donna, SEM 6)

I go through stages, of being worried about it, I'm more worried... about career wise... what I will do because I don't particularly want to teach for the rest of my life I'm not a big fan... drives me insane... I have always wanted to do

performing, and I'm not really good at anything else I'm, just a musician that's what I do... that scares me, not the, pain itself. (Donna, SEM 6)

It is not affecting, my general living like if it was... affecting, the way that I live and, my ability to get around and my ability to see people and my ability to work and my ability to function, then I would probably, be quite concerned about it.

However since it is only a little thing, at present... I don't get so stressed about it.

(Donna, SEM 6)

In conclusion, Donna's experiences of discomfort/pain were severe compared to most of the students in this study. The reported follow-on effects to other activities and mental state were significant and the lack of understanding and practical assistance she got from health professionals was disappointing. While she arguably should have kept her teachers better informed of her situation, it is difficult to see how her issues regarding the completion of her program could have resolved differently.

Student 33: Sally

Sally was a violinist who experienced increasing playing-related discomfort/pain as she progressed through her Bachelor of Music program. She was friendly and easy-going, displayed a light-hearted demeanour, and frequently laughed when describing her experiences of playing-related discomfort/pain.

Sally was inconsistent with her practice and, like many students in this research, said that she noticed an increase in discomfort/pain in line with an increase in practice/playing time. She perceived that her pain could be aggravated by Orchestra, in particular the Opera, and that the repertoire could also have a significant influence. Sally was the only student in this research project to mention the impact of Opera rehearsals running over schedule (and cutting into the lunch break) on her pain levels.

As she continued, Sally's discomfort/pain affected more parts of the body. The focus of the pain was constantly moving however it was increasingly present at time of questionnaire completion and aggravated by more factors/activities. Examples included posture, tension, temperature of the rehearsal space, outside work, and sleeping position. During her final semester, she started doing regular yoga, and said that she had noticed a decrease in her pain levels. However, at this time her pain scores indicated that her playing-related discomfort/pain was close to its highest level.

Ultimately, at the conclusion of her program, Sally was uncertain as to what her future held. Although she was still interested in pursuing music as a career she didn't believe she was ready yet to work in a professional orchestra. During her final semester she was considering doing a Graduate Diploma of Education with the aim of moving into instrumental music teaching.

Table B33

Reported Pain Experience for Student 33: Sally

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1-4	2	Yesterday	Both wrists, upper right arm, and right shoulder	2	1-2 hours	N/A
2	3	4	Yesterday	Right thumb	1	2-4 hours	7 hours
3	2	3	2 weeks ago	Left shoulder	4	2 hours	5-6 hours
4	2-3	5	Present at time, 1	Left shoulder	3	2 hours at most	7-8 hours
5	2	3	Present at time, 2	Lower back	4	2 hours at most	5 hours
6	2	5	Present at time, 2	Neck	5	1 to 3 hours	7 hours
7	2-3	2	That morning	Mid to upper back, below shoulder blades	4	2-3 hours	5 hours
8	4	4	Present at time, 2	Neck		2-3 hours	7 hours

Prior to her studies at the institution, Sally had experienced playing-related discomfort/pain in her wrists, right arm, and left shoulder. The discomfort/pain in her

left shoulder bothered her the most, and recurred when she resumed practice after a long break.

As she continued through her program, Sally began to experience more playing-related discomfort/ pain in her shoulders, back, and hands. Initially she noticed an increase in her back pain during Orchestra rehearsals. This discomfort/pain continued for some time after she stopped playing. The pain in her hands also increased during her second year so that at times she was aware of it when she was not playing.

During her third year, Sally reported for the first time that she was experiencing discomfort/pain in her neck. However, the pain in her hands was bothering her most and she was now aware of it when typing and writing. Her back pain also continued to persist, particularly during Orchestra rehearsals and work (see further on for more details).

My hands... when I'm away from the instrument I use them, still, for... writing and stuff... in lectures and... just general day-to-day use, so I will find that I'll be doing this quite a lot... in both hands actually I just realised [stretching out fingers]. (Sally, SEM 6)

I do get a bit [of discomfort/pain] in the neck, on both sides... and... sometimes not always, lower back though... I have managed to improve that a bit throughout the semester, through postural awareness... I noticed at work as well. (Sally, SEM 6)

It was during her third year that Sally had her most severe experience of playing-related discomfort/pain. The experience reportedly occurred during a Chamber Orchestra rehearsal, when the room was particularly cold, and the pain affected the entire left side of her body. At this time she discussed her experiences with her Major

Study teacher and said that she was considering complaining about the temperature in the rehearsal venue. However, she didn't as the next semester she noticed that the temperature had been adjusted.

There was this, one time in, Chamber Orchestra where... my whole... left arm... was really excruciating... tense... I think that was, partly because of the cold... it's freezing... I've been talking to other people and they've, said that they find it's really cold too... I was actually thinking of writing a complaining e-mail, saying... "Make it warmer in there", because it's just it's really damaging in some instances especially lately. (Sally, SEM 6)

It's been a lot better... because... the room is slightly warmer... this semester.
(Sally, SEM 7)

In her final year, Sally noticed increased pain in her left thumb and neck as well as the ongoing discomfort/pain in her arms, hands, shoulders, and back. She purchased a new, lighter violin case (brand BAM) and perceived an immediate decrease in pain in her shoulders and neck. However, she continued to experience a lot of neck pain, and found her pain in general could be influenced by her pillows, sleeping position, and increases in practice time.

I got my light violin case... halfway through last semester... and, it was just an immediate improvement... with my shoulders... because my old case was quite heavy and I used to keep all my music in it as well... whereas now I keep my music in my bag, and I try to carry less music as well... and... carry my violin case on my back... and it's a lot lighter as well so... I noticed it's a lot better, since then... I'm getting a lot less pulling in my neck and stuff. (Sally, SEM 7)

Still get a few... occasional muscular pains when... [I have] either taken a break... or... a couple days' break... after the Easter break... I had bit of trouble... I'd wake-up the next morning... my shoulder and my arm feeling, really sore... if I pulled it a certain way it would be like "Ow"... it's only happened once or twice this semester... that I have woken up with pain, once was just because I was sleeping badly. (Sally, SEM 7)

Right now my neck is giving me a bit of, strife... because, I'm sleeping on a different pillow... I did change to much higher pillows, this semester... I think it was a good change in the end... I sleep on my side mostly... to begin with when I was sleeping on my back I was like "Aaagh"... but... I've gotten used to it... but... when I sleep on something different... it's... same issues again. (Sally, SEM 8)

The focus of Sally's pain changed many times, from her left shoulder, to her back, hands, left thumb, and finally her neck. In fact, she commented several times that as soon as one problem was resolved, another would pop up. This may have been one reason why her memories of previous experiences were hard to recall. On several occasions she was asked about problems that she had highlighted as serious and was going to talk to her teacher about during a previous interview only to say that she couldn't really recall them. Like many other students in this study, Sally also said that she would often not be aware of her discomfort/pain until she stopped playing.

I changed the grip for my bow... it was fine for most of the semester but lately I've been getting a little bit of joint pain in my first finger... yesterday, actually... I felt... pretty bad... I'll have to talk to him [my teacher] about it. (Sally, SEM 4)

I can't actually remember if I spoke to him [my teacher] about it or not, but, it hasn't been worrying me since. (Sally, SEM 5)

More often than not I do feel some sort of discomfort.... the neck is a major... area at the moment that's... probably just because I'm feeling a bit stiff in my neck today. (Sally, SEM 6)

I kind of don't notice it when I'm playing... because I'm concentrating on the music more than, I am my back. (Sally, SEM 7)

I have got like good news about it and then there are also other things that have kind of popped up... for instance, yesterday in Symphony, I had quite a bit of, pain at the, base, joint of my thumb... on the right hand. (Sally, SEM 8)

Sally was consistent throughout in perceiving that her playing-related discomfort/pain was more severe during Orchestra, in particular the Opera. She highlighted one of the main reasons for this as being the increase in playing time and tried to circumvent this by reducing her own practice during weeks when there were successive Orchestra rehearsals. Early on she also highlighted the chairs she had to sit on during rehearsals as affecting her discomfort/pain. However, as she progressed, she said that she came to realise that it had more to do with her posture during orchestral playing. "When it comes to Orchestra... when we got to the, theatre, because they had different chairs there, I got a lot of pain in my back" (Sally, SEM 3).

When I was doing Opera I was getting a bit of back pain, because I had, very bad posture when I play orchestrally I realised... I slouch quite a bit... I... noticed... this time it was... my own posture... that was contributing. (Sally, SEM 4)

I just grit my teeth and bear it for Orchestra... and then go home and collapse... when I had my stomach bug I was still really weak and everything and I got horrible back pain... I've got a bit of pain in my back at the moment but... I don't know if that's, just from remembering... usually I can just... do something and it starts to ease it up a bit... I think it is just from, holding one position for a long time. (Sally, SEM 5)

I have pretty much limited myself to only practising one or two hours on the days that I have Orchestra... so I don't wear myself out at the end of the day. (Sally, SEM 7)

I did start getting... this pain behind my, left, shoulder blades... that happened a lot especially when I was... doing Opera... this semester... long hours every day of like hunching forward in my bad Opera... posture. (Sally, SEM 8)

To begin with it was, tough... because this particular one... didn't really have a lot of rests in it like... the last Opera I played... but after a while... I found the problems were getting less and less... there was one day in particular where I had to go home and put a heat pack, on, basically that side of my body and my neck and stuff... and that helped a lot. (Sally, SEM 8)

Sally also identified poor posture, the temperature of the rehearsal space, tension/frustration whilst playing, her bow hand, resuming practice after a break, and, towards the end of her program, her sleeping position as influencing her playing-related discomfort/pain. Repertoire was also an issue for her, for example, she noticed a lot of pain in her right thumb during an Orchestra rehearsal for a Bruckner Symphony which had lots of tremolo. She also experienced a lot of pain in her left forearm during one

particular piece with lots of shifting. "I might have gotten it [discomfort/pain] a couple of times... start of the year... just wasn't used to, practising again" (Sally, SEM 3).

I think just the way I play... whether I'm getting too frustrated or not... with the tuning and.... I noticed... especially, tensing up... I end up doing this weird thing with my thumb where I push it right back... it feels, bad... but... if I pay more attention to it, it doesn't feel as bad. (Sally, SEM 7)

When I was doing really, big shifts... in... this concerto I am doing... I'd get this pain... down my arm... but it turned out it was because, of my thumb being too far back and stuff and not coming with my... arm when I shifted. (Sally, SEM 8)

Yesterday in Symphony, I had quite a bit of, pain... on the right hand... I think that was because we were playing, Bruckner... lots of tremolo... and I just wasn't, set up well for it. (Sally, SEM 8)

In her third year Sally started riding an exercise bike and noticed that this helped to reduce the discomfort/pain in her lower back. In her final year, when she took up yoga, she also noticed a decrease in general discomfort/pain for the first time in her program. However her pain scores at the time indicated that her discomfort/pain may have actually been at its most severe.

I think that's [riding exercise bike]... helped... I've just developed a bit of strength in my lower back... and I find I don't get as tired in the legs as well... I want to do some strengthening exercises with my arms because... I did notice one day I went for a really, long swim, in the morning, and then that night when I was playing, it was totally effortless. (Sally, SEM 6)

It kind of, went up... this semester because I have been doing more exercise and stuff... I think that's helped a lot and brought it down again... I've noticed less

pain... less muscle fatigue in my back... and my arms, can take, a lot more, playing now... I don't get so tired. (Sally, SEM 8)

Like most of the students in this study, Sally's responses contained many inconsistencies. For example, at the end of her first year, she said she had only had a couple of experiences of playing-related discomfort/pain, and these were in her left shoulder. However, she then revealed she also had bad back pain and pain in her right hand. Again, at the end of the second year, early in she said she had no pain in her left shoulder, and then later on said it was very bad during the Opera.

I didn't generally get pain before while I was practising but a couple of times this year... I just couldn't play one day... because I had really bad pain in my shoulder. But that's pretty much it... just a couple of occasions when I have had, pain in my shoulders... (Sally, SEM 2)

And then:

...Orchestra was a huge problem last semester... I got, really bad back pain, all through... I think it was because... I wasn't used to having rehearsals that long. (Sally, SEM 2)

I haven't noticed it [any pain], anyway... (Sally, SEM 4)

Later on:

... Actually now that I remember, my left shoulder did play up a lot during Opera to the point where one rehearsal, towards the end of the week I just had to stop... playing just, let my arm hang. (Sally, SEM 4)

Sally said that her main strategy for preventing playing-related discomfort/pain throughout her program was playing in blocks of one hour, something she had been doing for as long as she could remember. As she continued through her program, she

also began to take smaller breaks within these blocks and to stretch before her practice, and found both of these very beneficial in both preventing and delaying onset of pain. Nonetheless, like most students in this study, as time went on Sally admitted that she often forgot to stretch before her practice, only remembering once she was already experiencing discomfort/pain. “I’ll... do a few stretches... not every time, but most... and it helps a lot” (Sally, SEM 3). “I’m not as, vigilant with it [stretching] as I used to be... that’s for sure but... if I do feel discomfort I certainly, will stretch it out a bit” (Sally, SEM 4).

Whenever I get like a little bit, tense or sore or something I... stretch it out and it usually helps a lot... sometimes before I play... but... it's just usually... after I've started practising. (Sally, SEM 5)

I just do one hour blocks... ever since I started practising... I just had that number in my head... it doesn't wear you out too much. (Sally, SEM 5)

I have... started taking little tiny short breaks during my practice sessions... if I'm getting a little bit frustrated or... halfway through I... put my instrument down and go get a drink of water or something... and then come back to it. (Sally, SEM 7)

The whole stretching thing helps, beforehand and during I just take small breaks every so often... walk away from the music stand put the violin down, do some more stretches if need be... it's... something I have done, unconsciously all the way through... my playing and then, really started consciously doing it about this year... sometimes I don't remember until after, [laughs] I have started playing... probably about 70% of the time. [Laughs] And then there is a large chunk when I forget entirely. (Sally, SEM 8)

At the onset of her program, Sally had only discussed her experiences with a family member. As she continued, she discussed it with her teachers and some other students in the form of general talk during Orchestra rehearsals. Generally speaking, her discomfort/pain went away when she stopped playing, and so she was not particularly worried about it. The exceptions were during her third year when she spoke to a friend studying physiotherapy and her final year when she was experiencing a lot of pain during the Opera. At this point she contemplated consulting a practising physiotherapist. However, the problem resolved itself so she did not. "It's not terrible pain... so I just... push through it I know you're not supposed to... but, it's not distressing me greatly" (Sally, SEM 2). "It [my pain] hasn't been too severe so, I'm not too worried about it at the moment" (Sally, SEM 5).

There was this, one time in, Chamber Orchestra... I went home and I live with a physio... I... knocked on her door... she just, totally, deactivated all the muscles in my arm and said... "Don't play for the rest of the day and it will be sore tomorrow but it'll be fine" and it was... after that rehearsal I started doing a full on warm-up... stretching... shaking out my hands and... [Teacher B] kept telling me that I should... let my arm fall loose... during rehearsals. (Sally, SEM 6)

When I got the forearm thing because I knew that, Melissa [Student 26] had had a similar, problem... last year... she got it really badly and had to stop playing for... couple of weeks... I asked her... because she had actually gone to see a physio about it... and she is the one who suggested, pushing shoulders... back and, sitting properly. (Sally, SEM 8)

I think when we are doing Orchestra... because it is... a present issue, [laughs] in everyone's mind... when you are doing Orchestra... come out during the break

and everyone complains about, how sore they are... especially with Opera... just because of the long hours. (Sally, SEM 8)

It's almost gotten to the stage where I have gone to see, a physio, because... I was a bit worried... with the whole shoulder and forearm thing... but then it... stopped being a problem... it was the first time I had ever thought "Okay... that's... a different sort of pain from what I had ever felt before..." [MW: "So do different, types of discomfort or pain worry you different amounts?"] Yeah... you can tell the difference between when... you are a bit sore because, you have just done a lot of practice, and... when there is something... really wrong. (Sally, SEM 8)

Sally commented throughout that she experienced discomfort/pain in the lower back, legs, and sometimes also her neck when working. Towards the end of her program she said she was getting a similar kind of pain when standing up for Divertimenti rehearsals, and that it would also sometimes recur during private practice or lesson. "Sometimes I get a little bit sore... from standing like in the lower back... like I do from work... but not, too bad" (Sally, SEM 7).

Sometimes I do get it in the back I had to work... as the door greeter... for the past two weeks... the first shift of doing that was really like, "Wow" because, you are moving around even less than when you are on registers... I was trying to, have a good posture the whole time but, also because it was the first, shift I had done after, the break over Opera, I wasn't used to, standing... like that, again, so, I got a bit of pain in my lower back. (Sally, SEM 8)

On reflection, in her opinion there should have been a longer break during the middle of the day when there were Opera rehearsals. Although the break was supposed

to be an hour, the musicians had to be back early, and often the first rehearsal would run over time. Sally also perceived that there was a general atmosphere of intimidation within Orchestra, and as a result claimed that she didn't feel comfortable enough to stop, relax, and/or stretch throughout.

I was thinking for Opera they definitely... need to make that lunch break a little bit longer... because... you are only having about forty-five minutes of actual rest... in between they say it is an hour but it is not because you have to be back early, and sometimes the morning rehearsal goes overtime, and so... you are... still fatigued from the morning rehearsal when you go back in for the afternoon rehearsal... [MW: "And do you find problems with [Teacher C] if you stop and try and stretch and relax or anything like that?"] Yeah you feel like you can't, most of the time... he's just so demanding... I have never ever really seen anyone do it that's the thing as well... everyone's so on edge... they are not game to try... taking a break and stretching. (Sally, SEM 8)

There was one day during Opera week where... because [Teacher C] had picked on, my desk during, the rehearsal and freaked me out and told us that... "Tomorrow I'm going to get you all to play, for me in my office"... rather than going home and resting like I should have I, went to a practice room after rehearsal and... kept practising. (Sally, SEM 8)

On reflection, prior to starting at the institution, Sally was generally aware of playing-related injuries but had no education regarding how to prevent them. She had since received a limited amount of information but thought it would be good to have some preventative education integrated into one of the first year courses. She found it beneficial to be in the study because it made her more aware of her own playing-related

discomfort/pain. In her opinion, her pain was a result of bad posture and inconsistent amounts of playing time.

[MW: “So like before you came to The Con had you ever thought about the whole issue of playing-related pain, injury...?”] I guess I was, aware of it because I heard stories of, other people... not even been able to play anymore... and so I have always thought well... I have to be careful but... there wasn't much education about, how... [MW: “Have you received any of that here, do you think?”] Yeah... well I've gotten more... education about how to be careful here. Some of it I've come up with on my own... trial and error... but... when they have [physiotherapist] come in for Project Week, stuff, that's, really good and that's, educating us and, having people like you... doing research projects... gets you thinking about it too so. [MW: “Do you think it would be beneficial to have some kind of course or something in the first year?”] I think so... even if it is integrated into, something. (Sally, SEM 8)

I have been pretty solid on my opinion, all the way through about what causes, my pain specifically... it's, from, bad posture and lack of playing. (Sally, SEM 8)

Being in the study... it's definitely, made me think. Even lately I've realized... knowing that this meeting is coming up even... you start thinking more carefully about your playing in the lead up to it as well. (Sally, SEM 8)

At the conclusion of her program Sally was considering doing a Graduate Diploma of Education so that she could teach in a school. This was a change from what she wanted to do originally but she said that she was now realizing that she needed to earn money and the best way to do that was to teach.

I'm, currently... making that final decision "Do I want to do a Diploma of Education or not?"... So I have more options in terms of jobs... [MW: "So is that a change from what you wanted to do in the beginning?"] Yeah, definitely... I think it has just, really sunk in, because, my parents aren't able to help me, financially, anymore... at the moment I'm... thinking, "Okay... where is the money in this degree?" [Laughs] and going towards that... I still, have... hopes to go back into the performing thing... audition, for orchestras and stuff. But I don't think I am ready for that... right now. (Sally, SEM 8)

In conclusion, Sally's experiences of playing related discomfort/pain were more severe than those of many others in this study. She highlighted some contributing factors that were unique to her. However, her experiences did not reach the point that she felt she needed to consult a health professional.

Student 34: Robyn

Robyn was a violinist whose experiences of playing-related discomfort/pain throughout her program were comparatively minor. She was very easy-going and it was difficult to get her to elaborate on her answers.

Like most of the students in this study, Robyn's playing-related discomfort/pain was more severe during Orchestra rehearsals, particularly the Opera. She attributed this increased discomfort/pain to poor posture and not being used to playing for long hours. Robyn also found the chairs in the theatre to be better and thought they should be available for use in all venues at the institution.

As a Bachelor of Music Education student, Robyn was required to study other string instruments. In the third year of her program she had to learn the cello, and for the first time indicated experiencing Grade 2 discomfort/pain in her right forearm. This pain was influenced by carrying the cello but didn't concern her because she saw playing the cello as a short term project. At this time, Robyn also purchased a lighter violin case (brand BAM) and perceived that this was beneficial in helping to reduce playing-related discomfort/pain.

During her final interview Robyn recalled the first year as being most difficult for her in terms of playing-related discomfort/pain. She went as far as to say that she would sometimes wake up with a sore neck after Orchestra rehearsals, and revealed that, on one particular occasion she had to cancel work because she couldn't turn her head. However she did not mention her neck at all after her Initial Questionnaire, she consistently stated that the only body part affected when playing violin was her back.

At the conclusion of her program Robyn was planning to finish the Education component of her program and become a string teacher. In her opinion, being involved

in the research project had not made her more aware of her own and others' experiences of playing-related discomfort/pain. As she said so eloquently, "Like, not really. You try not to think about it".

Table B34

Reported Pain Experience for Student 34: Robyn

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	2	Doesn't specify	Doesn't specify	1	1-2 hours	N/A
2	1	2	That week during Orchestra	Back	4	1 hour	5 hours
3	1	1	A month ago during Orchestra	Back	5	1 hour	4 hours
4	1	2	Orchestra previous Friday	Back	4	2 hour	6 hours
5	2	1	Previous Friday during cello lesson	Right forearm	3	1 hour	4 hours
6	2	2	That morning when playing cello	Right forearm	5	1 hour	3-4 hours

Prior to her studies at the institution, Robyn had experienced playing-related discomfort/pain in her right wrist, left shoulder, and neck. Although this discomfort/pain recurred it didn't bother her because it was reportedly not too severe.

As she progressed through the first year of her program, Robyn also began to experience playing-related discomfort/pain in her back. This pain recurred after about three hours of orchestral playing. By the end of her second year, this pain was recurring after one hour. However, she was no longer noticing any discomfort/pain in any other body parts. In her opinion this was because she had gotten used to playing for longer hours and had also improved her technique. “Sometimes my back... starts to hurt... I found it in the concert, because we had... rehearsals leading up... every day for... three hours... and so during the concert I was like ‘Ow’” (Robyn, SEM 2).

I'm not really noticing it [discomfort/pain] as much... cause, my technique is getting better... I think it's probably that... sometimes I just get a bit tired but that's about it. (Robyn, SEM 3)

Not that I've noticed... it's just so busy... I don't really get much time to... notice these things. (Robyn, SEM 4)

During her third year, Robyn was required to learn the cello as part of her Education component. By this stage she said that she no longer experienced any discomfort/pain whilst playing violin and attributed this at least in part to purchasing a lighter violin case. However, she had begun to experience pain in her right forearm when she played the cello. This was worsened by having to carry the instrument around: at times her arm was already sore when she arrived at her cello lesson.

I'm actually pretty good in the, whole, back thing now... I just got a new case, you know those BAM really light ones... and... it's pretty good... it weighs like nothing... so I feel I can just like carry it around whenever. (Robyn, SEM 5)

Even when I was sitting up in Orchestra the other day like, it was fine... I think I just... got used to it. (Robyn, SEM 6)

The only thing I really notice with cello is my arms hurt... a lot... on Fridays I have a lesson... so I have to catch a ferry and a bus and I have to carry it....

[MW: "... So is it often already hurting by the time you get to your lesson?"]...

Yeah. (Robyn, SEM 6)

Robyn was consistent throughout in perceiving that her playing-related discomfort/pain was greatly influenced by Orchestra. In her opinion this was a combination of her poor posture and not being used to playing for long hours. She found it more difficult during the Opera, and commented that the discomfort/pain came sooner as the week progressed. Like many students, Robyn mentioned the adjustable chairs in the theatre specifically, and said that they should be in all venues. "I was in the Opera... the only thing, there was getting tired but... there wasn't really much pain... I think it was just from sitting up, like straight" (Robyn SEM 4).

The ones [chairs] that make you sit up straight like you can lean back but still be sitting up straight, they are... better, then the ones... [MW: "... In the theatre?"]

Yeah... they're really good... [MW: "So you think it would be better if they had those in the orchestral hall as well?"] Yeah... then you get the feel of it as well... because you are going to be sitting on those for the concert so... you may as well be, for the practices. (Robyn, SEM 4).

Generally, when she experienced discomfort/pain, Robyn would try and sit back in her chair for a few minutes or stretch. Her main strategies for minimising discomfort/pain included working on her posture, particularly during Orchestra rehearsals, and increasing her stamina. Her warm-up throughout consisted of scales and exercises. Generally, she did not take practice breaks because she didn't practise for

very long. “I sit back on my chair sometimes, for... five or 10 minutes and then I can sit back up and it's fine” (Robyn, SEM 3).

It's [discomfort/pain] never really worried me that much... if I get a pain then I just go stretch it out... and then it's all good. (Robyn, SEM 4)

I guess just good posture [is my main preventative strategy]... when it comes to Orchestra, not... leaning over at all because... that kind of hurts. (Robyn, SEM 5)

Robyn kept her practice consistent throughout the program, at around six hours a week. During her first interview, when she commented that she hadn't really noticed any changes in the amount of discomfort/pain, she said that she thought this was because she had not increased her practice. In her final semester, she linked a decrease in discomfort/pain to only having to participate in one Orchestra program. “Not really [noticed any change in discomfort/pain]... been practising about the same amount as I used to... it's only minor... sometimes” (Robyn, SEM 2).

Robyn exercised regularly throughout her program for around three to four hours per week. Generally this consisted of running and walking. At one stage she was doing a Body Pump class at the gym, and reportedly found this beneficial in strengthening her stomach muscles. As a result she was able to sit for longer during orchestral rehearsals without pain. “I guess just, strengthening my stomach muscles so than, I can sit up straight, for longer [is my preventative strategy]” (Robyn, SEM 3).

Robyn worked around 15 hours a week at a supermarket for the duration of her program. Early on, she said that she could sometimes experience pain in her arms from lifting things at work; however this ceased to be a problem.

Prior to her studies at the institution, Robyn had discussed her experiences of playing-related discomfort/pain with a family member and her teacher. The advice was

to adjust her posture and method of holding the violin. Throughout her program she also discussed the pain in her right arm with her cello teacher, who said it was a result of bad posture.

She [Teacher G] just reckons... it's, cause I've got bad posture... with the cello... [MW: "Does she think it will go away or?"] Yeah if I, do the right posture... but I'm too lazy I'm like "Yeah whatever". I only have... three weeks to go so... I'm not going to change anything. (Robyn, SEM 6)

At the end of her first year, Robyn said she was a little bit concerned about her back pain. However, as she continued she was no longer concerned. During her final interview, Robyn said that she was concerned about her back and neck pain early in her program. She stated that sometimes she would wake up in the morning with a sore neck and that once she had to cancel work because she couldn't turn her head. Interestingly, she never once mentioned her neck over the three-year period. "I'm just worried about my back... if it's going to be screwed up" (Robyn, SEM 2).

Probably first year... as far as I remember... Orchestra concerts, I'd get really really sore... from sitting that long, like it was an hour and a half or something... I just wasn't used to it... sometimes I'd wake up, and... my neck would be... really sore... once I remember calling in sick to work, because I couldn't, turn my head that side. (Robyn, SEM 6)

At the conclusion of her three years at the institution, Robyn's career ambitions were unchanged: she was planning to finish her Education component and become a string teacher. On reflection, she said that she was not sure if any of the other students at the institution were having problems with playing-related discomfort/pain. She was the

only student to say that being in this research project hadn't made her think about her experiences anymore, because she generally tried not to think about it.

[MW: "Since you've been at The Con, would you say you've noticed a gradual decrease, except for this cello stuff, in your pain?"] Yeah... I think it's just getting used to it really... [MW: "Do you think many of the other students, get pain when they play?"]... I haven't had anyone complain to me... but they might?... As far as I know no... [MW: "Has being in this study made you think about it more, or, not really?"] Um, not really. Like I try to think about it.

(Robyn, SEM 6)

In conclusion, Robyn's experiences of playing-related discomfort/pain were not particularly severe. However, she did have some contributing factors in common with the other students in this study.

Student 35: Robert

Robert, a violist, was one of the most severe cases of playing-related discomfort/pain in this research project. My initial impressions of him were that he was very laid-back and the sort of person who liked to have a good time. However over time it became apparent that Robert could also be perfectionistic and dedicated in certain areas of his life.

One of the most interesting aspects of Robert's case was his unwillingness to change certain behaviours that he acknowledged were most likely aggravating his playing-related discomfort/pain. These behaviours included inconsistent and excessive hours of practice, not warming-up before playing, lots of upper body exercise, and late nights "partying". Robert was consistent throughout his program in stating that his main strategy for preventing pain was simply to play through it.

Robert appeared to be very open during his interviews with me regarding his experiences of playing-related pain. However he generally didn't like to discuss them and his pain was not something he spoke about with his teacher. Reasons for this included not wanting to use his pain as an excuse for playing badly and not wanting to waste any of his lesson time discussing it. Similarly, he said that he was not open with other students or his family regarding the extent of his problems and admitted to having a "hard-line" attitude to pain.

Robert was able to link all of his most severe episodes of pain to periods of playing long hours with limited breaks. During the third year of his program he attended a national music camp and noticed a significant increase in pain due to the long hours of playing required. A few months later he consulted a physiotherapist and a GP about his pain and both advised reducing playing/taking a break followed by slow reintroduction

of playing. However Robert was adamant that this was not an option for him and said that it was far more important to him that he continued progressing with his music. His solution was to utilise a pattern of taking short breaks in holiday periods followed by resumption of full workload (with ever-increasing pain).

Robert's responses were also inconsistent on many occasions. For example, in several interviews he said that he stretched before and took breaks during his practice but then said it depended how motivated he was to practise, how much time he had etc. Some of his behaviours were also inconsistent. For example, Robert professed to be increasingly concerned about his playing-related discomfort/pain yet seemed unwilling to make adjustments to his playing habits and lifestyle.

One thing that was abundantly clear was that Robert had a very good understanding of what had caused and was aggravating his playing related pain/injury. He also understood what steps he needed to take in order for this injury to heal. Yet in his case he made a conscious decision not to follow them, as he believed that it would be too detrimental to his progress to take an extended break from playing at that time.

At the conclusion of his program Robert was planning to either study acting or continue with further study of his viola. He said that there was a better chance that his injury might heal if he got into acting school as he wouldn't be playing his viola as much. On reflection, despite his experiences he said that he wished that the Bachelor of Music program had involved more playing and less academic work, saying "I think I would have loved it... but I would probably have had more back problems [laughs]".

Table B35

Reported Pain Experience for Student 35: Robert

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	1	2 years ago during an orchestral performance	Right wrist	2	1-2 hours	N/A
2	2	1	Previous week while busking	Right wrist	4	Varies greatly	6 hours
3	2-3	2	Previous Saturday during a rehearsal	Left shoulder	2	3 hours	9 hours
4	3-4	3	Previous Thursday during Orchestra	Both shoulders	6	3-4 hours	11 hours
5	2*	2	Present at time, 2	Upper back behind right shoulder	9	Up to 6 hours	13 hours
6	4	4	Present at time, 1	Upper back behind right shoulder	4	3 to 5 hours	12 hours
7	5	5	Present at time, 2	Upper back behind right shoulder	7	3 hours, (at least 7 hours playing each day)	10 hours
8	4	4	Present at time, 1	Upper back behind right shoulder	5	3-4 hours	9 hours

*Grade 5 after playing.

Prior to his studies at the institution Robert could recall one experience of playing-related discomfort/pain in his right wrist. This discomfort/pain occurred after a long orchestral performance.

As he progressed through the first year of his program Robert said that his playing-related discomfort/pain was getting better. He initially stated that he had only had a couple of instances of pain in his right wrist during Orchestra. However later when asked specifically about his back Robert said that he experienced back pain every time he was sitting down and playing long notes. "I fixed up my posture so, I'm actually feeling better... than I used to... [I've only experienced pain]... once or twice in... Orchestra... long symphonies and stuff" (Robert, SEM 2).

By beginning of his second year, Robert was no longer experiencing discomfort/pain in his right wrist. However he continued to experience pain in his back, including when using the computer and playing guitar. The focus of his pain was now the shoulders, particularly the right, and he found his discomfort/pain was more severe during orchestral rehearsals and slow playing. At this stage he had greatly increased the amount of playing and practice that he was doing and admitted that he would usually persist in playing through his pain.

Extended playing... in Orchestra, sometimes... even though I'm keeping everything relaxed... there's a fair bit of pressure up on your shoulders and stuff like that... and... I don't lean back in my chair much... so I sometimes get a bit of pain. (Robert, SEM 3)

I've got a kind of, hardline attitude... [when] I feel pain I... don't put down my viola, I... go... unless it gets really bad. (Robert, SEM 3)

These days... when I play classical guitar... I get some back problems. (Robert, SEM 3)

By the end of this year Robert had noticed a lot more pain in his back and shoulders. He had reportedly had one particularly severe experience of pain where his whole body was aching and he was subsequently unable to do any physical exercise for a week. This experience occurred after many days of playing long hours on viola, piano, and guitar, on top of exercising and “partying”. Since then, Robert said that he had been trying to cut back the amount of playing he was doing in order to reduce his pain.

I think... my Orchestra work, has been much larger, in the last semester... I've tried to cut back my practice a little bit... I've tried to keep my posture, better in general, and sleep better... I've always manage to sleep really well but, I sometimes think I sleep... in, wrong positions, and I wake up [sore already].

Yeah...and then I will probably sit, in a bad position on the train. (Robert, SEM 4)

The other day I had the most weird sensation... I'd been doing about two months of... solid... almost nine hours, playing a day... I just came home one Friday and my whole body was just like aching it's like the... whole couple of months just caught up with me on that one day... and... that was a bit nuts... I couldn't work out for about, a week... I don't know if it was coincidence that I had just been doing, two months of excessive, hard core viola playing and, and piano stuff as well and guitar stuff as well... or not, but I'm pretty sure it had something to do with that. (Robert, SEM 4)

Robert's pain continued to worsen early in the third year of his program as he increased his playing during (and sustained it following) a national music camp. The

pain at the top of his back behind the right shoulder was now always present and more severe when he was stressed and/or hadn't warmed up. Robert demonstrated an awareness that he needed to restrict playing in order to recover but said that was not really an option if he wanted to keep progressing at the rate that he was now. He continued to push himself to extremes in terms of practice, study (extra subjects), working, exercising, and partying.

Ever since I did... [a national music camp], at the beginning of this year my back has been getting pretty bad... it's actually pretty bad right now, just because I've been doing practice all day... but... there was some point... about halfway through, the first week... where... I heard this... crack in my back... I don't think it was a big thing... just next to my... right shoulder blade... and it got worse and worse, and then, at the end of, [the camp]... I... had a constant... dull, ache there whenever I played, like no matter how much I relaxed or had good posture so I figured it was just down to extensive playing. And then I didn't really rest so I just... kept playing a lot... at [a music festival], and then, more and more practice... for example today I started at, 8:30 and, it's almost been solid until about, five minutes ago [currently after 1 pm]... after the first half an hour of playing really it starts to ache, and then... it got to the point where I was... sitting in my practice room... leaning against walls and stuff and trying to make it go away but it, wouldn't. I used to be able to... crack my back and it would, go away for a while... but, it doesn't really do that anymore. (Robert, SEM 5)

I don't think I... did myself any favours, about a month ago... I was, right into, partying pretty much every night... but... I wouldn't... allow it to overtake any practising... and... I figured... I was doing the perfect... balance of... working my

arse off and partying hard at the same time, and then about, two weeks ago I just, at a... rehearsal... I just couldn't do it anymore, so I just said I'd, stop doing it for about a month. (Robert, SEM 5)

This year I have been setting myself some hard goals... my teacher... I like to impress him and all my lessons so far have been good because I've bothered to, put in the work... he says "Okay play, Bach at workshop next week", and I say "Okay I'll play it and I'll play it from memory"... and he's like, "Oh... you don't have to do it from memory" and I'm like "Yeah but I'm going to do it from memory anyway"... and then I'll, have to memorise Bach... as soon as I can... and I, have all sorts of rehearsals to do, and also get my technique exam up. (Robert, SEM 5)

I am going to be getting a job soon. [MW: "How are you going to fit that in?"]... I intend to get it, just before holidays... and then sort everything out... I've taken on a few extra subjects... this semester [as well]. (Robert, SEM 5)

By the end of this year Robert was reportedly playing his instrument for 50 to 60 hours a week. His pain was always present and affecting many other activities and he had discussed his experiences with his teacher, as well as a GP and a physiotherapist. The physiotherapist said that it was not serious but that he needed to play much less. However Robert perceived that at this stage he wasn't really in a position to cut his hours of playing back. He said that he planned to get his pain under control over the Christmas break by reducing his playing before attending another national music camp. However, he said that he could never have a complete break from playing his instrument due to his commitments with his gypsy band.

I went to the physio... for a check-up... and... he basically said I had to... calm down my playing... for a fair while, which I tried to do, and it was getting, a fair bit better... but then I started really stressing it again... this semester... and... everything is really good, except for... one crack in my back which, is, quite huge. (Robert, SEM 6)

He [physiotherapist]... worked it out really fast... it wasn't that bad, but... he just said I need to cut down... my playing a fair bit and taught me some, postural stuff as well. [MW: "Did he give you stretches and stuff to do...?"] Yep... it depends how impatient I am to practise really... but... I always stretch before I play now. (Robert, SEM 6)

I should have it [my pain], under control, if I take some time off over the holidays... then I hope [music camp] doesn't, flare it up again. (Robert, SEM 6)

I don't think I'll have any opportunity to... not play for, even a week... which, is bad, I guess, and then... in January next year, I'll be doing [a music camp]... and... I think that's where, the crack actually started at the beginning of this year... so... that might be a problem... I mean it doesn't stop me... playing a lot but... earlier this year when I was trying to memorise Bach... it was so bad I had to sit down and lean against a wall... I hope it doesn't get back up to that again. (Robert SEM 6)

Robert managed to have a two-week break from practice over the Christmas holiday however he perceived that his pain was much worse when he resumed playing early in his fourth year. Aching was now always present at the top of his back/right shoulder blade, worsening and spreading to the entire right side of back after 5 to 10 minutes of playing. Robert went back to see his doctor, and the advice was now that a

tendon under the shoulder blade had actually been torn. The doctor reportedly advised a total break from playing for two months followed by a slow reintroduction of playing with stretching. However Robert believed this was not feasible and, although his concern was increasing he still had no plan of action apart from hopefully taking a couple of weeks off from playing in June.

My back is... really bad again... that's probably because... I... haven't had the money to... go to the physio... and... I've forgotten to stretch all the time because I'll be in a rush... [and] I have been... continually doing stuff over the last, couple of months... [MW: "... Was it bad during AYO...?"]... Yeah it was pretty bad... but I'd been doing stretches... so, it was okay, but... now... I went to the doctor and he says that the tendon which, I had torn, under my shoulder blade [is]... even more... inflamed... [MW: "So you have actually torn a tendon?"]... Yeah under my shoulder blade... [MW: "Is it very painful?"] Oh it's... okay like it... heals up a little... it's not too bad... it builds up a whole lot of air... around the cartilage... and that's what makes the crack... [MW: "So what did the doctor advise you to do?"]... Take a couple of months off and let it heal... and then, restart playing, with all the stretches... slowly... getting used to it again. (Robert, SEM 7)

[MW: "So when did you actually, snap the tendon?"]... Well, last year... when I came back from [music camp]... I went to the physio and doctor and they said "Yeah you've torn it". [MW: "... You never told me last time that it had been torn!"]... They told me... it was... really stuffed, and then when I went back... they had another look at it and it was. (Robert, SEM 7)

It's pretty much just my back... my neck sometimes... [once] it starts building up it will spread all over, that side of my back... it really doesn't go away unless... I can spend 10 minutes... sitting down or lying down or something like that... [and then] it dies down a bit, it doesn't really go away. (Robert, SEM 7)

I don't really have one [a plan]... I have to... soldier on for about a month or so and then once my play finishes and, all these extra ensembles I am in... do their performances... I'll have... June, off... try and, chill out a bit... but then I go to [another national orchestral program] in July. (Robert, SEM 7)

Robert did have a two-week break over the holiday period. However once again his pain was worse when he resumed playing as he was not able to reintroduce it slowly and then for the remainder of the year he continued to do more playing and practising in general. At the time of his final interview Robert said that his pain was not as bad. He attributed a decrease in pain to stretching, warming-up, and being less stressed (note also that he had not been in any orchestral environments since July). However pain was still always present, started to bother him after 20 minutes of playing, and then continued to worsen throughout day. Unfortunately, Robert said that he now accepted pain as part of playing his instrument.

It's still pretty bad... because I haven't actually had a chance to... to give it a break... [MW: "Did you manage to stop over June...?"]... I gave it a two-week break... which was good... but then I... [went] straight back into... really heavy duty stuff so if anything that... complicated it more... just because... my body then wasn't quite used to... a five-hour six-hour... playing regime every day... it was... very painful for a... couple of weeks... [then] I started... playing more sporadically... for about a month and a half... and then I found since even though

I have done fairly regular playing... that it is not so bad... [MW: "... Do you have any ideas why that might be or?"]... Warming-up, better... less tension in general... [MW: "So is it always there when you play...?"]... From about twenty minutes in... [MW: "And do you still find that you can wake up, with the pain if you have slept in a certain way or?"] If I sleep in a certain way yes but... I've, been, sleeping, as much as possible... on my back... I always try to line up my spine well enough before I go to sleep. (Robert, SEM 8)

[MW: "And as it has... moved away from other spots have you noticed that it gets more intense behind your [right] shoulder, or?"]... Well it is hard to tell any more... because it has been such a long period of time... there is probably, some sort of increase with it... but it has been so gradual... that it's just... almost an accepted part of my playing now. (Robert, SEM 8)

For the majority of his program the focus of Robert's playing-related discomfort/pain remained his upper back\back of his right shoulder. Other body parts affected included his back, right wrist, right arm, both shoulders, left arm, neck, and upper arms.

Generally speaking, Robert played very long hours each day in a combination of different orchestral rehearsals, chamber music, work, and private practice. By the conclusion of his program he was regularly playing for 10 hours in a day. Robert did not necessarily reduce his private practice when he had a lot of other playing commitments.

Every now and then I'll, spend a day when I've got to do other stuff and I won't practise on that day, but then I feel the need to catch up, so then I will do twice as much practice the next day... so I guess... pacing myself out a lot more would be better. (Robert, SEM 5)

Initially Robert perceived that his pain was more likely to occur during orchestral rehearsals due to the long periods of playing while sitting down. (Robert didn't like to stop and stretch during rehearsals, and admitted to what he called a "soldier on attitude" to pain.) However he later said that his pain could be worse during private practice because he was standing up, and less likely to be really involved in the music. "It's usually if I'd been sitting in a, bad position... every time I have... really elongated... long notes" (Robert, SEM 2).

It's [Opera] just the most extended periods of time and... everything was aching towards the next break... and then... it was never long enough and then we are back and do it again. (Robert, SEM 2)

Once I get the adrenaline pumping in my system which I usually do when I'm playing... Orchestra or... Chamber Music... I tend to, blot it out anyway. And... keep going, which is probably silly I've got... this idea of just tanking it out kind of thing... I see people... put their viola down in Orchestra while everyone was playing... and I'd be like "No I'm just going to keep playing look at me"... which is silly but... I still do that a bit. (Robert, SEM 6)

Especially in Orchestra... I still have... a... "soldier on" attitude to it... instead of, stopping and just chilling out... especially... if I'm in a leading position or something like that. (Robert, SEM 7)

I think I am more used to it [Orchestra] now... and... my posture... my technique is a lot better than it used to be... [MW: "And would you be comfortable... stopping during Orchestra and stretching...?"]... I try to prepare myself as much as possible to not do that... not as some sort of heroic thing just because... I very much like to keep going with the music and... as I've gotten better... I get pushed

towards the front, more and more and I understand the, responsibility of... having a presence, in front of the other musicians... but... if it gets too ridiculous then I will... crack my back at least. (Robert, SEM 8)

Throughout his program Robert's private practice ranged greatly (from one to nine hours a day). Although he regularly said that he took breaks during his practice, he also admitted that taking these breaks depended on the amount of perceived pressure he was under and his motivation to practise. In addition, if he became particularly involved in the music he would lose track of time and only notice his pain once he stopped playing. Robert believed that it was particularly important to stay in his practice room whilst at the institution in order to stop other people taking it.

Once I'm on the adrenaline rush then, I can, go anywhere and do anything... it's most present when I'm not at all engaged in the music... I guess that's mainly because... when I love playing what I'm playing then, I don't really care... I just... block it out and, get completely involved. (Robert, SEM 4)

Because it's so hard to get a practice room here whenever I do have one I... feel the pressure to do stuff while I've got it... if you want to go get some water or stuff like that you'll often come back and find someone has jumped into your room and they will be like "Well you know you've obviously been here for a while so get out". (Robert, SEM 7)

[Practice] can be... anywhere between one hour on a really lazy day through to eight nine hours... [MW: "... And when you have got a lot of other playing do you... cut your practice down...?"]... It depends what kind of playing it is... as far as any classical, music goes I definitely like... to keep my practice regime going. (Robert, SEM 8)

I... get obsessed with a passage and try to improve it until... I feel like it's been good and then I'll have a look at the time... depending how thorough... my working of it has been it will be between half an hour and an hour and 15. [MW: "And will you keep, just going even if it is... hurting a lot?"] Generally once it starts getting to... a fairly ridiculous point I tend to sit down and stretch out... but once it's made its presence felt... it's just a given that it will stick around... and even if I take... half an hour break... it will still, come back within five minutes of me playing so. (Robert, SEM 8)

Some of Robert's strategies for preventing his playing-related discomfort/pain included stretching, cracking his back, leaning against the wall, warming-up before practice, relaxing, improving his posture both during playing and everyday activities, restricting computer use, awareness, Alexander Technique, and exercise. However, for the most part his main strategy was simply to persist with playing and push the pain to the back of his head.

Been trying to keep a bit more aware... I did a bit of Alexander Technique... earlier this year... did some hands-on classes... I'd been to a class last year as well, and it opened up a lot of ideas, I remembered some of that, but it actually it didn't really stick... whereas this year... I just seemed to absorb it a lot more.

(Robert, SEM 3)

I don't go on the computer as much as I used to. (Robert, SEM 3)

I'm trying to be more conscientious with, how I keep my body... postural stuff, with every day-to-day life... my exercise as well... and try to stretch more in general... I never used to do much cardio stuff, I try to, bring that up again

because that's better for my health... but... unfortunately it's not stuff that's... always going through my mind. (Robert, SEM 6)

My strategy is to plough on get, all this stuff done as best as possible... and then hopefully get some time off in June to... recuperate. (Robert, SEM 7)

Once it's there [the discomfort/pain] it tends to stick around, for the rest of the day... [MW: "Does it get worse as you continue to play?"]... Yeah ... even when I am doing regular practice these days... there is not much I can really do about it so I try to just put it in the back of my mind and... crack my back... try and, stretch it out a bit and then get back into it again. (Robert, SEM 8)

I remember telling you that I used to have... "I don't care" kind of policy... and ... that's probably been detrimental... but I've... worked out now that... I need to stretch out do a good warm-up... [MW: "Do you have any other strategies...?"]... If you don't practise for a while, try if you can to slowly reintroduce yourself to it... treat it like an athletic sport... they don't... go back and then run a marathon... the first day of training, they start warming-up... playing a classical instrument especially one which is, un-naturally held... is fairly taxing... so it needs to be approached in a similar, manner I think. (Robert, SEM 8)

If I had the knowledge of, stretching out, and, technical postural... then I definitely would have, employed that [earlier]. [MW: "Do you think you would have listened, when you were younger...?"] [Laughs]... well that's the thing... it takes a mindset of acceptance... knowing what you want... and understanding... how to... work cleverly. (Robert, SEM 8)

In addition to practising/playing long hours Robert found that his discomfort/pain could be aggravated by playing long notes, using long bows, and

concentrating on multiple tasks. It could also be influenced by outside factors including his sleeping position, exercise, playing the guitar, travel, working on the computer, and too much physical stress. “Any sort of... long tone... held notes... anything that... requires a lot of... concentration... on multiple tasks... longer bows” (Robert, SEM 8).

I think it's [my pain] mainly from bad sleeping, lots of work... it hasn't happened so much in the last week, which is good but that's mainly because I haven't been playing as much. (Robert, SEM 4)

Every day I wake up and I have to, crack it and it's still... there... if I do lie on that side I often wake up [during sleep]... feeling... sore and stuff like that.

(Robert, SEM 7)

I still, haven't got myself a good chair to sit down, and do computer stuff.

(Robert, SEM 7)

For the majority of his program Robert's warm-up consisted of scales and technical work. It was only at the very end of his fourth year that he said that he was incorporating stretching into his warm-up routine. The majority of the time he reserved stretching for when he was already in a significant amount of pain.

Once it's bothering me [I stretch]... it... happens when I don't bother warming-up properly as well I think... like today I just... came here and, launched into Bach and then didn't stop playing Bach. And also I was quite stressed, so I think that made it worse. (Robert, SEM 5)

If it gets any worse then it's going to, really start becoming a bit of an issue... and I don't, really know what to do... I can, remember to stretch out more but... I just... forget... [MW: “So how often, would you say you remember to stretch...?”] Maybe once every, 10 times I play. (Robert, SEM 7)

Prior to his Bachelor of Music program Robert was not particularly physically active. However, from his first year onwards this changed dramatically. For the duration of his program he maintained at least one hour a day of upper body exercise. At various times he indicated that he thought that the exercise may actually have been worsening his pain and there did seem to be a link between the amount and type of exercise, amount of viola playing, and the severity of his pain. However he remained unsure about this link as his teachers and doctors couldn't give him an answer. "I work-out for, one or two hours pretty much every night... [that's] a lot more this year... I... used to be very unfit, overall... and I've been just been, slowly trying to turn that around" (Robert, SEM 2).

I've been, working-out a lot more this year, and, it's... been helping in some ways and... not... in some other ways as well... I started to rely on it, more than, relaxing. (Robert, SEM 4)

A couple of GPs advised that it [exercise] was good... as long as I was doing it properly... and with good postural exercise that I do, weight training and stuff like that... just for the instrument to be less of a burden... on me, but... [MW: "Does it aggravate it, lifting weights and doing pull-ups and things?"] Ah, no... it's... different like it... employs different muscles... so, no it's all right... [MW: "So did you by any chance notice any... correlation between, increasing your exercise and when the pain got, bad?"] Well it might have to do with overall physical stress, and... lack of, sleep... I have got a pretty regimented system these days I usually get home after... about 1 am and then I have to be in here... at least by 9. (Robert, SEM 7)

More so [exercise] than I used to... I'm doing more skipping... more running... I intend to go back and get into swimming at some point... lots of upper body stuff... weight exercises... push-ups... pull-ups... [MW: "And do you find that has any influence over the pain?"] I'm not entirely sure... I've thought about it quite often... and I've asked my teachers as well... and... they haven't really met... my questionings with any... conclusive result... so, so far I don't think so... I have always hoped or had the... myth in my head that maybe if I work out more then it will be easier and it will support... more naturally, but... this is generally speaking, holding the viola is very un-natural for the human body. (Robert, SEM 8)

Throughout his program Robert worked long hours both busking and performing/rehearsing with his gypsy band. There was a definite impact on his pain levels as this work was extending the number of hours he played his instrument in a single day. Later in the program, Robert also started doing some teaching, something that he said that he enjoyed and planned to continue. Like many other students in this research project, he believed that teaching was a useful tool for looking at an improving his own playing and technique. "I do play for a very long period of time. And... busking my posture is very bad" (Robert, SEM 2).

I am teaching... I've got a fair few students now... I'll keep it up... as means of income and I like teaching... I find it very useful for a, for having a re-look at your own technique. (Robert, SEM 8)

Robert only really discussed his experiences of playing-related pain with his violin teacher once in his third year (the teacher recommended seeing a physiotherapist). Robert said the main reasons that he didn't bring the subject up again

were that he didn't want to waste lesson time and he didn't want to be seen as making excuses for playing badly.

I said a couple of times, lightly that... it will hurt during a lesson or something and he [Teacher B] says... stretch it out or something or try to just relax more... my next lesson with my teacher, [I will] approach him, much more seriously about it I guess. (Robert, SEM 5)

[Teacher B] said just, [laughs] "Go to a physio"... he said... my technique as far as posture goes was, "Pretty good"... I only mentioned it, once I didn't want to, keep coming into lessons and keep going... "Hey... I'm feeling really, you know, bad today"... it's like I am making an excuse... to play badly or something. (Robert, SEM 6)

I definitely don't go into lessons and... announce that... my back hurts again, because... I have already told him once so I don't need to, keep making that clear... I mean... I like to think we work pretty professionally... we don't really spend much time on my personal... problems. (Robert, SEM 8)

Other than his viola teacher, Robert also consulted a GP and a physiotherapist during his third year. Both practitioners reportedly recommended reducing/taking a break from playing. Robert didn't do this and, as a consequence, his pain worsened further in his fourth year. Once again he went to the GP and this time he was advised that he had actually torn a tendon under the right shoulder blade. At this point Robert commented that nobody really knew that his pain was so bad that at times he could not play and that he had no plans to enlighten them.

After I went to the physio I also went to a GP to get... some general advice, and he had talked to a couple of athletes about similar stuff as well... he

recommended some, weight training... and... basically taking time off from it...

[but] you know, I really can't improve if I... take time off. (Robert, SEM 6)

My parents, I know would probably just panic about it... and... don't have any money... I don't want to... make them feel guilty for that so I don't tell my parents anything... and, I'm sure that, all the other students are going through their own set of... problems so... I'll work it out one way or another. (Robert, SEM 7)

Unsurprisingly, as he progressed through his program Robert said that he was becoming concerned about his experiences of playing-related discomfort/pain.

However, he consistently stated that he didn't think about his pain until it was really bad. Robert believed that his only treatment options were vigorous physiotherapy alongside a long break from playing and reintroducing playing slowly. For the duration of his program he remained adamant this was something that was not possible for him. In his opinion it was far more important that he continued progressing well in his music studies by practising as much as possible.

At the beginning of the year I thought it would go away... pretty fast, but it hasn't... but, I will persevere, it will go away. [MW: "Does talking to me about it stress you out?"]... It, just, gives me a great awareness especially when I hear how... it's kind of, been increasing rather than, going away... but then a lot of the other stuff has gone away... at least it's in one place now and, I've... got a good idea of, what it is... a stuffed up muscle under there... it goes crack... and it's quite... audible... it freaks some of the other students out. (Robert, SEM 6)

I guess it does worry me a great deal, especially when I'm practising... I've got so much to do these days that... it doesn't really cross my mind... until I start playing or... feeling it quite badly. (Robert, SEM 7)

Yeah it does [worry me] but... beyond... going in to... really rigorous... physio, stuff... I don't, really know how I can get rid of it... or without taking a very long break and then very gradually getting back into... practice again... because... a physio told me that it is a torn tendon... so... I need to take... three months break for that... to heal. [MW: "So do you think you will ever be able to do that or?"]... Not really... I might be able to, play viola very little... for but I couldn't stop playing for three months that would be... really detrimental... even if I am not focused career-wise on viola... I would still want to be able to hold onto... a fair margin of technique. (Robert, SEM 8)

I've... gotten a fair bit of advice on it and most of it, seems to point towards... not playing for a while and... relaxing in general and trying to, get a fairly stress-free environment so your muscles... can heal and... I am twenty and... I am just about to finish Uni. or my first degree at least and... there are a lot of things I need to be doing. (Robert, SEM 8)

Despite saying that he accepted his pain, Robert said that at times it made him feel angry as it could turn playing his instrument into a negative experience. He consistently said that he had an attitude where he would just play through the pain in order to put on a brave face and that he was not comfortable discussing his experiences with other students and musicians.

I have to... force it to the back of my head... if I want something done then I just keep doing it and, it just becomes a very negative experience... it also increases

frustration and everything... so every now and then I get pretty angry. (Robert, SEM 5)

It can be frustrating... which... obviously aggravates me and that can, ah, destroy, concentration and stuff... everything becomes a bit of an issue and... so, often I'll start getting quite sloppy with my technique if it's really painful.

(Robert, SEM 7)

On reflection, Robert said that he used to get a fair amount of pain when he was younger during orchestral rehearsals but assumed it was normal. (In his Initial Questionnaire he indicated that he had only ever had one experience of pain in his right wrist.) As he increased his classical music playing, (particularly during his third and fourth years), he noticed a corresponding increase in his pain. He recalled his most severe experience as occurring early in the fourth year of his program, when he was trying to memorise a piece of Bach.

I do remember in my youth... when I was playing so much with local orchestras and stuff like that... after... three hours of rehearsing, I had... a lot of problems... well not real problems it's just stuff I kind of, thought was just a part of playing... that everyone gets it, kind of thing. (Robert, SEM 6)

As I play more... especially classically-based intensive... music... then it [pain] definitely increases. [MW: "So has it increased up to this year do you think?"]... It increased somewhat... I mean first two years I was here... I was playing a fair bit but I was still, fairly lazy about a lot of... practice... whereas last year I really put my head down and, started focusing especially... for the last half of last year and first half of this year. (Robert, SEM 8)

I think I described... one time earlier this year when I was trying to memorize Bach... that was probably the worst, I ended up lying down on the ground in the practice room... just, staring at the ceiling for about, twenty minutes or something like that... but it hasn't been that bad since. (Robert, SEM 8)

Prior to his studies at the institution Robert had heard of RSI however he associated it with a bad wrist technique rather than lack of relaxation and stretching. In his opinion there were quite a few students at the institution experiencing playing-related pain, and the most common perceived causes were the unnatural position of the instrument, tension in upper shoulders, and irregular practice times.

[MW: "Before you came to The Con had you, thought about the whole issue of, playing-related pain and injuries...?"]... Not much... I'd had a few, concerts...

during school and stuff like that where I had, suffered a lot of... pain... mainly because I had, terrible posture... and I, used to... hunch over playing the viola...

[MW: "... Did you think many people had, problems with pain and injury?"]... I heard of RSI... from a young age... because it had always been, told to me as something which had to do with having terrible... wrist technique and that is why I have always... associated it with... [that] rather than... just... not stretching out and... tensing too much... [MW: "So, does that mean... that since you have been here your opinions changed a lot about what causes it and stuff like that?"]... Yeah... how widely spread it is... and how so many different things can cause it in so many different muscles... [MW: "So where did you hear about RSI from?"] From my mum... she used to be at The Con and... she knew a violinist who had to give up at The Con because of Repetitive Strain Injury. (Robert, SEM 8)

[MW: “What do you think has actually caused your problem, behind the shoulder there?”]... I tore a tendon... under the shoulder blade... I think it's just... not natural to continually... hold it like that... and I used to have a fair bit of tension in my upper shoulder... that might have something to do with it as well... lots and lots of playing and also... irregular practice times... that has something to do with it... most athletes probably have... scheduled times every day... and then the body comes used to that... so when you are, spontaneously... pushing your body through three or four hours the next day maybe, not much at all and then suddenly... eight hours then... it's always going to get a... shock... and that is going to cause problems I think... I don't know many musicians who do treat... their practice... as a bodily taxing, thing... at least not a muscular kind of degree. (Robert, SEM 8)

[MW: “Do you think that there are many students here at The Con who are having problems...?”]... Certainly... heard about a few, yeah... there are always people saying “Oh my shoulder hurts or my wrist hurts” or... “I have to go to the chiropractor and get him to crack my back”... [MW: “Do you ever talk about your, experiences?”]... Well... it's, thankfully starting to become common knowledge to do, Alexander Technique... and stretches so... even when we do Orchestra concerts, beforehand... most people will be seen doing stretches and stuff like that. (Robert, SEM 8)

At the conclusion of his program Robert was hoping to either study acting, or to continue to perform and pursue viola. (He stated there was a better chance that he could let his body heal if he got into the acting school.) Like many of the students in this study, he said he wished there had been less academic credit points and more playing

required throughout his program and bemoaned the perceived lack of influence of student opinion. He says he would have loved to do more playing even though he was fully aware that he would have had worse problems with his back.

I have got a couple of auditions coming up one for [acting school]... because I have been doing so much acting stuff the last couple of years and... a lot of people have encouraged me to do that... so... if I do get in then... there is probably a good chance of me... taking it a bit more easy on viola because I will be so focused on other stuff... but if I don't then I will be going to [another city] and, working and... getting all my other, skills up and practising a lot as well.

(Robert, SEM 8)

I was always very bemused at the idea of a performance degree which... is based, majorly, around the academic... written side of things... that has always been kind of thorn in the side of, my progress to a certain extent... [MW: "So how do you think you would have gone if you'd had to play even more, than you already do?"] I think I would have loved it... but I would probably have had more back problems [laughs]. (Robert, SEM 8)

Until recently... it has been mainly a... student run agenda to increase, personal chamber ensembles and... playing curriculum... I am sure if there was some sort of petition vote or if... the students... held any sway whatsoever... it wouldn't be a problem, but the thing is that... no one really listens to us anyway. (Robert, SEM 8)

[MW: "Has it been any benefit at all having to talk to me about it?"] Absolutely it definitely... made me re-realize things... it was also a constant update for myself and my personal reflection coming in here and just having a look at

exactly how things have gone... for me and... how I can possibly approach things. (Robert, SEM 8)

In conclusion, Robert was one of the more interesting cases in this research project. At various stages of his program his playing-related discomfort/pain was constant and affecting his ability to perform other activities. His reported tendency to exercise long hours despite perceiving this as aggravating his pain was revealing.

Student 36: Becky

Becky was a cellist who withdrew from her Bachelor of Music program after one year of study. She reportedly experienced minimal playing-related discomfort/pain, and she struggled to recall any specific experiences. As such, her ability to contribute to the research was limited.

Prior to arriving at the institution Becky said that she had experienced playing-related discomfort/pain in her right hand and left shoulder only. At the conclusion of the first year of her program Becky said that her discomfort/pain had gradually decreased. She now reportedly only experienced occasional pain in her shoulder and back. Becky was unable to link her discomfort/pain to anything in particular however commented that she found Orchestra harder.

Unfortunately Becky did not continue her studies at the institution past this point. However as she did leave her contact details with me I was able to contact her regarding her decision to withdraw from the Bachelor of Music program. In a subsequent conversation Becky confirmed that this decision was unrelated to any experiences of playing-related discomfort/pain.

Table B36

Reported Pain Experience for Student 36: Becky

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	4	Last time she played	Right thumb and left shoulder	3	2-3 hours	N/A
2	1	2	A few weeks ago	Right shoulder	3	At least 2 hours	6 hours

Student 37: Claire

Claire was a cellist who withdrew from the Bachelor of Music program after completing her first semester. As a result she did not participate in any interviews and our interactions were limited.

Prior to her studies at the institution Claire had experienced playing-related discomfort/pain in her left fingers, left forearm, and right shoulder. She described her pain as general tension and wrote that it recurred “When I play certain things that strain and put tension on these areas”. Claire did a technical warm-up at the start of her practice.

As with all the students in this research project, during the second round of data collection in 2008 Claire was contacted via email. She replied and informed me that she was no longer enrolled at the institution. However, she unfortunately did not reply to a further email asking whether her experiences of playing-related discomfort/pain had any influence over her decision to withdraw.

Table B37

Reported Pain Experience for Student 37: Claire

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	3	A couple of days ago whilst practising	Left forearm	4	Less than one hour	N/A

Student 38: Jack

Jack was a cellist whose experiences of playing-related discomfort/pain throughout his program were relatively minor. He presented as friendly, confident, and laid-back, and laughed frequently throughout our interviews.

As he progressed through his Bachelor of Music program Jack noticed an initial increase in playing-related discomfort/pain, followed by a gradual decrease. He perceived that his discomfort/pain could be influenced by factors such as stress, repertoire, the type of chair provided, playing for long periods of time (particularly in cramped conditions), and playing loudly.

Jack's main strategy for preventing playing-related discomfort/pain throughout his program was "snoozing" during practice. He said that he stumbled upon this strategy when he fell asleep during a practice break during his second year of study. Afterwards he perceived that he was able to resume practice feeling refreshed and so continued this routine.

Early in his program Jack also revealed that he initially learnt the cello from a violin teacher in a group situation. He believed that, as a result of these early learning experiences, he learned an incorrect bow hold. Jack spent much of his program correcting this bow hold and said that he experienced recurring pain in his right wrist during this process.

Correspondingly, on reflection, Jack said his most severe experiences of playing-related discomfort/pain involved his right wrist. However, he also recalled experiencing a significant amount of discomfort/pain in his left shoulder during the first year of his program, something he had not mentioned previously.

Jack was also an accomplished singer who, at various times, indicated that he was torn between whether he wanted to pursue cello or voice. However, at the conclusion of his program Jack was hoping to complete further cello study either overseas or interstate.

Table B38

Reported Pain Experience for Student 38: Jack

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	1	3	Previous Saturday	Upper right arm	5	1 to 2 hours	N/A
2	1	2-3	2 weeks ago	Left hand and both forearms	3	1 to 2 hours	5 to 6 hours
3	1	1	2 months ago	Right bicep	1	3 to 4 hours	5 hours
4	2	2	Last week	Left hand	1	3 to 4 hours	5 ½ hours
5	1 (was 2-3)	2	A couple of weeks ago	Right hand	2	2 to 4 hours	7 to 8 hours
6	1	2	Previous week	Right shoulder	1	3 to 4 hours	5 to 6 hours
7	1	2	Previous week	Right wrist	1	At least 3 hours	9 hours
8	1	1	2 weeks ago during a rehearsal	Right shoulder blade and lower back	1	2 to 3 hours	8 hours

Prior to his studies at the institution Jack had experienced playing-related discomfort/pain in his right and left forearms and his upper right arm. The pain in his right arm recurred approximately twice a week.

As he continued through the first year of his program Jack perceived an initial increase in pain in his arms and hands before a decrease mid-semester. He said that his pain was more likely to occur during Orchestra rehearsals and that it could be influenced by the type of chair he was sitting on.

Having, six months... of, practising now I have, actually improved... a lot of pain... when I first started, it used to be all my... arm... but... [Teacher D] actually told me to use more wrist and... I found that I projected more, and... the pain is now a lot less than it used to be [MW: "... And did increase initially?..."]... Yeah... because I had to practise a little bit more... in order to get, the new technique right... and therefore, my arm was getting a bit tired... all the way to... this semester. (Jack, SEM 2)

Early in his second year, Jack commented that he had had no pain for some time now. He mostly attributed this decrease to his new strategy of "snoozing" during practice times (practise one hour, sleep 30 minutes, set alarm, repeat until three hours of practice). At this stage he said that he was only experiencing occasional discomfort/pain in his biceps.

I have had none the last couple of months... I just had... breaks in between... when I practise, I've, actually, just had... a bit of a snooze... to, relax the muscles and when I come back to it I... have more intense work... you get a lot more out of it because... your brain actually, takes on more information when it has had... had that rest. (Jack, SEM 3)

If I do feel discomfort at all it's probably just because of endurance or just how much practice I have done... there's nothing... extremely alarming... fatigue probably in the biceps... once every three weeks that's, I'm hypothesising... but that's... in the area of how, often it does. (Jack, SEM 3)

At the end of his second year, Jack also had one occasion of pain in his lower back. He initially related this pain to using a different chair but later revealed that at the time he was also trying to practise two hours without a break. He continued to experience some discomfort/pain in his left fingers and related this discomfort to both playing for longer periods of time without breaks and stress.

I think there was... one instance when there was a little bit of pain but it was also because I was on a higher chair... it was during my... practice time at home... because one of my chairs... had a bit of a leg problem so I decided to use a different... higher chair... and... the new position... did something to my... lower back. (Jack, SEM 4)

I tried doing two hours straight and, that was when I had the lower back problem... so I thought... an hour straight and then maybe... 10-15 minutes just to, do nothing with my hands... get... back... any, lost feeling... and then go back and do the same routine again. (Jack, SEM 4)

There's still [a]... little bit of tension there, and... it, might get worse because it's coming up to exam time so stress could be a bit of a... factor in it but, I'm trying to keep that as relaxed as possible... keeping also my mind relaxed as well when I practise. (Jack, SEM 4)

As he progressed through the third year of his program Jack changed his bowling technique and initially perceived an increase in pain in his right wrist. He continued to

link his pain to uncomfortable chairs, playing for long periods of time, and playing loudly.

I've actually got a new bowing technique now... so, it's, been a bit uncomfortable the first couple of weeks, because I'm still getting used to the new position but as time has gone on... it's, getting better and there is still little bit of discomfort in my wrist because it's... adjusting to the new position, but it is slowly... on the mend... once it is fully, comfortable I think it should be no problem at all but has been a little bit stiff... I used to have a violin teacher when, I was in primary school so I had to readjust to that and some of the old habits have... kept with me. (Jack, SEM 5)

Occasionally... I do get... shoulder problems but I think that's because of my posture and how I don't sit really sit properly... and I've been... finding... strategies... in order to get the right... seat position... the chair that I normally practise on is a... study chair which... swings around so it's hard... to get an absolute... stable position for it... if I bring the chair lower... it's more beneficiary but, the problem is the chair swings around a bit, so it is hard to... adjust... and, keep it that way. (Jack, SEM 6)

Just my bowing arm occasionally if I play for, [a] long, period of time and it has to be... really loud the whole way through. (Jack, SEM 6)

Early in the fourth year of his program, Jack increased his practice to three hours a day. His right wrist was still uncomfortable at times due to the new bowing technique and he said that he had noticed that it was more likely to occur when he was trying to play loudly or had not put rosin on his bow.

I've been practising a little bit more often that's for sure and I think that I've got a little bit of... uncomfortability in my wrist... but that's just mainly because... I'm adjusting to a new... bow technique... and it is taking a while... if I haven't rosined my bow in a while and I'm trying to get a lot of sound out of it I think I, tend to... force it out more... generally it's okay... it's still playable but just, not as easy as I thought, at first. (Jack, SEM 7)

Shoulders are okay... a little bit tense, in the first couple weeks... because I hadn't, practised at all that year and I was... getting back into it but, as the year has gone on... that... area of my body has been, no problem. (Jack, SEM 7)

By the end of this year Jack had cut his practice back down due to participation in the Opera but he continued to experience some discomfort when playing for a long time, particularly in cramped conditions. On reflection, he was happy with the structure of the Bachelor of Music program and Orchestra course although he thought that that a less concentrated rehearsal schedule for Opera would be beneficial.

I haven't been concentrating on my own repertoire I've been, concentrating on... the Operas... [MW: "And how have you been finding the Orchestra...?"]... It's been getting better as I went along for the first deck of calls on Sunday... everyone was, a bit nervous about how everything was going to go... but, every time we performed it... it just got better... generally it has been good... I have... no... obvious signs of... any sort of joint... or... pain issues it's just been, a discomfort or two if I've been playing for too long and it's only been... about a day or two... throughout the whole semester so far. (Jack, SEM 8)

One of the last, dress rehearsals we've had, in the pit... just because we were in a bit of a confined space I think... I was playing for, cello class previous to that as

well... the... shoulder and maybe a bit of the lower back as well... which is a bit of a new one to me... maybe it was just the way I was sitting or the chair I was using... it was more obvious, in the pit... it was, very confined... trying to fit seventy-five seventy-six was, was never... going to be a comfortable experience I can guarantee you that. (Jack, SEM 8)

Definitely during the Opera week... we had a dress rehearsal Friday, I was playing since 8:00 in the morning on, Friday, before the debut of the Opera which was about, two weeks ago, played straight through from 8:00 till about, 5:00... It took a definite toll on my, on my shoulders... I just can't understand why they left the rehearsal so late... but I think it is one of those things that you really can't do much about... it is just the way that, Project Week happened... I think that it was, more of an accumulation of, the last, week, previous to that... because Project Week we have rehearsals 10:00 to 5:00, all day from Monday to Thursday and, continued that Wednesday to Friday into the pit. On that week it was just never going to be... exactly comfortable. (Jack, SEM 8)

In my time here I never really had a particular problem with... anything or anyone, within the Orchestra department... but, look many other people would, have stronger views... I don't see any issues with it to be honest. (Jack, SEM 8)

As he continued through his Bachelor of Music program, the focus of Jack's playing-related discomfort/pain changed many times. Body parts affected included his right arm, left hand, back, biceps, left fingers, right wrist, right shoulder, left shoulder, lower back, and legs.

Jack consistently perceived that the main influencing factors for his discomfort/pain included stress, the technical difficulty of the music, the type of chair

he was sitting on, playing for long periods of time (particularly in cramped conditions), and playing loudly. His discomfort/pain could be worse during Orchestra rehearsals due to the combination of several of those influencing factors.

When I lay back and, really don't sit at the front of my chair, I tend to slouch a bit that's, when I do get the pain... just depends on the height of the chair itself... whether it's a high chair or a low chair. (Jack, SEM 2)

As I get to the third hour I really start to... notice... my left hand is a bit... numb... because I'm doing some difficult studies at the moment... if it's really... tough finger work... if... I can't really get the feeling of actually, being solid on the finger board... that's when that's my signal saying "hang on, better stop here just in case". (Jack, SEM 4)

It's, exhausting for sure [Opera orchestra], but... because there was, breaks in between that, it didn't really take, much of a toll... at the end of it... that was when it [right shoulder] was really noticeable... during the actual performance itself. (Jack, SEM 6)

I've got a new chair this year so it's... a lot more comfortable on my back because it is more leather... especially in the lower back. (Jack, SEM 7)

Jack's main strategy for preventing his playing-related discomfort/pain throughout his program was "snoozing" during his practice breaks. He stumbled upon this strategy early in his program when he fell asleep during a break. Initially he would set his alarm and allow 30 minutes of sleep for every hour of practice (he was able to do this as he did his practice at home). However, as he progressed, got more sleep at night time and increased the proportion of practice he did at the institution, he decreased his practice breaks to 10 minutes for every hour and used the time to relax and "meditate".

I just fell asleep one day, when I was supposed to have... A 15 to 20 minute break... because I was feeling so tired... then, came back, realised I was running out of time, had to quickly do practice, and then I felt, it was a completely different experience... I absorbed a lot more... and... I thought maybe I can try this as... an actual... ritual. (Jack, SEM 3)

In the middle of my practice when I have, an hour I have 10-15 minutes of... nap time just to get my body... refreshed... and then go back again and it, works nearly every time... being in third year with assessment coming up and that it's, extra important that I actually have that snooze time... I have only one early morning during the week rather than having three early mornings in the week... so I do get, a lot more sleep now, which... funnily enough actually has improved my playing believe it or not... I have got a lot more focus on what I've been doing plus being third year I have to step it up anyway... with more sleep it actually assisted that, process. (Jack, SEM 5)

Naps every now and again... it does tend to work especially, with the workload I'm doing now it... becomes even, more crucial that I actually have those little mini-naps in between... I lie my cello down and because my bed is right next to me I just... go on there for about 10-15 minutes have a mini snooze, put the alarm on, and then, come back and, feel refreshed. [MW: "What about if you are here at Uni...?"] If I have to stay all day... I haven't really thought of that. [Laughs]... I'd probably say just go to a practice room and just try to, relax and lie on the floor or something just to... space out a little bit. (Jack, SEM 6)

I sleep in a bit more now because I have got less... of an early-morning, ritual... this year so... I don't really need the... snooze in between but definitely, a relaxation just lying down... meditation in a way. (Jack, SEM 7)

Still do [take breaks] but just not as many as I would like to... I would say half an hour still... but I think I've reduced it from 15 minutes to 10... [MW: "And do you ever do the napping now during your, practice...?"]... Not as much as I used to... I think it is more of a case of me going to bed too late, last, couple of years I have been trying to, get more sleep, during that time rather than trying to do it during the day. (Jack, SEM 8)

Jack's other strategies for preventing playing-related discomfort/pain included working on his technique, walking regularly, practising in blocks of one hour, starting with slow scales, exercising before practising, and not using the computer during practice breaks. "I just make sure my hands are... free... [MW: "Are you a big computer user...?"]... Definitely... just not when I practise" (Jack, SEM 4).

I say just start the practice slowly just do slow scales first don't get into the concertos straightaway... so, you can get your, wrist and your, left arm, really relaxed just, nice and, easy just with the normal slow scales and then once they are relaxed it much easier to play... the concertos and the studies more comfortably. (Jack, SEM 5)

Always exercise beforehand just keep your muscles warmed up and... taking some naps... to, calm your... muscles down if you strain too much... [MW: "Did you always take breaks during your practice or was that something you started doing?"]... It was... something I developed... here. (Jack, SEM 8)

Jack consistently reported that he did scales as part of his practice warm-up. However, he was inconsistent as to whether he stretched before practising. During his third year he said that he tried stretching but abandoned it because he noticed no difference. Then, in his final year he said he stretched “Whenever I do have time to”. In regards to experiencing discomfort/pain during Orchestra rehearsals, he was of the opinion that people just tried to play through their pain for fear of drawing attention to themselves. “I tried once [stretching]... and it didn't really feel much of a difference so... I thought there was no point in trying to... continue with that” (Jack, SEM 6).

Just stop and... try to... stretch it out or... take a break from it and if [Teacher C] says something say “Look, I am in a bit of pain”. [MW: “Has he ever said anything?”] No... it hasn't really happened in Orchestra much but people just try to plough through it and... at the end of the day, either you, know what you're doing or, if it gets worse... you just have to stop. [MW: “Do you see other people who stop during Orchestra and?”] Not really no. [MW: “Do you think everyone's a bit afraid?”]... Of course they would be... he's [Teacher C] more of an authority figure so, whatever he says goes. (Jack, SEM 6)

Well, time has been a, more of an issue this year obviously but whenever I do have time to, myself I normally just do that [stretching] just to keep my body in check. (Jack, SEM 8)

Jack was not concerned by his experiences of discomfort/pain at any stage and perceived that he was very easy-going. However, during his fourth year of his program when he was the leader of the cello section in Orchestra he noticed a subsequent increase in playing-related discomfort/pain and attributed this to putting more pressure

on himself. "I'm a very easy-going person myself I, I take things, sometimes a bit too easily in terms of life" (Jack, SEM 3).

You can't really worry too much... if... the feeling is not coming back... maybe there's something wrong... but if it comes back... it's... a passing thing you just played too much. (Jack, SEM 4)

I was, appointed leader this year therefore... more pressure was... put on me in terms of actually getting everything right so... I felt a sense of stress and I suppose there was a bit of tension that also went in my wrist and shoulder as well... at the start of the year... I was trying to get, every single thing right... for my benefit... rather than, the whole orchestra... [Teacher C], seemed to think that... I did a good job... so that's all I can, ask really. (Jack, SEM 7)

As he progressed through his program Jack said that he discussed his experiences of playing-related discomfort/pain in his right wrist with his teacher who reportedly advised that it was normal when adjusting to a new bowing technique. Jack linked what he perceived as being an incorrect bowing technique to his early learning experiences in a group situation.

I think it's just a new position just trying to feel comfortable with it... it was basically the same, when I had my first... actual cello lesson... because I had to be taught, a completely new technique for it and it took some time for me to adjust to that as well... so there was a bit of pain and a bit of stiffness involved in that but once I got into it... it was no trouble at all. (Jack, SEM 5)

They said basically the same thing... it's just a matter of getting used to it, because... they have had a, similar experience with different teachers themselves

that had different techniques... I think it's the same with everybody. (Jack, SEM 5)

For the majority of his program Jack did not have an outside job. However, midway through his program he started singing in a choir and revealed that, at various times he had also considered making singing his main priority. At one stage during his fourth year, he was reportedly singing in eight different choirs with a total of 25 hours a week rehearsal. However at the conclusion of his program he said that he had decided to stick with the cello as his main instrument.

I was thinking of actually doing The Con Opera next year... because... once I get out of Uni I'm not sure if I will get an opportunity to do that type of thing again... in... an actual Opera production... [then I can] make the decision once and for all whether I should do one or the other in terms of, my... final, career. (Jack, SEM 6)

Cello has been, more what I wanted to do but I just, don't think I'm quite ready to join... a, professional orchestra... as of yet... I'm still getting more experience... in that area... this year has really got to be, decision time... as hard as it is to, leave singing behind... I still want to keep it up, as... a secondary job. (Jack, SEM 7)

Jack's exercise throughout his program varied depending on whether or not he felt like he needed to lose weight. He perceived that he did feel better in general when he participated in some form of physical activity, particularly walking.

I do... a lot of walking now... because it gets my whole body into shape... my legs... as well because, that, can be a bit of an issue as well because the cello,

with the shape it... does tend to, split the sides a bit... but... soon as I started to walk it's... improved quite a bit. (Jack, SEM 2)

On reflection Jack said that over the course of program he thought that his pain had decreased dramatically to his growing awareness and implementation of preventative strategies. He could recall discomfort/pain particularly in his left shoulder during the first year of his program (he did not elaborate at the time). In his opinion, his worst experience of playing-related pain involved his right wrist.

It has improved, dramatically... and that's, I think just because I am, becoming more aware of... how my body is adapting to the playing and, devising strategies I can use to... ease, my body a little bit... on the whole I think it's gradually... there were some exceptions when I had been playing for, too long in the day... that it, started to come back but... it generally is on the improve and... now it's the case where it's... very, very rare. [MW: "... What parts of the body can you recall, it happening in whilst you have been here for the four years...?"]

Definitely both my shoulders... I remember in the first year it was more in the left one and the left wrist because I was trying to get my new... fingering system, all working and then, it transferred over to the right-hand side... then by the time I got to third year I had to have a new... bowing technique and then, that generally got, better and... the most pain I have had now is just because... I have been playing for too long in a day. (Jack, SEM 8)

There was one instance... I did have to stop playing because my right wrist was just too, tense... I'm not sure whether it was... two years ago or my first year... I was really... concerned saying "Look, I've got to change my regime here otherwise this is not going to... improve at all". [MW: "And so what did you

change?"] I... did a bit of stretching and... little bit of naps and... that, seemed to work so I'd rather just stick to that. (Jack, SEM 8)

It's definitely gone down I think I used to do a lot of Grade Two stuff... in the last couple of semesters and then, this is probably the first Grade One I've had it's just been considerably... better as I've gone along. (SEM 8)

Jack said that, before he came to the institution he hadn't really discussed or thought about playing-related pain and injury. He didn't notice if other students at his high school were in pain but assumed they wouldn't have been because they were mostly athletes. In Jack's opinion not many students at the institution were suffering from pain however he thought that people might not talk about it for fear of being seen as weak. In his opinion the main causes of playing-related pain were lack of endurance, aspects of technique, and playing in awkward positions.

[MW: "Did you have pain before you came to The Con, when you played...?"] I probably did but, as I said before I wasn't... very aware of it... it wasn't really big issue that was talked about, in any playing at all. [MW: "So, you think having to talk to me has helped you with it or?"] Oh, it's, done the world of good for me... I will have to, just keep reminding myself of these things if I... continue my study elsewhere. (Jack, SEM 8)

It was, not really a thing that that was discussed, when I was in school... generally because music wasn't really... the main priority of the schools... [MW: "And did you think many people had pain when they played?"] If they did I would not have noticed it because... half the guys... actually, playing in an orchestra... were doing... rugby and, other types of very contact sports... so any pain... would not have affected them as much as... when they were playing

sports. [MW: "... Now do you think many of the other students here are having issues with pain?"] From what I have heard, probably not. I mean I... wouldn't really know because I hardly go to The Con anymore... because of my schedule. But... from what I have heard, people seem to be generally comfortable... [MW: "... Is it very common that people actually do discuss their, issues?"]... Well they prefer to keep them private obviously because they want to be seen as... the tough person... but I am sure, teachers would have discussed with them... [MW: "Did you ever talk about it with your teacher?"] [Pause.] No, don't think so... I don't think it was a really was big deal at the time... I try to learn things for myself and if it's the hard way then... so be it because I need to learn to, be more independent and take responsibility for what I do... if I want to live overseas so, because my parents won't be, there to help if I, get in trouble... [MW: "...What do you think are the main causes of people's pain when they play?"] Endurance and technique... if they play too much in the day then obviously, the body will take a toll but if your, technique is wrong if you are sitting in the wrong position or your shoulders are too tense... then definitely it is, a concern... in terms of the joints. (Jack, SEM 8)

At the conclusion of this program Jack was hoping to do further study on the cello, either overseas or interstate. He planned to continue his singing but only as a secondary interest.

I'm going to try and apply, to do... either an internship... or part-time position with [a professional orchestra]... because... I know a few people in there and... their season finishes in September which is, quite coincidental with me actually starting my season [overseas]... that's what I'm trying to do after I graduate...

but... I'm, trying to be as realistic as I possibly can obviously it's, a good thing to, have confidence in yourself so you will do it... but... [Teacher G] studied there before and she has already given me an ear full on how... tough the competition is... to even get a place let alone, succeeding at it and so... she's given me the realistic... side of things... if that doesn't work then I'll have to do a Masters here... but I've always wanted, music as a career it's just a matter of where I... continue my study and where I possibly could work. (SEM 8)

In conclusion, Jack's experiences of playing related discomfort/pain were relatively minor compared to other students in this study. However his strategy of “snoozing” to prevent playing related discomfort/pain was interesting.

Student 39: Felicity

Felicity was a cellist who experienced recurring playing-related discomfort/pain for the duration of her program. She presented as friendly and was easy to meet with as she regularly attended workshop. However she hesitated a lot in her delivery and at times looked very embarrassed. Felicity also laughed before answering almost every question.

From early on Felicity perceived that her playing-related discomfort/pain was caused by “bad technique” and “an incorrect bow hold”. She believed that she could trace these back to her early learning experiences in a school group situation.

As she progressed through her Bachelor of Music program Felicity worked with her cello teacher to correct these technical issues. As a result, over time her playing-related pain reportedly decreased from being present after 30 minutes of playing to being present after one to one and a half hours of playing. When she experienced playing-related discomfort/pain Felicity would either take a break from playing, or simply continue playing (as generally her pain did not get significantly worse).

Like many of the students in this study, Felicity did perceive that she was prone to experiencing back pain during long Orchestra rehearsals. However this discomfort/pain did not usually last longer than a half-hour after she stopped playing. Felicity continually stated that she was not concerned by her experiences as she believed they were normal and also that she was used to it.

At the conclusion of her program Felicity was planning on doing a Graduate Diploma in Education (Secondary). She said that she was still not entirely sure what she wanted to do as a future career but said she did not believe she was advanced enough to be a professional soloist or orchestral player.

Table B39

Reported Pain Experience for Student 39: Felicity

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	3	3	Last time she practised	Shoulders, front of upper right arm, and left thumb	5	2 to 3 hours	N/A
2	3	2-3	That morning whilst practising	Right hand	5	1.5 to 2 hours	5.5 hours
3	3	2-3	Previous day whilst practising	Right hand	2	2.5 to 3 hours	5 to 6 hours
4	2	2	Last night	Right shoulder	2	2.5 to 3 hours	6 to 7 hours
5	3	2-3	4 days ago whilst practising	Back and right arm	3	3 hours	8 to 9 hours
6	1-2	2	Previous day	Right arm	3	2 to 3 hours	7.5 hours

Prior to her studies at the institution Felicity had experienced playing-related discomfort/pain in her left fingers and forearm, her right hand, both of her wrists and shoulders, and the left side of her back. The pain in her right shoulder was ongoing and bothered her most. This pain was present after she had been playing her cello for half an hour.

At the end of the first year of her Bachelor of Music program, Felicity said that she was still experiencing discomfort/pain after 30 to 60 minutes of playing her

instrument. However, the focus was now in her right hand as well as the shoulder and upper arm. Felicity commented that she was also experiencing back pain during Orchestra rehearsals. “It's usually, my hand... around, in my thumb and... in my, shoulders up here in my upper arm” (Felicity, SEM 2).

As she progressed through the second year of her program Felicity said that she was working on trying to relax/fix up the position of her arms. As a result the discomfort/pain was not always as severe, although it continued to recur after she had been playing her instrument for an hour. Pain was still mostly affecting her right side (with the exception of her back during Orchestra) and the focus was her right hand and arm.

I'm kind of working on it... it's just cause... I learnt off a violin teacher, so I always bring this arm... down... so I am working on trying to, make that better [MW: “And is that helping with the pain?”] It is... because I'm trying to relax... there is not as much strain on it. (Felicity, SEM 3)

It's not as bad as it was... my technique is improving a fair bit because I had really bad, posture and stuff... it takes a bit longer, to come on so maybe like an hour or so. (Felicity, SEM 4)

During her third year, Felicity said that her playing-related discomfort/pain was continuing to improve. Although it was still present every time that she practised, it now appeared after one to one and a half hours of playing. The perceived focus remained her right arm and shoulder, with her left arm and back also affected. On reflection Felicity said she had noticed a gradual decrease in the intensity of her pain over the course of the program.

It is, probably getting, better... because I'm trying to think about... less tension and stuff... [MW: "... Do you still get it every time you play?"]... Yeah but not as bad... I'm okay for like, an hour, hour and a half. (Felicity, SEM 5)

I think it's because I've been kind of fixing my posture and stuff... because I... used to be a lot more tense, when I played. (Felicity, SEM 6)

For the majority of her Bachelor of Music program the focus of Felicity's playing-related discomfort/pain remained her right shoulder and arm. Other body parts affected included the right hand, left fingers and forearm, both shoulders, and her back.

Initially the pain in Felicity's right side was present after half an hour of playing. However over the course of the program it gradually decreased to be present after one to one and a half hours of playing. Generally speaking Felicity's pain would not last longer than a half-hour after she stopped playing her cello.

Felicity also experienced pain in her back during Orchestra rehearsals for the duration of her program. She believed that this pain was linked to sitting down for long periods of time however unlike most students in this study had no preference of chair. "During Orchestra I get a bit of a sore back I guess from sitting up for so long" (Felicity, SEM 3).

Sometimes... playing for a long time... in orchestral rehearsals... I, tend to get sore back, [laughs] but not, so much when I'm practising. (Felicity, SEM 6)

Yeah, it does, hurt [my back] after sitting up for so long... it will take a while but it does, go away... [after] half an hour. (Felicity, SEM 5)

Once she was experiencing playing-related discomfort/pain Felicity would either stop playing (if the pain was particularly bad) or she would continue playing. Once it

was present her pain generally didn't worsen, it just remained uncomfortable and then went numb.

I do notice it and then after a while it... goes numb [laughs]... and then... I try not to think about it. [MW: "And does it last very long after you stop playing?..."]... I wouldn't say... really quickly but... it doesn't stay for too long. (Felicity, SEM 3)

It's just kind of, uncomfortable, but it's not, always really bad... sometimes it gets, kind of bad in my hand but, I'll stop if it does, but most of the time it's not really too bad. (Felicity, SEM 3)

Well sometimes if it's not too bad I just keep going but, if it is bad... I generally, stop and take a break for a bit... try to stretch it out and... move it and relax it. (Felicity, SEM 5)

Felicity took regular breaks throughout her practice for the duration of the program. These 15 to 30 minute breaks varied from every hour to every hour and a half and generally coincided with when she started to experience pain. "I stop and have a break [laughs]... go away for about, 15 minutes to half an hour and then come back again and then it goes away" (Felicity, SEM 2).

I just usually, have a break for like 10 or 15 minutes and then come back when it goes away, because it doesn't take that long to go away. (Felicity, SEM 4)

Felicity's regular warm-up consisted of scales. In the third year of her program she said she was trying to get into stretching but then stated that "I don't really ever get around to it". "Scales, and I was trying to do... a proper physical type warm-up but, [laughs] I don't really ever get around to it" (Felicity, SEM 6).

Felicity did not exercise consistently throughout her program although she did undertake regular dance classes during her third year. At this time she perceived that she was feeling a lot better in general. For the duration of her program she also worked at Coles however only experienced occasional pain in her legs. “I do, dance classes... I just started regular classes this year... I think I am feeling better a lot better in general” (Felicity, SEM 5).

Felicity's strategies for preventing playing-related discomfort/pain throughout her program included taking regular breaks throughout her practice, relaxing, working to change the position of her hands and arms, improving her posture, and self massage. In her opinion her pain was caused by bad technique and a tight bow hold that she believed she could trace back to learning from a violin teacher in a school group situation. Felicity only started learning from a cello teacher in Grade 11 (two years prior to her studies at the institution). “Loosen up, I guess... which don't really do [laughs] but I probably should” (Felicity, SEM 2).

Sometimes, when I do get the pain in my right hand... I just put down my bow and... just for five minutes... massage it... because it's just... cramped. (Felicity, SEM 3)

Probably working on my posture and stuff. (Felicity, SEM 5)

Probably relax... and, take, regular breaks... but don't... completely go, off track... during breaks and stuff... so... your mind is... still there, so you don't, come back and forget what you've done. (Felicity, SEM 6)

I know why that is... I hold my bow too tightly [laughs]... and I am trying to fix that but, it's taking a while because I'm so used to playing like that. (Felicity, SEM 2)

I never really had proper, technique and stuff... I always just played really funny... I started in about Grade 6 but... I didn't really ever practise or anything... just... through... school instrumental program... it was only... in about Grade 11 that I started... with a cello teacher, and... started to kind of take it a bit more seriously I guess. [MW: "So, all the time while you were playing from when you were younger did you experience like pain in your right, shoulder..?"]... I can't really remember any... intense pain but... probably... but I never really played for very long... at one time. (Felicity, SEM 6)

Felicity consistently said that her experiences of playing-related discomfort/pain did not concern her. This was because she was used to it and believed that it was normal to experience playing-related pain. However, on reflection she did say that she was a little bit concerned about her back pain in Grade 12 and during the first year of her program (although she didn't mention it specifically at the time). "I just haven't really thought that it was anything major" (Felicity, SEM 2) "It doesn't really worry me that much because I'm kind of used to it" (Felicity, SEM 3).

Just kind of figured it was normal, and that, because I'm trying to fix it, that, it should get better soon. (Felicity, SEM 3)

Not really... because I've kind of, gotten... less pain... [MW: "Were you ever very worried about it?"]... I was a bit about my back... because sometimes it would hurt if I bent over and stood up again... but like, it's, fine now... that was actually in about Grade 12 I think and about first-year Uni I had it a bit as well. (Felicity, SEM 6)

Early on Felicity said that she was too embarrassed to discuss her experiences of playing-related discomfort/pain with her teacher, although the issue was discussed

generally in terms of improving her posture and arm position. “She gives me tips on my lesson about how to, improve my technique and posture... like sit up straighter”

(Felicity, SEM 4).

My right arm is still... pretty high... all through school I had a violin [teacher]... I started learning with [Teacher G] when I was at the end of high school so... it was... hard at first but, now I'm... more used to it and it's not so bad. (Felicity, SEM 4)

At the conclusion of her program, Felicity said she had decided not to undertake a fourth year and instead was planning to pursue a Graduate Diploma in Education (Secondary). At the time she said that she had some interest in Music Therapy but did not have pre-requisites to enrol. On reflection Felicity said that she never planned on being a soloist. Although she would have liked to work in a professional orchestral setting she said she now believed that her playing was not advanced enough.

I'm, hoping to go do a Graduate Diploma in Education next year... for... high school... there is a, couple of subjects in like instrumental... music so it is in there as well, but I would really like to do Music Therapy... I just need the prerequisites for it... so, I'm just doing Education as well because I don't think there's that much work in it either so... [MW: “... After you have got that, will you get into Music Therapy do you think?”]... I am not really sure I'm... a kind of a go-with-the-flow type person... I haven't actually, known exactly what I wanted to do till... a few months ago. [Laughs]... It would have been nice to be an orchestral player but... I've always known that it's not really realistic... because... I only really started seriously playing... two years before I started

here... but I'm okay with that though... I like playing just for fun. (Felicity, SEM 6)

On reflection, Felicity said that she couldn't recall any particularly severe experiences of playing-related discomfort/pain throughout her program. In her opinion she had noticed a gradual decrease in pain. Although she was not really sure how many other people at the institution were experiencing problems with pain she could recall two specific people who had openly talked about their issues.

[MW: "Is there any... experience that stands out in your mind as being really bad for you here?"]... There might have been a few Orchestra rehearsals but I don't really recall it... really bad. Just, really tired and stuff. (Felicity, SEM 6)

I don't really talk to very many people... but... I remember [student] saying something about he had, bad pain maybe, I think last year or sometime, I think last year?... That is, probably... about it... oh although, Rachel [Student 20] in the year above me I remember her... last semester, she was talking about... her first or second year, she had, some really bad pain after playing in Opera... and that's why she was a semester behind... but... that's about it. (Felicity, SEM 6)

It would probably be a good idea [to have a course] just to help people have... more understanding of it and stuff. (Felicity, SEM 6)

In conclusion it is clear that Felicity experienced recurring pain in her right arm and shoulder for the duration of her program. However she did not appear to be particularly bothered by it as she believed it was normal to experience pain whilst playing.

Student 40: Jane

Jane was a double bass player who withdrew from the Bachelor of Music program during her first semester. Prior to her studies at the institution she had experienced recurring playing-related discomfort/pain in her left fingers, left hand, left forearm, and back.

In her Initial Questionnaire Jane said that she had no strategies for preventing playing-related pain and that she had not discussed her experiences with anyone. However she said that she did a warm-up consisting of scales etc. at the beginning of each practice session.

Jane was only enrolled in the Bachelor of Music program long enough to complete the Initial Questionnaire. As a result the data she contributed to the research was limited and it is not known whether her experiences of playing-related discomfort/pain influenced her decision not to continue her studies at the institution.

Table B40

Reported Pain Experience for Student 40: Jane

Semester	Grade	At worst	Most recent experience	Location	No. of words	Amount of practice	Most played in one day
1	2	2	Last week during practice	Left forearm and back	5	Less than 1 hour	N/A

Appendix C: Consent Forms

Sample Consent Form: Focus Group

Playing-related discomfort / pain among tertiary string students (QCM/23/06/HREC)

Dr. Stephen Emmerson (principal supervisor)
Queensland Conservatorium, South Bank



Dr. Scott Harrison (associate supervisor)
Music Education, Mt. Gravatt



Megan Waters (student researcher)
Queensland Conservatorium, South Bank



Dear string student,

Thank you for your continued involvement in this research project. This stage of data collection involves your participation in a small focus group discussion, the purpose of which is to gain further insight into the issues surrounding playing-related discomfort/pain among string students. The focus group will last no more than an hour. It will be recorded on video and later transcribed. Please be assured that any information or opinion that you share will remain confidential. The recordings and transcriptions will be stored in a locked file in the Queensland Conservatorium Research Centre and destroyed after five years. All data will be de-identified once collection is complete.

Participation in this project is voluntary. You are free to withdraw from the study at any time and there will be no consequences for you if you choose to do so. No identifiable or sensitive information collected at this focus group will be released to anyone including your teachers.

Please be aware that in participating in this focus group, you are giving consent for any information you share or opinion you express to be used for the purpose of the research. If you wish, you will have opportunity to discuss any possible implications of your participation in this research with us. Confidential counselling is also available to you if you need to discuss any issues. In this circumstance, please contact Dr. Michael Free, Clinical Psychologist and Lecturer in Clinical Psychology, School of Psychology, Griffith University. His phone numbers are 

If you wish to ask any questions about this research, please do not hesitate to contact a member of the research team.

Sincerely,

Megan Waters

Dr. Stephen Emmerson

Griffith University conducts research in accordance with the National Statement on Ethical Conduct Involving Humans. If you have any concerns or complaints about the ethical conduct of this research project please contact the Manager, Research Ethics on 3735 5585 or research-ethics@griffith.edu.au. The conduct of this research involves the collection, access and/or use of your identified personal information. The information collected is confidential and will not be disclosed to third parties without your consent, except to meet government, legal or other regulatory authority requirements. A de-identified copy of this data may be used for research purposes. However, your anonymity will at all times be safeguarded. For further information consult the Universities Privacy Plan at www.gu.edu.au/ua/aa/vc/pp or telephone (07) 3735 5585.

Sample Consent Form: Interview

Perceptions of playing-related discomfort / pain among tertiary string students: A longitudinal study (QCM/23/06/HREC)

Dr. Stephen Emmerson (principle supervisor)
Queensland Conservatorium, South Bank

Dr. Scott Harrison (associate supervisor)
Music Education, Mt. Gravatt

Megan Waters (student researcher)
Queensland Conservatorium, South Bank

Dear first-year string student;

As you already know, my name is Megan Waters and I am currently undertaking a PhD. In Orientation Week 2007 you decided to participate in a study looking at the incidence of playing-related discomfort / pain among string students. You now have the opportunity to participate in phase two of this study.

Up until this time you have been completing questionnaires. The purpose of these questionnaires is to find out about your general and musical backgrounds, practice habits, general attitudes towards playing-related discomfort / pain and your experiences with any such discomfort / pain. This aspect of the study remains ongoing to the end of your degree, and we sincerely thank you for your continued participation.

It is now time to get volunteers for phase two of the study. The aim of this phase is to explore in further detail the personal circumstances under which playing-related discomfort / pain may or may not develop. This will happen through interviews.

All participants in phase one of the study are being asked to give interviews. Participation in this phase of the study is voluntary and separate from the ongoing questionnaires.

Participation in the interviews means that you will sit with me at a time and place of mutual convenience and discuss your particular experiences. These discussions will last no more than one hour at a time. The dialogue will be recorded and at the completion of each discussion you will be forwarded a transcript. If you wish to amend what you have said you will be able to.

Please note that whatever you tell me will remain confidential. The interview transcripts and recordings will be stored in a locked file in the Queensland Conservatorium Research Centre and destroyed after five years. This means it is extremely unlikely that anyone will be able to link specific information to one person. After collection all data will be de-identified.

After the interview it is possible that you may want to talk to someone about any feelings raised. A counsellor from Griffith University is available for you to talk to. In this circumstance please contact Dr. Michael Free, Clinical Psychologist and Lecturer in Clinical Psychology, School of Psychology, Griffith University. His numbers are [REDACTED]

[REDACTED] Any discussions that you may have with this man are confidential.

If you so desire, you will have opportunity to discuss your results with the researchers. Please note, however, that the aim of this research is not to diagnose you with any type of injury. In fact, if you are bothered by pain or discomfort we strongly advise you to seek medical advice.

This is a rare opportunity for your experiences to help the musical world as a whole understand why playing-related pain may or may not develop. Your experiences are very important. The more that educators can understand about the unique environment in which injuries can develop, the more they can put into place strategies which aim to reduce such injuries.

If you have any further questions, please do not hesitate to contact a member of the research team. The contact details are at the top of this letter.

Sincerely,

Megan Waters

Dr. Stephen Emmerson

Dr. Scott Harrison

Sample Consent Form: Ongoing Pain Questionnaire/interview (Revised)

Perceptions of playing-related discomfort / pain among tertiary string students: A longitudinal study (QCM/23/06/HREC)

Dr. Stephen Emmerson (principal supervisor)
Queensland Conservatorium, South Bank

Dr. Scott Harrison (associate supervisor)
Music Education, Mt. Gravatt

Megan Waters (student researcher)
Queensland Conservatorium, South Bank

Dear string student,

Thank you for your continued participation in this research project. This stage of data collection involves your participation in a questionnaire/interview. This includes filling out a short questionnaire and then answering some questions from the researcher. The questionnaire/interview will be recorded. You will be required to put your name on your questionnaire however this is only so that we can track your experiences. Please be assured that any information collected as part of this research will remain confidential. The questionnaires are being stored in a locked file located in an office within the institution. The audio recordings are being stored securely on the student researcher's personal computers to which no-one else has access. These will be destroyed after five years. All data will be de-identified once collection is complete.

Participation in this project is voluntary. Your marks will not be affected in the event that you withdraw and no identifiable or sensitive information will be released to your teachers. You are not required to answer every question and are free to withdraw from the study at any time.

Please be aware that in answering the questions, you are giving consent for your information to be used. If you wish, you will have opportunity to discuss your personal results and the possible implications of them with us. Confidential counselling is also available to you if you need to discuss any issues raised through the research. In this circumstance, please contact Dr. Michael Free, Clinical Psychologist and Lecturer in Clinical Psychology, School of Psychology, Griffith University. His phone numbers are

If you wish to ask any questions about this research, please do not hesitate to contact a member of the research team.

Sincerely,

Megan Waters

Dr. Stephen Emmerson

Dr. Scott Harrison

Griffith University conducts research in accordance with the National Statement on Ethical Conduct Involving Humans. If you have any concerns or complaints about the ethical conduct of this research project please contact the Manager, Research Ethics on 3735 5585 or research-ethics@griffith.edu.au. The conduct of this research involves the collection, access and/or use of your identified personal information. The information collected is confidential and will not be disclosed to third parties without your consent, except to meet government, legal or other regulatory authority requirements. A de-identified copy of this data may be used for research purposes. However, your anonymity will at all times be safeguarded. For further information consult the Universities Privacy Plan at www.gu.edu.au/ua/aa/vc/pp or telephone (07) 3735 5585.

Sample Consent Form: Ongoing Pain Questionnaire

Perceptions of playing-related discomfort / pain among tertiary string students: A longitudinal study (QCM/23/06/HREC)

Dr. Stephen Emmerson (principal supervisor)
Queensland Conservatorium, South Bank



Dr. Scott Harrison (associate supervisor)
Music Education, Mt. Gravatt



Megan Waters (student researcher)
Queensland Conservatorium, South Bank



Dear first-year string student,

Thank you for your continued participation in this research project. This stage of data collection involves you filling in a short questionnaire and briefly answering some questions from the researcher. You will be required to put your name on your questionnaire however this is only so that we can track your experiences. Please be assured that any information collected as part of this research will remain confidential. Questionnaires will be stored in a locked file in the Queensland Conservatorium Research Centre and destroyed after five years. All data will be de-identified once collection is complete.

Participation in this project is voluntary. Your marks will not be affected in the event that you withdraw and no identifiable or sensitive information will be released to your teachers. You are not required to answer every question and are free to withdraw from the study at any time.

Please be aware that in answering the questionnaire, you are giving consent for your information to be used. If you wish, you will have opportunity to discuss your personal results and the possible implications of them with us. Confidential counselling is also available to you if you need to discuss any issues raised through the research. In this circumstance, please contact Dr. Michael Free, Clinical Psychologist and Lecturer in Clinical Psychology, School of Psychology, Griffith University. His phone numbers are



If you wish to ask any questions about this research, please do not hesitate to contact a member of the research team.

Sincerely,

Megan Waters

Dr. Stephen Emmerson

Dr. Scott Harrison

Griffith University conducts research in accordance with the National Statement on Ethical Conduct Involving Humans. If you have any concerns or complaints about the ethical conduct of this research project please contact the Manager, Research Ethics on 3875 5585 or research-ethics@griffith.edu.au.

Sample Consent Form: Initial Questionnaire

Perceptions of playing-related discomfort / pain among tertiary string students: A longitudinal study (QCM/23/06/HREC)

Dr. Stephen Emmerson (principle supervisor)
Queensland Conservatorium, South Bank

Dr. Scott Harrison (associate supervisor)
Music Education, Mt. Gravatt

Megan Waters (student researcher)
Queensland Conservatorium, South Bank

Dear first-year string student;

Welcome to the Queensland Conservatorium, Griffith University! Congratulations on your acceptance. My name is Megan Waters. I am a violinist; I graduated from the Bachelor of Music in 2005. At the moment I am completing a PhD. My area of research is playing-related discomfort / pain among string students.

As a string player myself, I am familiar with the physical and emotional demands that are placed on us. Although I don't claim to have experienced an injury as such, I have experienced physical pain in the course of my musical learning. You may be surprised to know that in the past few years it has emerged that a very high percentage of string players experience pain in some form whilst playing their instrument. The news is not all bad though! Researchers are constantly working on identifying the risk factors and this is where your help is needed.

Current thought is that the learning environments young musicians are trained in play a key role in the development of playing-related injuries. As yet there has been no research either proving or disproving this. The Queensland Conservatorium of Music, (with your help), is hoping to be the first.

In a nutshell, what I am planning to do is study two groups of string players throughout their Bachelor of Music program. All first year string students in 2007 are being given the opportunity to participate. Although the research is being conducted with the support of the strings department, participation is voluntary. This means that your marks will not be affected by your decision, and no identifiable or sensitive information will be released to your teachers. You are not required to answer every question and are free to withdraw from the study at any time.

Participation in the research project means filling out questionnaires at certain stages throughout your degree. The first questionnaire is being distributed in the session "Introduction to String Quartet Playing". The final 30 minutes of this session have been reserved for you to complete it. You will be asked about your musical background, practice habits and any experiences you may have had with pain either presently or in the past. Questionnaires will be handed in as you leave.

You may be thinking, “30 minutes is a long time!” Rest assured, future surveys will be far less detailed, focusing only on any changes in your playing / pain / discomfort. We plan to distribute these surveys in a common forum such as string workshop. Later there may also be opportunities for you to participate in interviews where you describe your personal experiences. The interviews are optional.

In order for us to track your experiences, you will have to put your name on your questionnaire. However, only Scott, Stephen and I will have access to this information. The questionnaires will be stored in a locked file in the Queensland Conservatorium Research Centre and destroyed after five years. This means it is extremely unlikely that anyone will be able to link specific information to one person. All data will be de-identified once collection is complete.

You may be wondering why you should bother to participate in such research. Firstly, this is a chance for your opinions and experiences to matter! Secondly, the research will benefit both you and future students at this conservatorium and other institutions. The more that educators can understand about the environment in which injuries can develop, the more they can put into place strategies which aim to reduce such injuries.

The results of the research will be given to you in the form of unidentifiable summaries of all the research participants. If you so desire, you will have opportunity to discuss your personal results and the possible implications of them with the researchers. Confidential counselling is also available to you if you need to discuss any issues raised through the research. In this circumstance, please contact Dr. Michael Free, Clinical Psychologist and Lecturer in Clinical Psychology, School of Psychology, Griffith University. His phone numbers are 

Please note that the aim of this research is not to diagnose you with any type of injury. If you are bothered by pain or discomfort we do urge you to seek advice from your medical practitioner.

So, we approach our farewells. But first, a few more things!

- By completing the questionnaire you are giving your consent for your information to be used in this research project.
- If you have any further questions, please do not hesitate to contact a member of the research team. The contact details are at the top of this letter.
- Griffith University conducts research in accordance with the National Statement on Ethical Conduct Involving Humans. If you have any concerns or complaints about the ethical conduct of this research project please contact the Manager, Research Ethics on 3875 5585 or research-ethics@griffith.edu.au.
- The conduct of this research involves the collection, access and / or use of your identified personal information. The information collected is confidential and will not be disclosed to third parties without your consent, except to meet government, legal or other regulatory authority requirements. A de-identified copy of this data may be used for other research purposes. However, your anonymity will at all times be safeguarded. For further information consult the

University's Privacy Plan at www.gu.edu.au/ua/aa/vc/pp or telephone (07) 3875 5585.

Don't be alarmed! It all sounds a lot worse than it is.

I shall leave you now by telling you that your opinions and experiences really do matter to me, and I hope you choose to take part in the research project. Thank you for your time.

Sincerely,

Megan Waters

Dr. Stephen Emmerson

Dr. Scott Harrison

Appendix D: Orientation Week Handout, The Musician's Twelve-Point Fitness-to-Play Programme

(Historical version downloaded from the British Association of Performing Arts Medicine in 2006. For current version please refer to http://www.bapam.org.uk/documents/FittoPlay_BAPAMfactsheet.pdf. Reprinted with permission.)

THE MUSICIANS' TWELVE-POINT FITNESS-TO-PLAY PROGRAMME



1. Never try to play through pain – stop beforehand.
2. Make yourself a manageable short programme of exercises to do prior to each episode of playing, i.e. physical **warm-up exercises** away from your instrument.
3. Allow a few minutes to adjust physically after playing, i.e. **cool-down exercises**.
4. Ensure that your **technique** is as sound as possible, allowing for individual physical proportions and level of experience. We strongly advise that you seek professional advice, whatever your level of playing; bad technique may become a habit and lead to further problems.
5. Ensure that you are as comfortable as possible when playing your instrument. Check your own **posture** when playing (a full-length mirror maybe helpful – or even better, videoing yourself on a camcorder). Adaptations (e.g. chin rests, shoulder pads, supports, straps) are designed to help you, so make sure that you take full advantage of what is available. Expert advice from a teacher may help.
6. Always check the position and height of your **music stand, chair, piano stool, organ mirror**, etc, to ensure that playing is as comfortable as possible and that you maintain good posture whilst playing. Changes made by others may not suit you, and adjustments may be necessary.
7. Plan your practice sessions to allow frequent **breaks** in playing. It is important to stop before any discomfort is reached – kitchen timers or digital watches can be pre-set to remind you that a break from playing is advisable. Relax your muscles for a few minutes.
8. Your physical build may make some repertoire more uncomfortable for you. Respect and accept this, and design your repertoire and rehearsal schedules accordingly. Try to play within your capabilities.
9. Your general lifestyle can effect your playing. Make sure you are eating and sleeping properly. Vision and hearing can affect your neck and upper limb posture; have them tested periodically.
10. A mixture of regular **exercise** (e.g. a sport of your choice, such as swimming), and relaxation will help you maximise your potential and reduce the risk of playing-related injury. Performing is stressful and tension can lead to pain and stiffness. There are many forms of exercise and relaxation techniques. Find ones that you enjoy – they're more likely to help!
11. Remember that you are a musical athlete, and that your performance depends on taking care of yourself. Think twice before going roller-blading, painting the ceiling or banging nails into walls in the days before a concert.
12. Get a life! **There is a world outside music** – find a hobby or interest totally unrelated to your music making, and spend time on that as well.

Appendix E: Initial Questionnaire by Instrument

Cello

1

Section One: Student Background

1. What is your name or student number?.....
2. How old are you?.....
3. What is your sex? Male
Female
4. How tall are you?.....
5. What is your current weight?.....
6. At what age did you begin playing the cello? < 5 6-7 8-10 >10
7. What size was your first cello? 1/8 1/4 1/2 3/4 4/4
8. With how many different cello teachers have you studied?
1 2 3 4 5 or more
9. Are you continuing with the same cello teacher this year? Yes No
10. Do you play any instruments other than the cello? Yes No
If yes, what are the instruments?.....
11. For how long have you been serious about cello playing?
Since I was a beginner Since high school Since last year
Since late primary school The last 3 years I'm still not sure that I am
12. Did you participate in the Young Conservatorium prior to acceptance in the Bachelor of Music?
Yes No
13. Do you currently participate in any ensembles outside of QCGU? (e.g. QYS, AYO, chamber group)
Yes No
If yes, for how many years have you been doing so?
14. Prior to this year, for how many hours per week do you estimate playing in ensemble rehearsals?
1-2 3-5 6-10 >10
15. Do you take part in any physical activities on a regular basis? Yes No
If yes, please indicate which type:
Ball sports Walking / running Cycling Swimming Weights Yoga / Pilates
Other.....
16. During the past year, how many hours per week do you estimate participating in these activities?
<1 hour 1-2 hours 3-4 hours >5 hours

2

17. Have you ever sustained any injuries from sport or other activities that you feel might influence your cello playing? Yes No

If yes, please specify.....

.....

18. Do you have any strategies you actively use to prevent yourself experiencing discomfort or pain whilst playing the cello? If so, please note them down in one to two concise sentences.

.....

.....

19. How did you learn about these strategies?

Not applicable	<input type="checkbox"/>	Internet	<input type="checkbox"/>	Reading material	<input type="checkbox"/>
Common sense	<input type="checkbox"/>	Peers	<input type="checkbox"/>	Family	<input type="checkbox"/>
From watching others	<input type="checkbox"/>	Cello teacher	<input type="checkbox"/>	Doctor	<input type="checkbox"/>
		Other health professional	<input type="checkbox"/>		

Other.....

.....

20. Do you currently hold any jobs? Yes Please continue
No Please skip to question 21

a) On average, how many hours per week do you work?

1-5 hours 6-10 hours 11-15 hours >15 hours

b) Do any of your jobs involve staying in fixed positions (such as at a desk or standing still) for long periods of time? Yes No

Please specify.....

.....

c) Do any of your jobs involve hand intensive tasks such as typing, writing, cleaning, gardening or housework?

If yes, for what proportion of your working time? Yes No

0-25% 26-50% 51-75% 76-100%

Please specify.....

.....

ALL RESPONDENTS TO ANSWER

21. How many hours per week (excluding cello playing and any job requirements) do you undertake hand intensive tasks such as typing, writing, housekeeping, gardening, craft work or similar?

<1 hour 1-5 hours 6-10 hours 11-15 hours >15 hours

22. At the completion of your music program, where do you see yourself?

- | | | | |
|-----------------------------------|--------------------------|---------------------------------------|--------------------------|
| Haven't given it much thought yet | <input type="checkbox"/> | Teaching cello privately | <input type="checkbox"/> |
| Performing as a soloist | <input type="checkbox"/> | Teaching for the education department | <input type="checkbox"/> |
| Performing in an orchestra | <input type="checkbox"/> | Performing in a chamber ensemble | <input type="checkbox"/> |
| | | Studying overseas | <input type="checkbox"/> |

Other (please specify)

.....

.....

Section Two: Practice

1. During the past year, on average;

a) How much individual practice per day do you estimate undertaking? (Please be honest, this information is confidential)

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 > 3

2. During the past two weeks, on average;

a) How much individual practice per day do you estimate undertaking?

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 > 3

3. Do you have a specific routine that you always follow when you practice?

- Yes No

Please elaborate.....

.....

.....

4. Do you start your practice sessions with a warm-up of some kind?

- Yes Please continue on
No Please skip to question 5

a) What does this warm-up involve?

- Slow playing Scales / technical exercises / studies Physical warm-up away from instrument
Other (e.g. stretches)
-
-

b) Is there any particular reason why you start your practice with this type of warm-up?

- | | | | |
|---|--------------------------|---------------------------------------|--------------------------|
| Not really | <input type="checkbox"/> | Everyone else does it like this | <input type="checkbox"/> |
| It's a habit, I've always done it like this | <input type="checkbox"/> | It makes sense from what I've learned | <input type="checkbox"/> |
| My teacher told me to | <input type="checkbox"/> | To keep myself healthy | <input type="checkbox"/> |

Other.....

.....

.....

5. Do you take breaks (other than for adjustments to stand etc.) during your practice sessions? Yes Please continue on
 No Please skip to question 6

a) How frequent are these breaks?
 Every 15 minutes Every half hour Every hour Every second hour

It varies / Other (please specify).....

b) How long are these breaks?

<1 minute 1-5 minutes 5-10 minutes 10-15 minutes >15 minutes

c) What do you do in these breaks? (Please indicate as many as relevant)

Emails / computer work Stretch out my muscles
 Chat with friends Go over my music in my head
 Go for a walk / some other type of light physical activity

Other.....

d) Why do you take these breaks? (Please indicate as many as relevant)

Not sure My teacher told me to I get physically tired
 It's a habit Everyone else does My concentration lapses
 To keep myself healthy

Other.....

ALL RESPONDENTS TO ANSWER

6. In the past, have you discussed how to practice with any of your cello teachers?

On a regular basis A few times Infrequently Not really Never

7. How would you describe your discussions?

- Not applicable
- General i.e. strategies such as metronome work or repetition
- Specific i.e. teacher told you exactly what to practice and for how long
- Both

a) On a scale of 1 to 6, how much impact did your discussions have on your method of practicing?

Absolutely no influence Significant influence

Optional comment.....

Section Three: Discomfort / pain

1. Have you ever felt any kind of discomfort or pain related to playing your cello?

Yes Please continue on
 No Please relax for a few minutes

2. In which body parts have you experienced discomfort / pain? Please indicate as many as relevant.

<table border="1" style="border-collapse: collapse; width: 100%;"> <tr><td style="text-align: center;">L</td><td style="text-align: center;">R</td></tr> <tr><td>Fingers</td><td></td></tr> <tr><td>Hand</td><td></td></tr> <tr><td>Wrist</td><td></td></tr> </table>	L	R	Fingers		Hand		Wrist		<table border="1" style="border-collapse: collapse; width: 100%;"> <tr><td style="text-align: center;">L</td><td style="text-align: center;">R</td></tr> <tr><td>Forearm</td><td></td></tr> <tr><td>Elbow</td><td></td></tr> <tr><td>Shoulder</td><td></td></tr> </table>	L	R	Forearm		Elbow		Shoulder		<table border="1" style="border-collapse: collapse; width: 100%;"> <tr><td style="text-align: center;">L</td><td style="text-align: center;">R</td></tr> <tr><td>Neck</td><td></td></tr> <tr><td>Back</td><td></td></tr> <tr><td>Lower body</td><td></td></tr> </table>	L	R	Neck		Back		Lower body	
L	R																									
Fingers																										
Hand																										
Wrist																										
L	R																									
Forearm																										
Elbow																										
Shoulder																										
L	R																									
Neck																										
Back																										
Lower body																										

3. What has been your most severe experience of discomfort / pain?.....

4. Does any of your discomfort / pain recur? Yes
No

a) If yes, please specify how often.....

5. How would you describe the discomfort / pain felt? Indicate as many as relevant.
 Other.....

Strong pain <input type="checkbox"/>	Weakness <input type="checkbox"/>	Muscle Spasm <input type="checkbox"/>	Stiffness <input type="checkbox"/>
Numbness <input type="checkbox"/>	Tightness <input type="checkbox"/>	Aching <input type="checkbox"/>	

6. Which recurring pain / discomfort bothers you the most in terms of severity?.....

The following questions relate to the recurring discomfort / pain that bothers you the most

7. Is the discomfort / pain ongoing when you play your instrument?

Yes If yes, for how long has the most recent episode been ongoing for;
 No Please skip to question 7

< 24 hours <input type="checkbox"/>	< 1 week <input type="checkbox"/>	< 3 months <input type="checkbox"/>	< 12 months <input type="checkbox"/>
24-48 hours <input type="checkbox"/>	< 1 month <input type="checkbox"/>	< 6 months <input type="checkbox"/>	> 12 months <input type="checkbox"/>

And generally, for how long can you play before you experience the discomfort / pain ?

It is always present <input type="checkbox"/>	After half an hour <input type="checkbox"/>	After two hours <input type="checkbox"/>
After 10 minutes <input type="checkbox"/>	After an hour <input type="checkbox"/>	After more than two hours <input type="checkbox"/>

Other (please define)

8. Under what circumstances did you first become aware of the discomfort / pain?

During private practice <input type="checkbox"/>	Immediately after a rehearsal <input type="checkbox"/>
Immediately after private practice <input type="checkbox"/>	During a concert <input type="checkbox"/>
During a rehearsal <input type="checkbox"/>	Immediately after a concert <input type="checkbox"/>

Other.....

Optional Comment.....

9. In your opinion, what is the cause of the discomfort / pain?

Didn't give it any thought	<input type="checkbox"/>	New cello	<input type="checkbox"/>	Change of repertoire	<input type="checkbox"/>
Not sure	<input type="checkbox"/>	New cello teacher	<input type="checkbox"/>	Performance conditions	<input type="checkbox"/>
Orchestral rehearsal	<input type="checkbox"/>	Change of playing technique	<input type="checkbox"/>	Uncomfortable chair	<input type="checkbox"/>
Increase in practice time	<input type="checkbox"/>	Some aspect of posture	<input type="checkbox"/>	Increase in school work	<input type="checkbox"/>
Performance exam	<input type="checkbox"/>	Learning a new skill on cello	<input type="checkbox"/>	High level of stress	<input type="checkbox"/>
Music camp	<input type="checkbox"/>	Playing in thumb position	<input type="checkbox"/>	Physical health problem	<input type="checkbox"/>
Carrying instrument	<input type="checkbox"/>	Unrelated trauma (e.g. sports related)	<input type="checkbox"/>		

Optional comment.....

10. Do you find that the discomfort / pain in any way hinders your playing / practicing? Yes
No

a) If yes, are specific aspects of playing affected? Some examples are given below, please add any not mentioned in the space provided.

Holding the bow	<input type="checkbox"/>	Playing on upper strings	<input type="checkbox"/>	Holding the cello	<input type="checkbox"/>
Bow control	<input type="checkbox"/>	Playing on lower strings	<input type="checkbox"/>	Vibrato	<input type="checkbox"/>
Tremolo	<input type="checkbox"/>	Pizzicato	<input type="checkbox"/>	Shifting	<input type="checkbox"/>
Volume of sound	<input type="checkbox"/>	Double stops	<input type="checkbox"/>	Rapid runs	<input type="checkbox"/>
Quality of sound	<input type="checkbox"/>	Repetitive passages	<input type="checkbox"/>	Playing in higher positions	<input type="checkbox"/>
		Intonation	<input type="checkbox"/>	Playing in thumb position	<input type="checkbox"/>

Other.....

11. Do you find that the discomfort / pain has follow on effects to any of these?

Your level of stress	<input type="checkbox"/>	Your confidence when performing	<input type="checkbox"/>
Your ability to perform tasks outside of music making	<input type="checkbox"/>	Your ability to sleep at night	<input type="checkbox"/>
Your confidence in your musical ability	<input type="checkbox"/>	Your emotional health	<input type="checkbox"/>

Other.....

12. How did you deal with the discomfort / pain when it first occurred?

Didn't think anything of it	<input type="checkbox"/>	Changed structure of practice	<input type="checkbox"/>
Nothing: Figured it was normal to feel pain	<input type="checkbox"/>	Began taking breaks in practice	<input type="checkbox"/>
Nothing: I was in a rehearsal	<input type="checkbox"/>	Discussed it with my cello teacher	<input type="checkbox"/>
Stopped playing immediately	<input type="checkbox"/>	Started doing stretches before practice	<input type="checkbox"/>
Stopped playing when pain persisted	<input type="checkbox"/>	Sought advice from medical specialist	<input type="checkbox"/>
Decreased amount of practice time	<input type="checkbox"/>	Sought advice from alternative therapist	<input type="checkbox"/>
		Immediately adapted the position of my cello / hand / bow arm	<input type="checkbox"/>

Optional comment.....

13. Since that time, have you changed the manner in which you deal with the discomfort / pain?.....

14. Have you ever talked to anyone about the cause of any of your discomfort / pain? Yes
No

If you answered yes, please continue. If you answered no, please skip to section four

15. Please rank in order of consultation, with 1 beside the first person consulted.

Cello teacher <input type="checkbox"/>	Physiotherapist <input type="checkbox"/>	Practitioner of Alexander Technique <input type="checkbox"/>
Fellow students <input type="checkbox"/>	Chiropractor <input type="checkbox"/>	Practitioner of Feldenkrais <input type="checkbox"/>
Family member <input type="checkbox"/>	Masseuse <input type="checkbox"/>	Acupuncturist <input type="checkbox"/>
Medical doctor <input type="checkbox"/>	Neurologist <input type="checkbox"/>	Other..... <input type="checkbox"/>

Optional comment.....
.....
.....

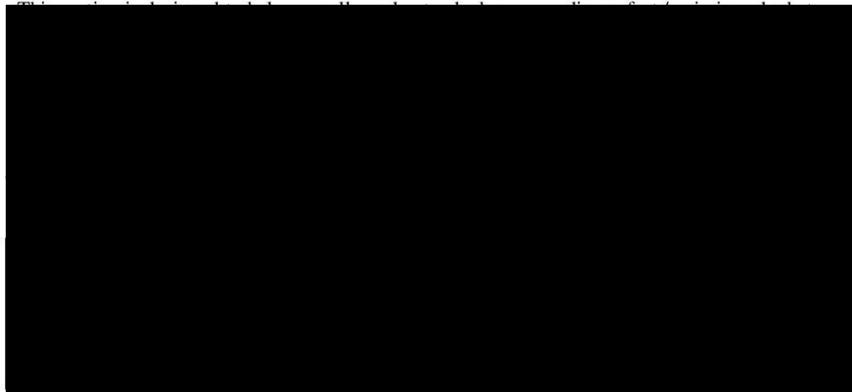
16. When did you consult these people?.....
.....
.....

17. What, if anything did they diagnose you with?.....
.....
.....

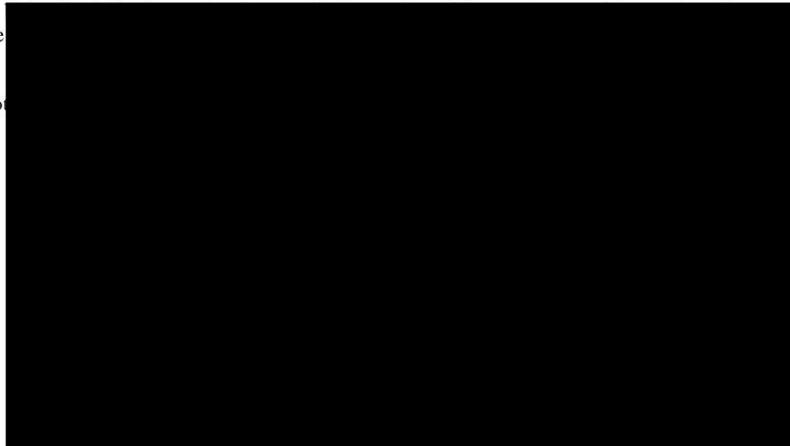
18. What did they recommend that you do?.....
.....
.....

19. What advice was the most helpful and why?.....
.....
.....

Section Four: Describing your discomfort / pain



2.
the
Not



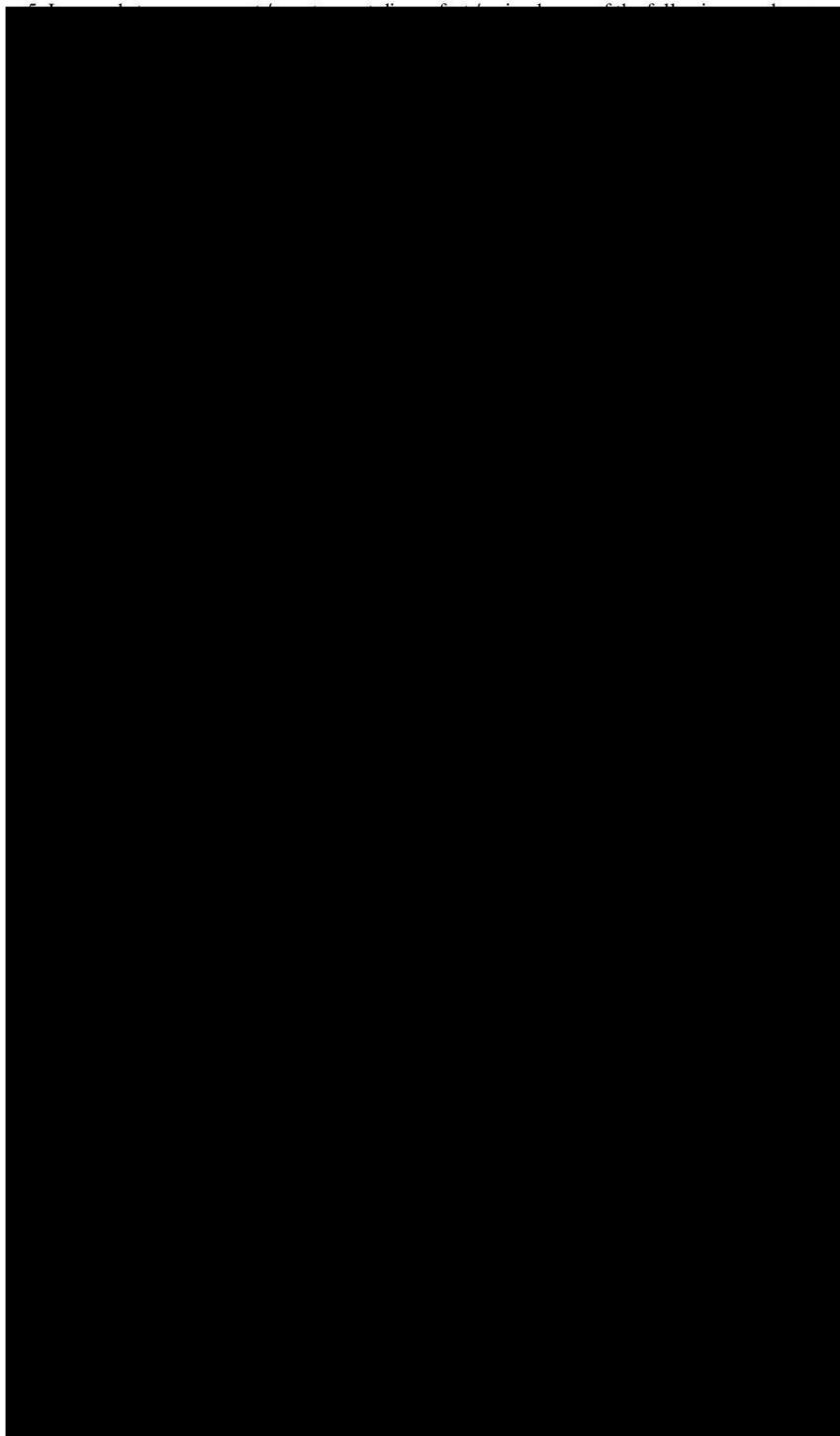
3. Are you feeling any playing-related discomfort / pain right now?

- Yes Please go to question 4
- No Please now recall your most recent experience of discomfort / pain

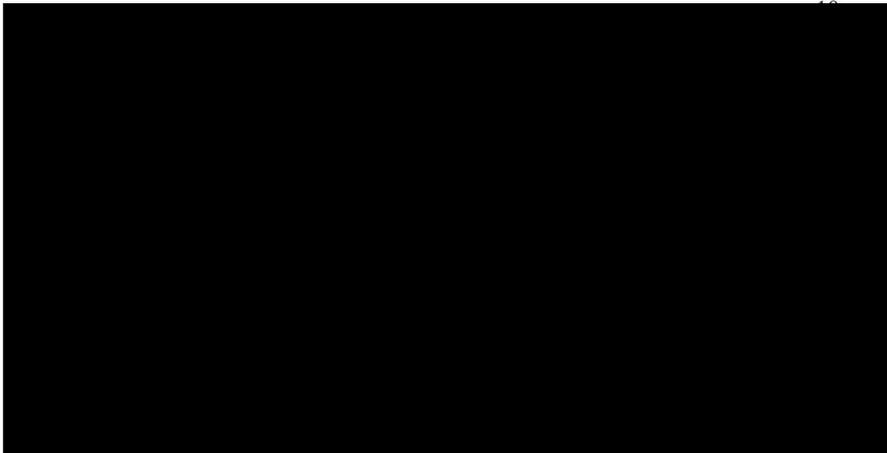
a) When did this experience take place? Please be as precise as possible.....
.....
.....

Questions 4-6 ask you to describe your discomfort / pain. If it is present right now, please describe it as it is now. If it is not present, please use your recall of your most recent experience, as referred to in question 3a

4. Please mark on the drawings where you feel / felt the discomfort / pain.



n be



15. Have you noticed any change in the intensity of the discomfort / pain during Orientation Week? Yes
 No

If yes, please elaborate.....

Section Five: Cello Supplement

1. How do you usually carry your cello?

On my back It's on wheels Over my shoulder In my hand
 Other.....

Optional Comment.....

2. Do you ever find it difficult or tiring to carry your cello? Yes No

Please elaborate.....

3. Do you ever travel on public transport with your cello? Yes No

a) If yes, do you find it difficult or tiring?.....

4. Approximately how much time do you spend physically moving your cello from one venue to another each week? (Do not include time when you are sitting in the car / bus / train)

10 minutes or less 11 - 30 minutes 31 - 60 minutes More than 1 hour
 Yes No

5. Have you ever received any advice regarding how to lift your cello?

a) If yes, who gave the advice and what was it?.....

6. Do you find at times that you are expected to practice / perform on chairs that you consider to be unsuitable? Yes No

a) If yes, what do you consider to be unsuitable and why?.....

7. What do you do when you have to play on a chair you don't consider to be suitable?

- Not applicable
- Nothing, what can I do?
- Tip up the back legs of the chair
- I carry a cushion for such situations
- Sit on the very front of the chair and lean forward
- Other.....

Optional comment.....

8. Have you ever received any advice regarding how to adjust your chair? Yes No

a) If yes, who gave the advice and what was it?.....

Section Six: Attitudes

Please indicate whether you believe the following statements to be either True (T) or False (F) by circling the appropriate letter

1. I am interested in learning more about the causes of musician's health problems T / F
2. I feel that I have adequate physical and psychological strength to cope with the demands of playing the cello T / F
3. This is the first I've ever heard of playing-related injuries T / F
4. I am sceptical of people who complain of pain when playing their instrument T / F
5. I don't think that I play with excessive tension T / F
6. I believe that pain is caused by faulty technique T / F
7. I am determined to do whatever it takes to play at my best T / F
8. I don't think any of my peers experience pain when they play their instruments T / F
9. The more practice I can do, the better T / F

10. I have suffered a playing-related injury T / F
11. When I can't play the cello I feel as though I am not complete T / F
12. I feel that being a musician is the most important thing in the world to me T / F
13. I feel that I am well equipped to deal with any health issues that may arise throughout my musical study T / F
14. If I experienced some type of physical problem I would feel comfortable discussing it with my teacher T / F
15. Music making is an emotional rather than physical activity T / F
16. I believe that I have control over my own wellbeing T / F
17. I like to slam my bow / slap my fingers into the strings T / F
18. I tend to cram my practice in close to my lesson / rehearsal / exam T / F
19. When playing the cello, I believe it is best to keep the torso upright and still T / F
20. I am a positive person T / F
21. I believe that physical discomfort is a part of playing a musical instrument T / F
22. The last year has been particularly stressful for me T / F
23. I am a hardworking person T / F
24. I have greatly increased my practice time in preparation for orientation week T / F
25. I am nervous about starting university T / F
26. I am confident in my abilities as a musician T / F
27. I consider myself to be an anxious person T / F
28. I am determined to prove myself as a musician over the next three years T / F
29. I am in good physical shape T / F
30. I am extremely self-motivated T / F
31. It is important to get good marks T / F
32. I am competitive T / F
33. I've always wanted to be a cellist T / F
34. I come from a family of high achievers T / F
35. I am happy with my technique at this stage T / F
36. I feel threatened by criticism T / F

Double Bass

1

Section One: Student Background

1. What is your name or student number?.....
2. How old are you?.....
3. What is your sex? Male
Female
4. How tall are you?.....
5. What is your current weight?.....
6. At what age did you begin playing the double bass? < 5 6-7 8-10 >10
 a) Did you originally play another instrument? Yes No
 b) If yes, at what age did you switch to the double bass and why?.....

7. What size was your first double bass? 1/4 1/2 5/8 3/4 7/8 4/4
cms / inches
8. With how many different double bass teachers have you studied?
 1 2 3 4 5 or more
9. Are you continuing with the same teacher this year? Yes No
10. Do you play any instruments other than the double bass? Yes No
 a) If yes, what are the instruments?.....

11. For how long have you been serious about playing the double bass?
 Since I was a beginner Since high school Since last year
 Since late primary school The last 3 years I'm still not sure that I am
12. Did you participate in the Young Conservatorium prior to acceptance in the Bachelor of Music program?
 Yes No
13. Do you currently participate in any ensembles outside of QCGU? (e.g. QYS, AYO, chamber group) Yes No
 a) If yes, for how long have you been doing so?.....

14. Prior to this year, for how many hours per week do you estimate playing in ensemble rehearsals?
 1-2 3-5 6-10 >10
15. Do you take part in any physical activities on a regular basis? Yes No
 a) If yes, please indicate which type:
 Ball sports Walking / running Cycling Swimming Weights Yoga / Pilates
 Other.....

16. During the past year, how many hours per week do you estimate participating in these activities?

<1 hour 1-2 hours 3-4 hours >5 hours

17. Have you ever sustained any injuries from sport or other activities that you feel might influence your double bass playing? Yes No

a) If yes, please specify.....

.....

18. Do you have any strategies you actively use to prevent yourself experiencing discomfort or pain whilst playing the double bass? If so, please note them down in one to two concise sentences.

.....

19. How did you learn about these strategies?

Not applicable <input type="checkbox"/>	Internet <input type="checkbox"/>	Reading material <input type="checkbox"/>
Common sense <input type="checkbox"/>	Peers <input type="checkbox"/>	Family <input type="checkbox"/>
From watching others <input type="checkbox"/>	Bass teacher <input type="checkbox"/>	Doctor <input type="checkbox"/>
	Other health professional <input type="checkbox"/>	

Other.....

20. Do you currently hold any jobs? Yes Please continue
 No Please skip to question 21

a) On average, how many hours per week do you work?

1-5 hours 6-10 hours 11-15 hours >15 hours

b) Do any of your jobs involve staying in fixed positions (such as at a desk or standing still) for long periods of time? Yes No

Please specify.....

.....

c) Do any of your jobs involve hand intensive tasks such as typing, writing, cleaning, gardening or housework?

If yes, for what proportion of your working time? Yes No

0-25% 26-50% 51-75% 76-100%

Please specify.....

.....

ALL RESPONDENTS TO ANSWER

21. How many hours per week (excluding bass playing and any job requirements) do you undertake hand intensive tasks such as typing, writing, housekeeping, gardening, craft work or similar?

<1 hour 1-5 hours 6-10 hours 11-15 hours >15 hours

22. At the completion of your music program, where do you see yourself?

- | | | | |
|-----------------------------------|--------------------------|---------------------------------------|--------------------------|
| Haven't given it much thought yet | <input type="checkbox"/> | Teaching double bass privately | <input type="checkbox"/> |
| Performing as a soloist | <input type="checkbox"/> | Teaching for the education department | <input type="checkbox"/> |
| Performing in an orchestra | <input type="checkbox"/> | Performing in a chamber ensemble | <input type="checkbox"/> |
| | | Studying overseas | <input type="checkbox"/> |

Other (please specify)

.....

.....

Section Two: Practice

1. During the past year, on average;

a) How much individual practice per day do you estimate undertaking? (Please be honest, this information is confidential)

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 > 3

2. During the past two weeks, on average;

a) How much individual practice per day do you estimate undertaking?

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 > 3

3. Do you have a specific routine that you always follow when you practice?

- Yes No

Please elaborate

.....

.....

4. Do you start your practice sessions with a warm-up of some kind?

- Yes Please continue on
No Please skip to question 5

a) What does this warm-up involve?

- Slow playing Scales / technical exercises / studies Physical warm-up away from instrument
Other (e.g. stretches)
-
-

b) Is there any particular reason why you start your practice with this type of warm-up?

- | | | | |
|---|--------------------------|---------------------------------------|--------------------------|
| Not really | <input type="checkbox"/> | Everyone else does it like this | <input type="checkbox"/> |
| It's a habit, I've always done it like this | <input type="checkbox"/> | It makes sense from what I've learned | <input type="checkbox"/> |
| My teacher told me to | <input type="checkbox"/> | To keep myself healthy | <input type="checkbox"/> |

Other

.....

.....

22. At the completion of your music program, where do you see yourself?

- | | | | |
|-----------------------------------|--------------------------|---------------------------------------|--------------------------|
| Haven't given it much thought yet | <input type="checkbox"/> | Teaching double bass privately | <input type="checkbox"/> |
| Performing as a soloist | <input type="checkbox"/> | Teaching for the education department | <input type="checkbox"/> |
| Performing in an orchestra | <input type="checkbox"/> | Performing in a chamber ensemble | <input type="checkbox"/> |
| | | Studying overseas | <input type="checkbox"/> |

Other (please specify)

.....

.....

Section Two: Practice

1. During the past year, on average;

a) How much individual practice per day do you estimate undertaking? (Please be honest, this information is confidential)

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 > 3

2. During the past two weeks, on average;

a) How much individual practice per day do you estimate undertaking?

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 > 3

3. Do you have a specific routine that you always follow when you practice?

- Yes No

Please elaborate

.....

.....

4. Do you start your practice sessions with a warm-up of some kind?

- Yes Please continue on
 No Please skip to question 5

a) What does this warm-up involve?

- Slow playing Scales / technical exercises / studies Physical warm-up away from instrument
 Other (e.g. stretches)
-
-

b) Is there any particular reason why you start your practice with this type of warm-up?

- | | | | |
|---|--------------------------|---------------------------------------|--------------------------|
| Not really | <input type="checkbox"/> | Everyone else does it like this | <input type="checkbox"/> |
| It's a habit, I've always done it like this | <input type="checkbox"/> | It makes sense from what I've learned | <input type="checkbox"/> |
| My teacher told me to | <input type="checkbox"/> | To keep myself healthy | <input type="checkbox"/> |

Other

.....

.....

2. In which body parts have you experienced discomfort / pain? Please indicate as many as relevant.

	L	R		L	R		L	R
Fingers			Forearm			Neck		
Hand			Elbow			Back		
Wrist			Shoulder			Lower body		

3. What has been your most severe experience of discomfort / pain?.....

4. Does any of your discomfort / pain recur? Yes
 No

a) If yes, please specify.....

5. How would you describe the discomfort / pain felt? Indicate as many as relevant.

Strong pain Weakness Muscle Spasm Stiffness
 Numbness Tightness Aching
 Other.....

6. Which recurring pain / discomfort bothers you the most in terms of severity?.....

The following questions relate to the recurring discomfort / pain that bothers you the most

7. Is the discomfort / pain ongoing when you play your instrument?

Yes If yes, for how long has the most recent episode been ongoing for;
 No Please skip to question 6

< 24 hours <1 week < 3 months <12 months
 24-48 hours < 1 month < 6 months >12 months

And generally, for how long can you play before you experience the discomfort / pain ?

It is always present After half an hour After two hours
 After 10 minutes After an hour After more than two hours
 Other (please define)

8. Under what circumstances did you first become aware of the discomfort / pain?

During private practice Immediately after a rehearsal
 Immediately after private practice During a concert
 During a rehearsal Immediately after a concert
 Other.....

Optional Comment.....

9. In your opinion, what is the cause of the discomfort / pain?

Didn't give it any thought	<input type="checkbox"/>	New double bass	<input type="checkbox"/>	Change of repertoire	<input type="checkbox"/>
Not sure	<input type="checkbox"/>	New double bass teacher	<input type="checkbox"/>	Performance conditions	<input type="checkbox"/>
Orchestral rehearsal	<input type="checkbox"/>	Change of playing technique	<input type="checkbox"/>	Uncomfortable stool	<input type="checkbox"/>
Increase in practice time	<input type="checkbox"/>	Some aspect of posture	<input type="checkbox"/>	Increase in school work	<input type="checkbox"/>
Performance exam	<input type="checkbox"/>	Learning a new skill on double bass	<input type="checkbox"/>	High level of stress	<input type="checkbox"/>
Music camp	<input type="checkbox"/>	Playing in thumb position	<input type="checkbox"/>	Physical health problem	<input type="checkbox"/>
Carrying instrument	<input type="checkbox"/>			Unrelated trauma (e.g. sports related)	<input type="checkbox"/>

Optional comment.....

10. Do you find that the discomfort / pain in any way hinders your playing / practicing?

Yes No

a) If yes, are specific aspects of playing affected? Some examples are given below, please add any not mentioned in the space provided.

Holding the bow	<input type="checkbox"/>	Playing on upper strings	<input type="checkbox"/>	Holding the double bass	<input type="checkbox"/>
Bow control	<input type="checkbox"/>	Playing on lower strings	<input type="checkbox"/>	Vibrato	<input type="checkbox"/>
Tremolo	<input type="checkbox"/>	Pizzicato	<input type="checkbox"/>	Shifting	<input type="checkbox"/>
Volume of sound	<input type="checkbox"/>	Double stops	<input type="checkbox"/>	Rapid runs	<input type="checkbox"/>
Quality of sound	<input type="checkbox"/>	Repetitive passages	<input type="checkbox"/>	Playing in high positions	<input type="checkbox"/>
Intonation	<input type="checkbox"/>	Doing full bows	<input type="checkbox"/>	Playing in thumb position	<input type="checkbox"/>

Other.....

11. Do you find that the discomfort / pain has follow on effects to any of these?

Your level of stress	<input type="checkbox"/>	Your confidence when performing	<input type="checkbox"/>
Your ability to perform tasks outside of music making	<input type="checkbox"/>	Your ability to sleep at night	<input type="checkbox"/>
Your confidence in your musical ability	<input type="checkbox"/>	Your emotional health	<input type="checkbox"/>

Other.....

12. How did you deal with the discomfort / pain when it first occurred?

Didn't think anything of it	<input type="checkbox"/>	Changed structure of practice	<input type="checkbox"/>
Nothing: Figured it was normal to feel pain	<input type="checkbox"/>	Began taking breaks in practice	<input type="checkbox"/>
Nothing: I was in a rehearsal	<input type="checkbox"/>	Discussed it with my bass teacher	<input type="checkbox"/>
Stopped playing immediately	<input type="checkbox"/>	Started doing stretches before practice	<input type="checkbox"/>
Stopped playing when pain persisted	<input type="checkbox"/>	Sought advice from medical specialist	<input type="checkbox"/>
Decreased amount of practice time	<input type="checkbox"/>	Sought advice from alternative therapist	<input type="checkbox"/>
		Immediately adapted the position of my bass / hand / bow arm	<input type="checkbox"/>

Optional comment.....

13. Since that time, have you changed the manner in which you deal with the discomfort / pain?

.....

7

14. Have you ever talked to anyone about the cause of any of your discomfort / pain? Yes
No

If you answered yes, please continue. If you answered no, please skip to section four

15. Please rank in order of consultation, with 1 beside the first person consulted.

- | | | | | | |
|-----------------|--------------------------|-----------------|--------------------------|-------------------------------------|--------------------------|
| Bass teacher | <input type="checkbox"/> | Physiotherapist | <input type="checkbox"/> | Practitioner of Alexander Technique | <input type="checkbox"/> |
| Fellow students | <input type="checkbox"/> | Chiropractor | <input type="checkbox"/> | Practitioner of Feldenkrais | <input type="checkbox"/> |
| Family member | <input type="checkbox"/> | Masseuse | <input type="checkbox"/> | Acupuncturist | <input type="checkbox"/> |
| Medical doctor | <input type="checkbox"/> | Neurologist | <input type="checkbox"/> | Other..... | |

Optional comment.....
.....
.....

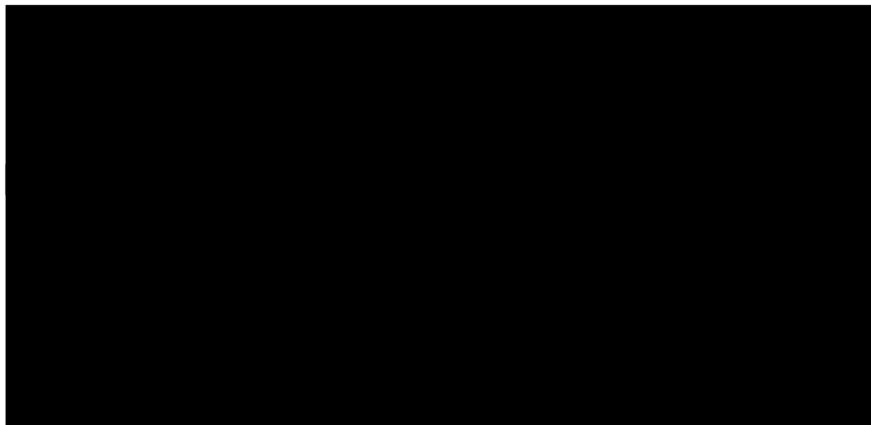
16. When did you consult these people?.....
.....
.....

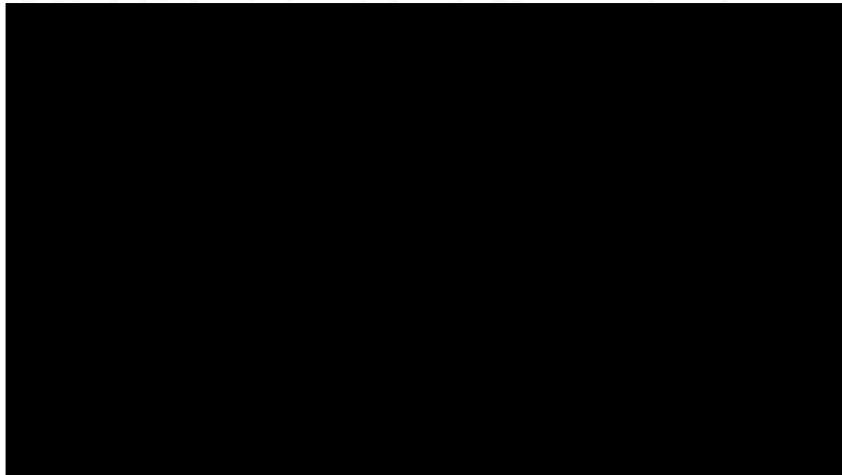
17. What, if anything did they diagnose you with?.....
.....
.....

18. What did they recommend that you do?.....
.....
.....

19. What advice was the most helpful and why?.....
.....
.....

Section Four: Describing your discomfort / pain





3. Are you feeling any playing-related discomfort / pain right now?

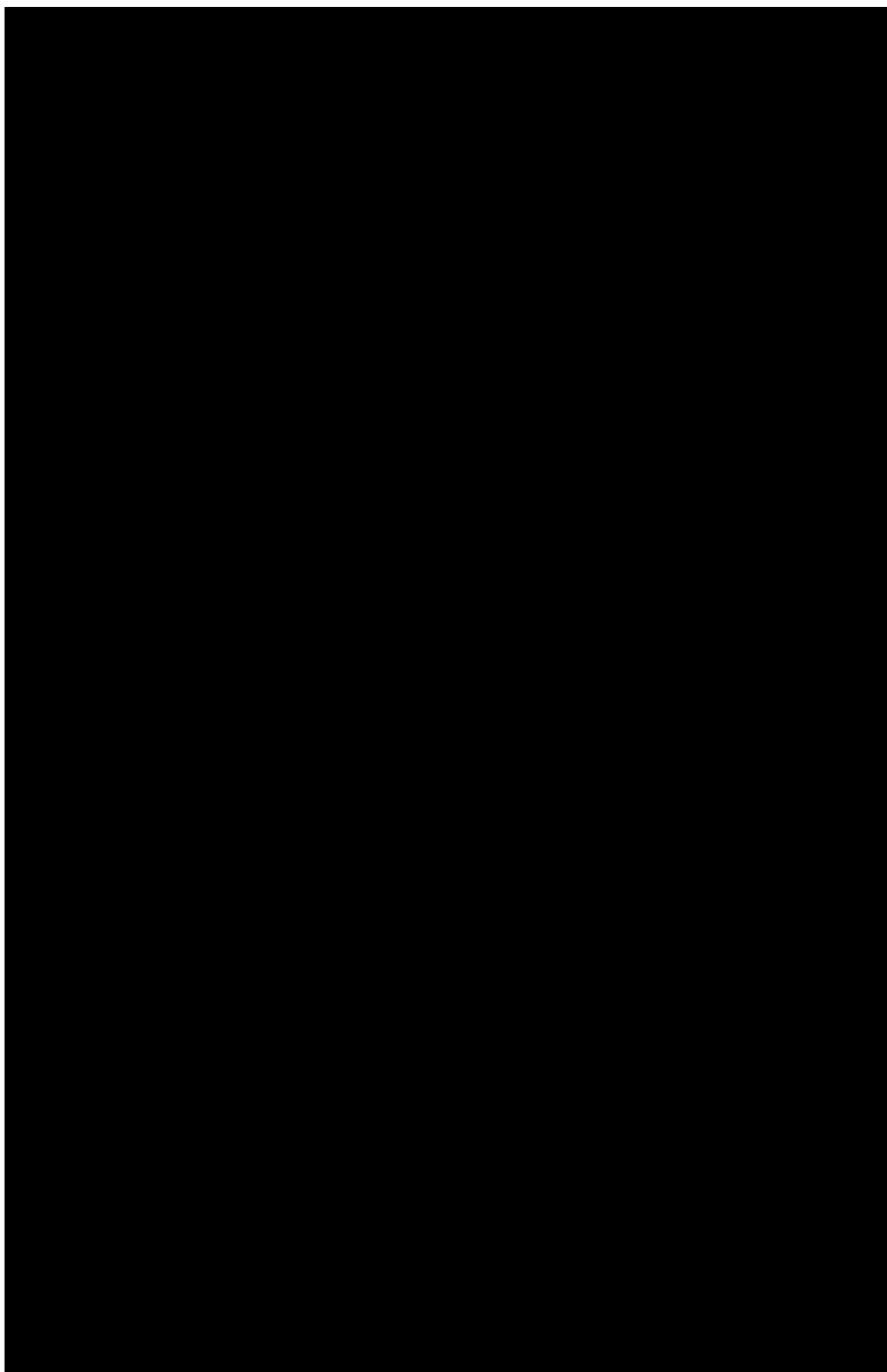
Yes Please go to question 4

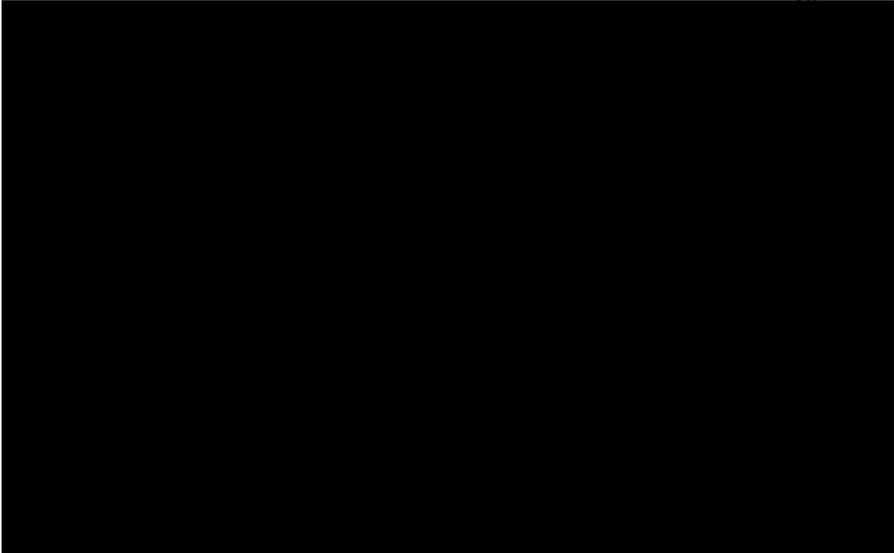
No Please now recall your most recent experience of discomfort / pain

a) When did this experience take place? Please be as precise as possible.....
.....
.....
.....
.....

Questions 4-6 ask you to describe your discomfort / pain. If it is present right now, please describe it as it is now. If it is not present, please use your recall of your most recent experience, as referred to in question 3a.

4. Please mark on the drawings where you feel / felt the discomfort / pain.





15. Have you noticed any change in the intensity of the discomfort / pain during Orientation Week? Yes
 No

If yes, please elaborate.....

Section Five: Double Bass Supplement

1. Do you know the size specifics of your current double bass?

Yes No

a) If yes, what are they?.....

2. Are there any unusual features on your double bass? (E.g. five strings)

Yes No

a) If yes, please elaborate.....

3. When playing the double bass, do you use a German or a French bow hold?

German French Don't know

Optional comment.....

4. Do you always play on your own double bass, or do you sometimes leave it at one venue (e.g. home or uni) and rely on supplied instruments at other venues?.....

5. When you have to, how do you usually carry your double bass?

On my back It's on wheels Over my shoulder In my hand
 Other.....

6. Do you ever find it difficult or tiring to carry? Yes No 11

a) If yes, please elaborate.....

7. Approximately how much time do you spend physically moving your double bass from one venue to another each week? (Do not include time when you are sitting in the car / bus / train)

10 minutes or less 11 - 30 minutes 31 – 60 minutes More than 1 hour

8. Have you ever received any advice on how to carry your double bass? Yes No

a) If yes, what was it?.....

9. Do you prefer to practice / perform whilst sitting on a stool or standing? Sitting
 Standing

a) What are your reasons for this?.....

10. Have you ever received any advice on how to adjust your stool? Yes No

a) If yes, what was the advice and who gave it to you?

11. Do you find that you are sometimes expected to practice / perform in a venue where there is no option of using a stool? Yes No

a) If yes, what do you do in this situation?.....

Section Six: Attitudes

Please indicate whether you believe the following statements to be either True (T) or False (F) by circling the appropriate letter

1. I am interested in learning more about the causes of musician's health problems T / F
2. I feel that I have adequate physical and psychological strength to cope with the demands of playing the double bass T / F
3. This is the first I've ever heard of playing-related injuries T / F
4. I am sceptical of people who complain of pain when playing their instrument T / F
5. I don't think that I play with excessive tension T / F

6. I believe that pain is caused by faulty technique T / F
7. I am determined to do whatever it takes to play at my best T / F
8. I don't think any of my peers experience pain when they play their instruments T / F
9. I find it difficult to position my body when I have to do full bow strokes from the tip to the heel of the bow (up bows) T / F
10. The more practice I can do, the better T / F
11. I have suffered a playing-related injury T / F
12. When I can't play the double bass I feel as though I am not complete T / F
13. I feel that being a musician is the most important thing in the world to me T / F
14. I feel that I am well equipped to deal with any health issues that may arise throughout my musical study T / F
15. If I experienced some type of physical problem I would feel comfortable discussing it with my teacher T / F
16. Music making is an emotional rather than physical activity T / F
17. I believe that I have control over my own wellbeing T / F
18. I like to slam my bow / slap my fingers into the strings T / F
19. I tend to cram my practice in close to my lesson / rehearsal / exam T / F
20. I have trouble maintaining a straight bow T / F
21. I am a positive person T / F
22. I believe that physical discomfort is a part of playing a musical instrument T / F
23. The last year has been particularly stressful for me T / F
24. I am a hardworking person T / F
25. I have greatly increased my practice time in preparation for orientation week T / F
26. I am nervous about starting university T / F
27. I am confident in my abilities as a musician T / F
28. I consider myself to be an anxious person T / F
29. I am determined to prove myself as a musician over the next three years T / F
30. I am in good physical shape T / F
31. I am extremely self-motivated T / F

Viola

1

Section One: Student Background

1. What is your name or student number?.....
2. How old are you?.....
3. What is your sex? Male
Female
4. How tall are you?.....
5. What is your current weight?.....
6. At what age did you begin playing the viola? < 5 6-7 8-10 >10
- a) Were you originally a violinist? Yes No
- b) If yes, at what age did you switch to viola and why?.....
.....
.....
7. What size was your first violin / viola? 1/16 1/8 1/4 1/2
3/4 4/4 Inches.....
8. With how many different viola / violin teachers have you studied?
1 2 3 4 5 or more
9. Are you continuing with the same teacher this year? Yes No
10. Do you play any instruments other than the viola? Yes No
- If yes, what are the instruments?.....
11. For how long have you been serious about viola playing?
Since I was a beginner Since high school Since last year
Since late primary school The last 3 years I'm still not sure that I am
12. Did you participate in the Young Conservatorium prior to acceptance in the Bachelor of Music?
Yes No
13. Do you currently participate in any ensembles outside of QCGU? (e.g. QYS, AYO, chamber group)
Yes No
- If yes, for how many years have you been doing so?
.....
.....
14. Prior to this year, for how many hours per week do you estimate playing in ensemble rehearsals?
1-2 3-5 6-10 >10
15. Do you take part in any physical activities on a regular basis? Yes No
- If yes, please indicate which type:
Ball sports Walking / running Cycling Swimming Weights Yoga / Pilates
Other.....
.....
16. During the past year, how many hours per week do you estimate participating in these activities?
<1 hour 1-2 hours 3-4 hours >5 hours

17. Have you ever sustained any injuries from sport or other activities that you feel might influence your viola playing? Yes No

If yes, please specify.....

18. Do you have any strategies you actively use to prevent yourself experiencing discomfort or pain when playing the viola? If so, please note them down in one to two concise sentences.

.....

19. How did you learn about these strategies?

Not applicable	<input type="checkbox"/>	Internet	<input type="checkbox"/>	Reading material	<input type="checkbox"/>
Common sense	<input type="checkbox"/>	Peers	<input type="checkbox"/>	Family	<input type="checkbox"/>
From watching others	<input type="checkbox"/>	Viola teacher	<input type="checkbox"/>	Doctor	<input type="checkbox"/>
		Other health professional	<input type="checkbox"/>		

Other.....

20. Do you currently hold any jobs? Yes Please continue
 No Please skip to question 21

a) On average, how many hours per week do you work?

1-5 hours 6-10 hours 11-15 hours >15 hours

b) Do any of your jobs involve staying in fixed positions (such as at a desk or standing still) for long periods of time? Yes No

Please specify.....

c) Do any of your jobs involve hand intensive tasks such as typing, writing, cleaning, gardening or housework? Yes No

If yes, for what proportion of your working time?

0-25% 26-50% 51-75% 76-100%

Please specify.....

ALL RESPONDENTS TO ANSWER

21. How many hours per week (excluding viola playing and any job requirements) do you undertake hand intensive tasks such as typing, writing, housekeeping, gardening, craft work or similar?

<1 hour 1-5 hours 6-10 hours 11-15 hours >15 hours

a) How frequent are these breaks?
 Every 15 minutes Every half hour Every hour Every second hour
 It varies / Other (please specify).....

b) How long are these breaks?
 <1 minute 1-5 minutes 5-10 minutes 10-15 minutes >15 minutes

c) What do you do in these breaks? (Please indicate as many as relevant)

Emails / computer work	<input type="checkbox"/>	Stretch out my muscles	<input type="checkbox"/>
Chat with friends	<input type="checkbox"/>	Go over my music in my head	<input type="checkbox"/>
Go for a walk / some other type of light physical activity	<input type="checkbox"/>		<input type="checkbox"/>

Other.....

d) Why do you take these breaks? (Please indicate as many as relevant)

Not sure	<input type="checkbox"/>	My teacher told me to	<input type="checkbox"/>	I get physically tired	<input type="checkbox"/>
It's a habit	<input type="checkbox"/>	Everyone else does	<input type="checkbox"/>	My concentration lapses	<input type="checkbox"/>
				To keep myself healthy	<input type="checkbox"/>

Other.....

ALL RESPONDENTS TO ANSWER

6. In the past, have you discussed how to practice with any of your viola teachers?
 On a regular basis A few times Infrequently Not really Never

7. How would you describe your discussions?

- Not applicable
- General i.e. strategies such as metronome work or repetition
- Specific i.e. teacher told you exactly what to practice and for how long
- Both

a) On a scale of 1 to 6, how much impact did your discussions have on your method of practicing?

	1	2	3	4	5	6	
Absolutely no influence	<input type="checkbox"/>	Significant influence					

Optional comment.....

Section Three: Discomfort / pain

1. Have you ever felt any kind of discomfort or pain related to playing your viola?

Yes Please continue on
 No Please relax for a few minutes

5

2. In which body parts have you experienced discomfort / pain? Please indicate as many as relevant.

Fingers	<input type="checkbox"/>	<input type="checkbox"/>	Forearm	<input type="checkbox"/>	<input type="checkbox"/>	Neck	<input type="checkbox"/>	<input type="checkbox"/>
Hand	<input type="checkbox"/>	<input type="checkbox"/>	Elbow	<input type="checkbox"/>	<input type="checkbox"/>	Back	<input type="checkbox"/>	<input type="checkbox"/>
Wrist	<input type="checkbox"/>	<input type="checkbox"/>	Shoulder	<input type="checkbox"/>	<input type="checkbox"/>	Lower body	<input type="checkbox"/>	<input type="checkbox"/>

3. What has been your most severe experience of discomfort / pain?.....

4. Does any of your discomfort / pain recur?

a) If yes, please specify how often.....

5. How would you describe the discomfort / pain felt? Indicate as many as relevant.

Strong pain <input type="checkbox"/>	Weakness <input type="checkbox"/>	Muscle Spasm <input type="checkbox"/>	Stiffness <input type="checkbox"/>
Numbness <input type="checkbox"/>	Tightness <input type="checkbox"/>	Aching <input type="checkbox"/>	

Other.....

a) If your original instrument was the violin, did you notice any change in discomfort / pain levels after changing to the viola? Yes No

If yes, please specify.....

6. Which recurring pain / discomfort bothers you the most in terms of severity?.....

The following questions relate to the recurring discomfort / pain that bothers you the most

7. Is the discomfort / pain ongoing when you play your instrument?

Yes If yes, for how long has the most recent episode been ongoing for;
 No Please skip to question 6

< 24 hours <input type="checkbox"/>	<1 week <input type="checkbox"/>	< 3 months <input type="checkbox"/>	<12 months <input type="checkbox"/>
24-48 hours <input type="checkbox"/>	< 1 month <input type="checkbox"/>	< 6 months <input type="checkbox"/>	>12 months <input type="checkbox"/>

And generally, for how long can you play before you experience the discomfort / pain ?

It is always present <input type="checkbox"/>	After half an hour <input type="checkbox"/>	After two hours <input type="checkbox"/>
After 10 minutes <input type="checkbox"/>	After an hour <input type="checkbox"/>	After more than two hours <input type="checkbox"/>

Other (please define)

6

8. Under what circumstances did you first become aware of the discomfort / pain?

During private practice	<input type="checkbox"/>	Immediately after a rehearsal	<input type="checkbox"/>
Immediately after private practice	<input type="checkbox"/>	During a concert	<input type="checkbox"/>
During a rehearsal	<input type="checkbox"/>	Immediately after a concert	<input type="checkbox"/>

Other.....

Optional Comment.....

9. In your opinion, what is the cause of the discomfort / pain?

Didn't give it any thought	<input type="checkbox"/>	New viola	<input type="checkbox"/>	Change of repertoire	<input type="checkbox"/>
Not sure	<input type="checkbox"/>	New viola teacher	<input type="checkbox"/>	Performance conditions	<input type="checkbox"/>
Orchestral rehearsal	<input type="checkbox"/>	Change of playing technique	<input type="checkbox"/>	Increase in school work	<input type="checkbox"/>
Increase in practice time	<input type="checkbox"/>	Some aspect of posture	<input type="checkbox"/>	High level of stress	<input type="checkbox"/>
Performance exam	<input type="checkbox"/>	Learning a new skill on viola	<input type="checkbox"/>	Physical health problem	<input type="checkbox"/>
Music Camp	<input type="checkbox"/>			Unrelated trauma (e.g. sports related)	<input type="checkbox"/>

Optional comment.....

10. Do you find that the discomfort / pain in any way hinders your playing / practicing? Yes
 No

a) If yes, are specific aspects of playing affected? Some examples are given below, please add any not mentioned in the space provided.

Holding the bow	<input type="checkbox"/>	Playing on upper strings	<input type="checkbox"/>	Holding the viola	<input type="checkbox"/>
Bow control	<input type="checkbox"/>	Playing on lower strings	<input type="checkbox"/>	Vibrato	<input type="checkbox"/>
Tremolo	<input type="checkbox"/>	Pizzicato	<input type="checkbox"/>	Shifting	<input type="checkbox"/>
Volume of sound	<input type="checkbox"/>	Double stops	<input type="checkbox"/>	Rapid runs	<input type="checkbox"/>
Quality of sound	<input type="checkbox"/>	Repetitive passages	<input type="checkbox"/>	Playing in high positions	<input type="checkbox"/>

Other.....

11. Do you find that the discomfort / pain has follow on effects to any of these?

Your level of stress	<input type="checkbox"/>	Your confidence when performing	<input type="checkbox"/>
Your ability to perform tasks outside of music making	<input type="checkbox"/>	Your ability to sleep at night	<input type="checkbox"/>
Your confidence in your musical ability	<input type="checkbox"/>	Your emotional health	<input type="checkbox"/>

Other.....

12. How did you deal with the discomfort / pain when it first occurred?

Didn't think anything of it	<input type="checkbox"/>	Changed structure of practice	<input type="checkbox"/>
Nothing: Figured it was normal to feel pain	<input type="checkbox"/>	Began taking breaks in practice	<input type="checkbox"/>
Nothing: I was in a rehearsal	<input type="checkbox"/>	Discussed it with my viola teacher	<input type="checkbox"/>
Stopped playing immediately	<input type="checkbox"/>	Started doing stretches before practice	<input type="checkbox"/>
Stopped playing when pain persisted	<input type="checkbox"/>	Sought advice from medical specialist	<input type="checkbox"/>
Decreased amount of practice time	<input type="checkbox"/>	Sought advice from alternative therapist	<input type="checkbox"/>
		Immediately adapted the position of my viola / hand / bow arm	<input type="checkbox"/>

Optional comment.....

7

13. Since that time, have you changed the manner in which you deal with the discomfort / pain?

14. Have you ever talked to anyone about the cause of any of your discomfort / pain?

If you answered yes, please continue. If you answered no, please skip to section four

Yes
No

15. Please rank in order of consultation, with 1 beside the first person consulted.

Viola teacher	<input type="checkbox"/>	Physiotherapist	<input type="checkbox"/>	Practitioner of Alexander Technique	<input type="checkbox"/>
Fellow students	<input type="checkbox"/>	Chiropractor	<input type="checkbox"/>	Practitioner of Feldenkrais	<input type="checkbox"/>
Family member	<input type="checkbox"/>	Masseuse	<input type="checkbox"/>	Acupuncturist	<input type="checkbox"/>
Medical doctor	<input type="checkbox"/>	Neurologist	<input type="checkbox"/>	Other.....	<input type="checkbox"/>

Optional comment.....

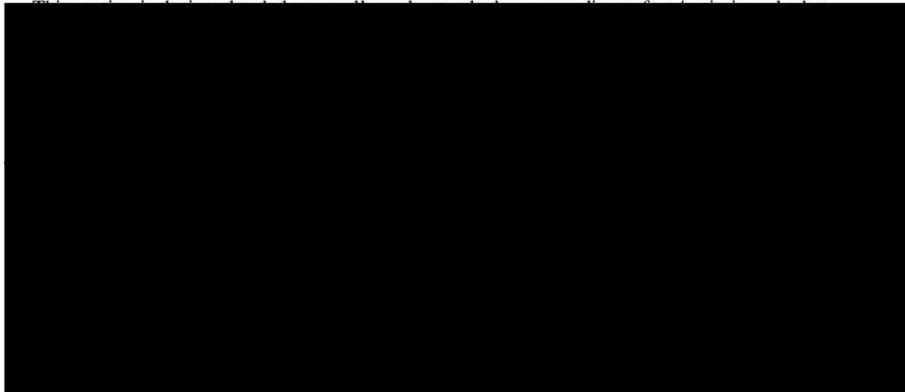
16. When did you consult these people?.....

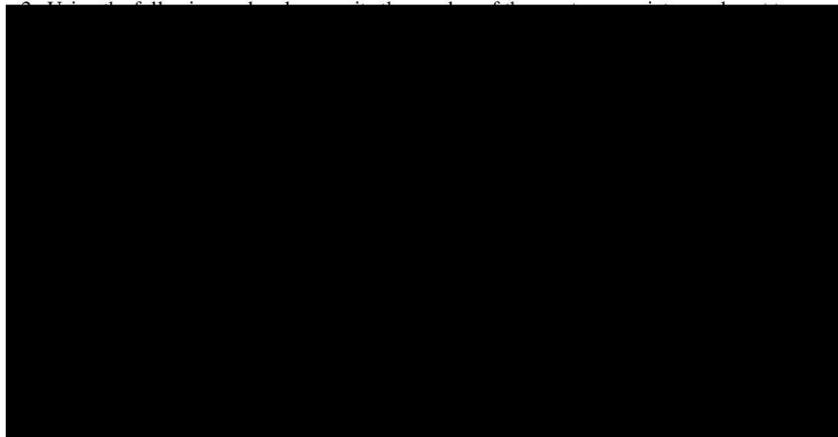
17. What, if anything did they diagnose you with?.....

18. What did they recommend that you do?.....

19. What advice was the most helpful and why?.....

Section Four: Describing your discomfort / pain





3. Are you feeling any playing-related discomfort / pain right now?

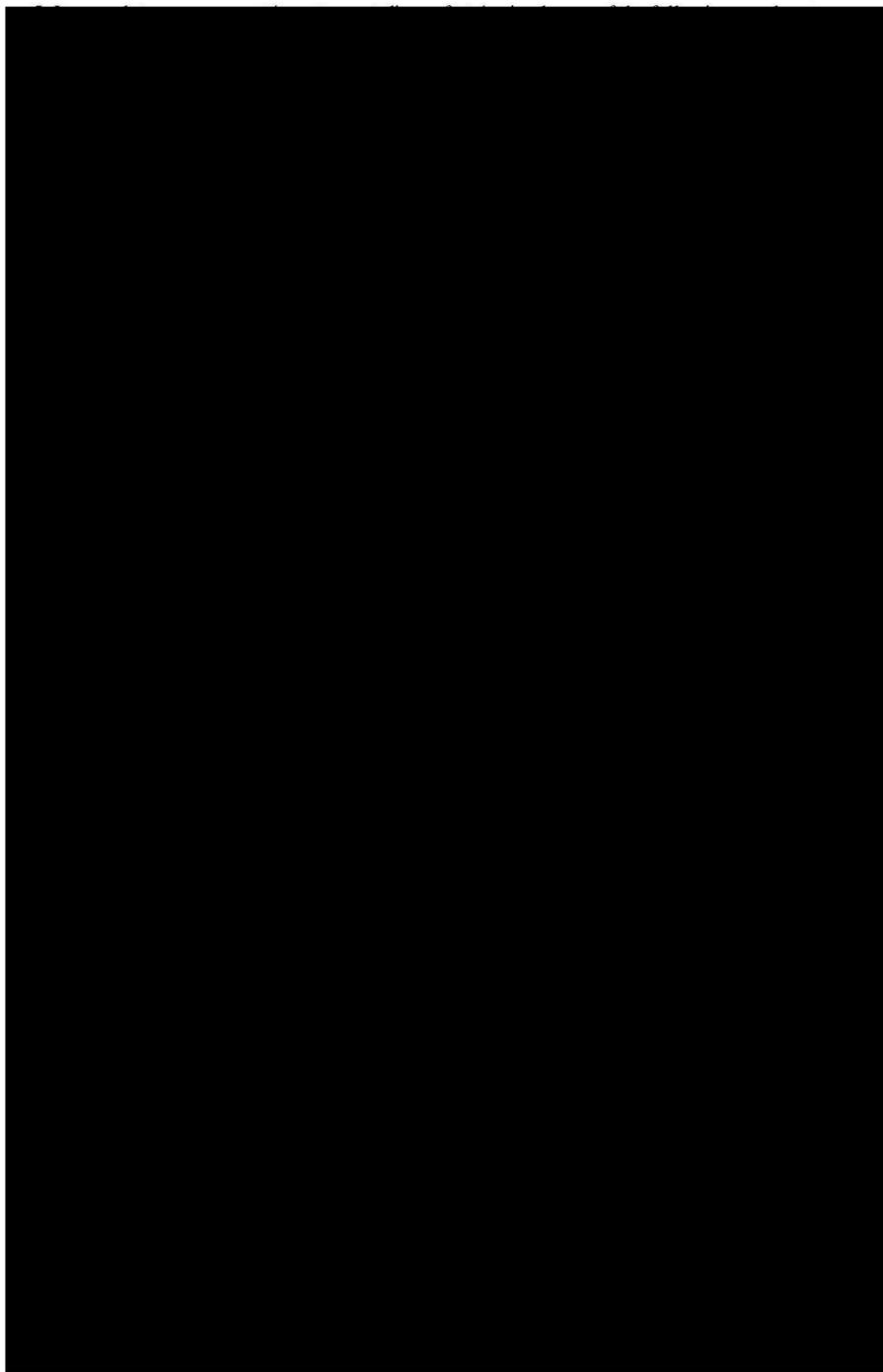
Yes Please go to question 4

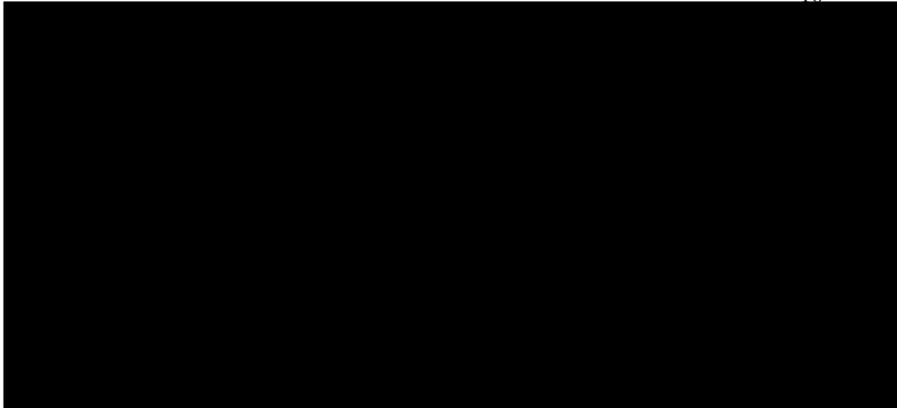
No Please now recall your most recent experience of discomfort / pain

a) When did this experience take place? Please be as precise as possible.....
.....
.....
.....

Questions 4-6 ask you to describe your discomfort / pain. If it is present right now, please describe it as it is now. If it is not present, please use your recall of your most recent experience, as referred to in question 3a.

4. Please mark on the drawings where you feel / felt the discomfort / pain.





15. Have you noticed any change in the intensity of the discomfort / pain during the past week? Yes
No

If yes, please elaborate.....
.....
.....
.....
.....

Section Five: Viola Supplement

1. Do you know the size specifics for your viola? Yes No

a) If yes, what are they?.....

2. Do you play with a shoulder rest? Yes No

a) If yes, who fitted it for you?

No-one A shop attendant A viola maker
I did My viola teacher A physiotherapist

Other (please specify).....
.....

3. Approximately what proportion of your individual practice time is spent playing whilst sitting down?

None 1-25% 26-50% 51-75% 76-100%

4. Is there any particular reason that you sit down to practice? No reason
I get tired
I only need the muscles in my upper body
It's more comfortable
I can't be bothered standing

Optional Comment.....
.....
.....

Section Six: Attitudes

Please indicate whether you believe the following statements to be either True (T) or False (F) by circling the appropriate letter

1. I am interested in learning more about the causes of musician's health problems T / F
2. I feel that I have adequate physical and psychological strength to cope with the demands of playing the viola T / F
3. This is the first I've ever heard of playing-related injuries T / F
4. I am sceptical of people who complain of pain when playing their instrument T / F
5. I don't think that I play with excessive tension T / F
6. I believe that pain is caused by faulty technique T / F
7. I am determined to do whatever it takes to play at my best T / F
8. I don't think any of my peers experience pain when they play their instruments T / F
9. The more practice I can do, the better T / F
10. I have suffered a playing-related injury T / F
11. When I can't play the viola I feel as though I am not complete T / F
12. I feel that being a musician is the most important thing in the world to me T / F
13. I feel that I am well equipped to deal with any health issues that may arise throughout my musical study T / F
14. If I experienced some type of physical problem I would feel comfortable discussing it with my teacher T / F
15. Music making is an emotional rather than physical activity T / F
16. I believe that I have control over my own wellbeing T / F
17. I like to slam my bow / slap my fingers into the string T / F
18. I tend to cram my practice in close to my lesson / rehearsal / exam T / F
19. I am a positive person T / F
20. I believe that physical discomfort is a part of playing a musical instrument T / F
21. The last year has been particularly stressful for me T / F
22. I am a hardworking person T / F
23. I have greatly increased my practice time in preparation for orientation week T / F
24. I am nervous about starting university T / F
25. I am confident in my abilities as a musician T / F
26. I consider myself to be an anxious person T / F

Violin

1

Section One: Student Background

1. What is your name or student number?.....
2. How old are you?..... 3. What is your sex? Male
Female
4. How tall are you?..... 5. What is your current weight?.....
6. At what age did you begin playing the violin? < 5 6-7 8-10 >10
7. What size was your first violin? 1/16 1/8 1/4 1/2 3/4 4/4
8. With how many different violin teachers have you studied?
1 2 3 4 5 or more
9. Are you continuing with the same violin teacher this year? Yes No
10. Do you play any instruments other than the violin? Yes No
- If yes, what are the instruments?.....
11. For how long have you been serious about violin playing?
Since I was a beginner Since high school Since last year
Since late primary school The last 3 years I'm still not sure that I am
12. Did you participate in the Young Conservatorium prior to acceptance in the Bachelor of Music?
Yes No
13. Do you currently participate in any ensembles outside of QCGU? (e.g. QYS, AYO, chamber group)
Yes No
- If yes, for how many years have you been doing so?
14. Prior to this year, for how many hours per week do you estimate playing in ensemble rehearsals?
1-2 3-5 6-10 >10
15. Do you take part in any physical activities on a regular basis? Yes No
- If yes, please indicate which type:
Ball sports Walking / running Cycling Swimming Weights Yoga / Pilates
Other.....
16. During the past year, how many hours per week do you estimate participating in these activities?
<1 hour 1-2 hours 3-4 hours >5 hours

17. Have you ever sustained any injuries from sport or other activities that you feel might influence your violin playing? Yes No

If yes, please specify.....

18. Do you have any strategies you actively use to prevent yourself experiencing discomfort or pain when playing the violin? If so, please note them down in one to two concise sentences.

.....

19. How did you learn about these strategies?

Not applicable	<input type="checkbox"/>	Internet	<input type="checkbox"/>	Reading material	<input type="checkbox"/>
Common sense	<input type="checkbox"/>	Peers	<input type="checkbox"/>	Family	<input type="checkbox"/>
From watching others	<input type="checkbox"/>	Violin teacher	<input type="checkbox"/>	Doctor	<input type="checkbox"/>
		Other health professional	<input type="checkbox"/>		

Other.....

20. Do you currently hold any jobs? Yes Please continue
 No Please skip to question 21

a) On average, how many hours per week do you work?

1-5 hours 6-10 hours 11-15 hours >15 hours

b) Do any of your jobs involve staying in fixed positions (such as at a desk or standing still) for long periods of time? Yes No

Please specify.....

c) Do any of your jobs involve hand intensive tasks such as typing, writing, cleaning, gardening or housework?

If yes, for approximately what proportion of your working time? Yes No

0-25% 26-50% 51-75% 76-100%

Please specify.....

ALL RESPONDENTS TO ANSWER

21. How many hours per week (excluding violin playing and any job requirements) do you undertake hand intensive tasks such as typing, writing, housekeeping, gardening, craft work or similar?

<1 hour 1-5 hours 6-10 hours 11-15 hours >15 hours

22. At the completion of your music program, where do you see yourself?

- | | | | |
|-----------------------------------|--------------------------|---------------------------------------|--------------------------|
| Haven't given it much thought yet | <input type="checkbox"/> | Teaching violin privately | <input type="checkbox"/> |
| Performing as a soloist | <input type="checkbox"/> | Teaching for the education department | <input type="checkbox"/> |
| Performing in an orchestra | <input type="checkbox"/> | Performing in a chamber ensemble | <input type="checkbox"/> |
| | | Studying overseas | <input type="checkbox"/> |

Other (please specify)

.....

.....

Section Two: Practice

1. During the past year, on average;

a) How much individual practice per day do you estimate undertaking? (Please be honest, this information is confidential)

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 >3

2. During the past two weeks, on average;

a) How much individual practice per day do you estimate undertaking?

- <1 hour 1-2 hours 2-3 hours >3 hours

b) How many days per week did you not practice at all?

- 0 1 2 3 >3

3. Do you have a specific routine that you always follow when you practice?

- Yes No

Please elaborate

.....

.....

4. Do you start your practice sessions with a warm-up of some kind?

- Yes Please continue on
No Please skip to question 5

a) What does this warm-up involve?

- Slow playing Scales / technical exercises / studies Physical warm-up away from instrument
Other (e.g. stretches)
-
-

b) Is there any particular reason why you start your practice with this type of warm-up?

- | | | | |
|---|--------------------------|---------------------------------------|--------------------------|
| Not really | <input type="checkbox"/> | Everyone else does it like this | <input type="checkbox"/> |
| It's a habit, I've always done it like this | <input type="checkbox"/> | It makes sense from what I've learned | <input type="checkbox"/> |
| My teacher told me to | <input type="checkbox"/> | To keep myself healthy | <input type="checkbox"/> |

Other

.....

.....

4

5. Do you take breaks (other than for adjustments to shoulder rest, stand etc.) during your practice sessions?

a) How frequent are these breaks?

Every 15 minutes Every half hour Every hour Every second hour

It varies / Other (please specify).....

b) How long are these breaks?

<1 minute 1-5 minutes 5-10 minutes 10-15 minutes >15 minutes

c) What do you do in these breaks? (Please indicate as many as relevant)

Emails / computer work Stretch out my muscles
 Chat with friends Go over my music in my head
 Go for a walk / some other type of light physical activity

Other

d) Why do you take these breaks? (Please indicate as many as relevant)

Not sure My teacher told me to I get physically tired
 It's a habit Everyone else does My concentration lapses
 To keep myself healthy

Other.....

ALL RESPONDENTS TO ANSWER

6. In the past, have you discussed how to practice with any of your violin teachers?

On a regular basis A few times Infrequently Not really Never

7. How would you describe your discussions?

- Not applicable
- General i.e. strategies such as metronome work or repetition
- Specific i.e. teacher told you exactly what to practice and for how long
- Both

a) On a scale of 1 to 6, how much impact did your discussions have on your method of practicing?

1 2 3 4 5 6

Absolutely no influence Significant influence

Optional comment.....

Section Three: Discomfort / pain

1. Have you ever felt any kind of discomfort or pain related to playing your violin?

Yes Please continue on
 No Please relax for a few minutes

2. In which body parts have you experienced discomfort / pain? Please indicate as many as relevant.

<table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td>L</td><td>R</td></tr> <tr><td>Fingers</td><td></td><td></td></tr> <tr><td>Hand</td><td></td><td></td></tr> <tr><td>Wrist</td><td></td><td></td></tr> </table>		L	R	Fingers			Hand			Wrist			<table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td>L</td><td>R</td></tr> <tr><td>Forearm</td><td></td><td></td></tr> <tr><td>Elbow</td><td></td><td></td></tr> <tr><td>Shoulder</td><td></td><td></td></tr> </table>		L	R	Forearm			Elbow			Shoulder			<table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td>L</td><td>R</td></tr> <tr><td>Neck</td><td></td><td></td></tr> <tr><td>Back</td><td></td><td></td></tr> <tr><td>Lower body</td><td></td><td></td></tr> </table>		L	R	Neck			Back			Lower body		
	L	R																																				
Fingers																																						
Hand																																						
Wrist																																						
	L	R																																				
Forearm																																						
Elbow																																						
Shoulder																																						
	L	R																																				
Neck																																						
Back																																						
Lower body																																						

3. What has been your most severe experience of discomfort / pain?.....

4. Does any of your discomfort / pain recur?

a) If yes, please specify how often.....

5. How would you describe the discomfort / pain felt? Indicate as many as relevant.

Strong pain <input type="checkbox"/>	Weakness <input type="checkbox"/>	Muscle Spasm <input type="checkbox"/>	Stiffness <input type="checkbox"/>
Numbness <input type="checkbox"/>	Tightness <input type="checkbox"/>	Aching <input type="checkbox"/>	

Other.....
 6. Which recurring pain / discomfort bothers you the most in terms of severity?.....

The following questions relate to the recurring discomfort / pain that bothers you the most

7. Is the discomfort / pain ongoing when you play your instrument?

Yes If yes, for how long has the most recent episode been ongoing for;
 No Please skip to question 7

< 24 hours <input type="checkbox"/>	< 1 week <input type="checkbox"/>	< 3 months <input type="checkbox"/>	< 12 months <input type="checkbox"/>
24-48 hours <input type="checkbox"/>	< 1 month <input type="checkbox"/>	< 6 months <input type="checkbox"/>	> 12 months <input type="checkbox"/>

And generally, for how long can you play before you experience the discomfort / pain ?

It is always present <input type="checkbox"/>	After half an hour <input type="checkbox"/>	After two hours <input type="checkbox"/>
After 10 minutes <input type="checkbox"/>	After an hour <input type="checkbox"/>	After more than two hours <input type="checkbox"/>

Other (please define)

8. Under what circumstances did you first become aware of the discomfort / pain?

During private practice <input type="checkbox"/>	Immediately after a rehearsal <input type="checkbox"/>
Immediately after private practice <input type="checkbox"/>	During a concert <input type="checkbox"/>
During a rehearsal <input type="checkbox"/>	Immediately after a concert <input type="checkbox"/>

Other.....

Optional Comment.....

6

9. In your opinion, what is the cause of the discomfort / pain?

Didn't give it any thought	<input type="checkbox"/>	New violin	<input type="checkbox"/>	Change of repertoire	<input type="checkbox"/>
Not sure	<input type="checkbox"/>	New violin teacher	<input type="checkbox"/>	Performance conditions	<input type="checkbox"/>
Orchestral rehearsal	<input type="checkbox"/>	Change of playing technique	<input type="checkbox"/>	Increase in school work	<input type="checkbox"/>
Increase in practice time	<input type="checkbox"/>	Some aspect of posture	<input type="checkbox"/>	High level of stress	<input type="checkbox"/>
Performance exam	<input type="checkbox"/>	Learning a new skill on violin	<input type="checkbox"/>	Physical health problem	<input type="checkbox"/>
Music Camp	<input type="checkbox"/>			Unrelated trauma (e.g. sports related)	<input type="checkbox"/>

Optional comment.....

10. Do you find that the discomfort / pain in any way hinders your playing / practicing?

Yes
 No

a) If yes, are specific aspects of playing affected? Some examples are given below, please add any not mentioned in the space provided.

Holding the bow	<input type="checkbox"/>	Playing on upper strings	<input type="checkbox"/>	Holding the violin	<input type="checkbox"/>
Bow control	<input type="checkbox"/>	Playing on lower strings	<input type="checkbox"/>	Vibrato	<input type="checkbox"/>
Tremolo	<input type="checkbox"/>	Pizzicato	<input type="checkbox"/>	Shifting	<input type="checkbox"/>
Volume of sound	<input type="checkbox"/>	Double stops	<input type="checkbox"/>	Rapid runs	<input type="checkbox"/>
Quality of sound	<input type="checkbox"/>	Repetitive passages	<input type="checkbox"/>	Playing in high positions	<input type="checkbox"/>
Other.....				Intonation	<input type="checkbox"/>

.....

11. Do you find that the discomfort / pain has follow on effects to any of these?

Your level of stress	<input type="checkbox"/>	Your confidence when performing	<input type="checkbox"/>
Your ability to perform tasks outside of music making	<input type="checkbox"/>	Your ability to sleep at night	<input type="checkbox"/>
Your confidence in your musical ability	<input type="checkbox"/>	Your emotional health	<input type="checkbox"/>

Other.....

12. How did you deal with the discomfort / pain when it first occurred?

Didn't think anything of it	<input type="checkbox"/>	Changed structure of practice	<input type="checkbox"/>
Nothing: Figured it was normal to feel pain	<input type="checkbox"/>	Began taking breaks in practice	<input type="checkbox"/>
Nothing: I was in a rehearsal	<input type="checkbox"/>	Discussed it with my violin teacher	<input type="checkbox"/>
Stopped playing immediately	<input type="checkbox"/>	Started doing stretches before practice	<input type="checkbox"/>
Stopped playing when pain persisted	<input type="checkbox"/>	Sought advice from medical specialist	<input type="checkbox"/>
Decreased amount of practice time	<input type="checkbox"/>	Sought advice from alternative therapist	<input type="checkbox"/>
		Immediately adapted the position of my violin / hand / bow arm	<input type="checkbox"/>

Optional comment.....

13. Since that time, have you changed the manner in which you deal with the discomfort / pain?.....

14. Have you ever talked to anyone about the cause of any of your discomfort / pain?

Yes
 No

If you answered yes, please continue. If you answered no, please skip to section four

15. Please rank in order of consultation, with 1 beside the first person consulted.

Violin teacher	<input type="checkbox"/>	Physiotherapist	<input type="checkbox"/>	Practitioner of Alexander Technique	<input type="checkbox"/>
Fellow students	<input type="checkbox"/>	Chiropractor	<input type="checkbox"/>	Practitioner of Feldenkrais	<input type="checkbox"/>
Family member	<input type="checkbox"/>	Masseuse	<input type="checkbox"/>	Acupuncturist	<input type="checkbox"/>
Medical doctor	<input type="checkbox"/>	Neurologist	<input type="checkbox"/>	Other.....	<input type="checkbox"/>

Optional comment.....
.....
.....

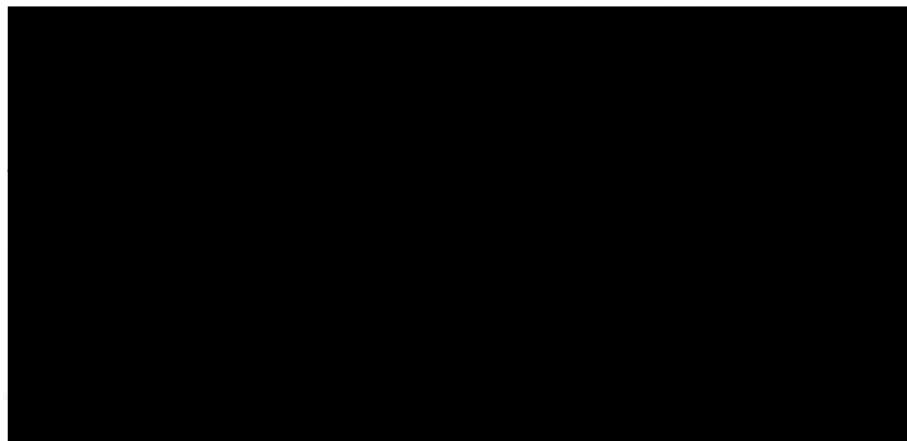
16. When did you consult these people?.....
.....
.....

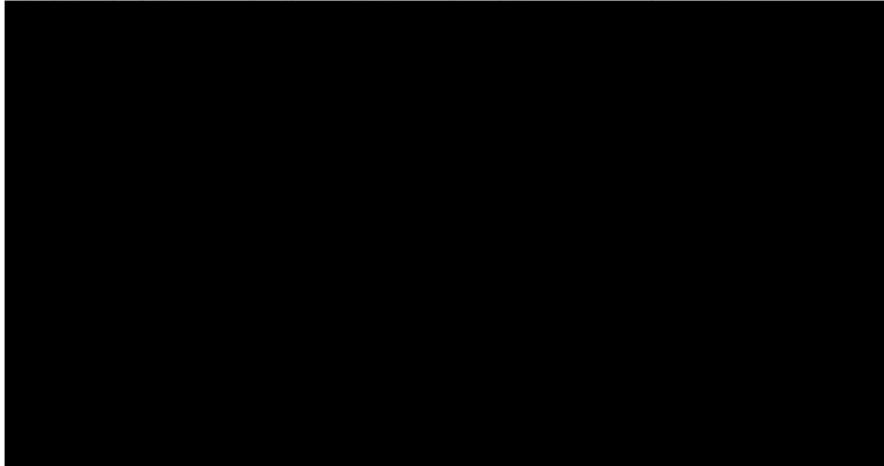
17. What, if anything did they diagnose you with?.....
.....
.....

18. What did they recommend that you do?.....
.....
.....

19. What advice was the most helpful and why?.....
.....
.....

Section Four: Describing your discomfort / pain





3. Are you feeling any playing-related discomfort / pain right now?

Yes Please go to question 4

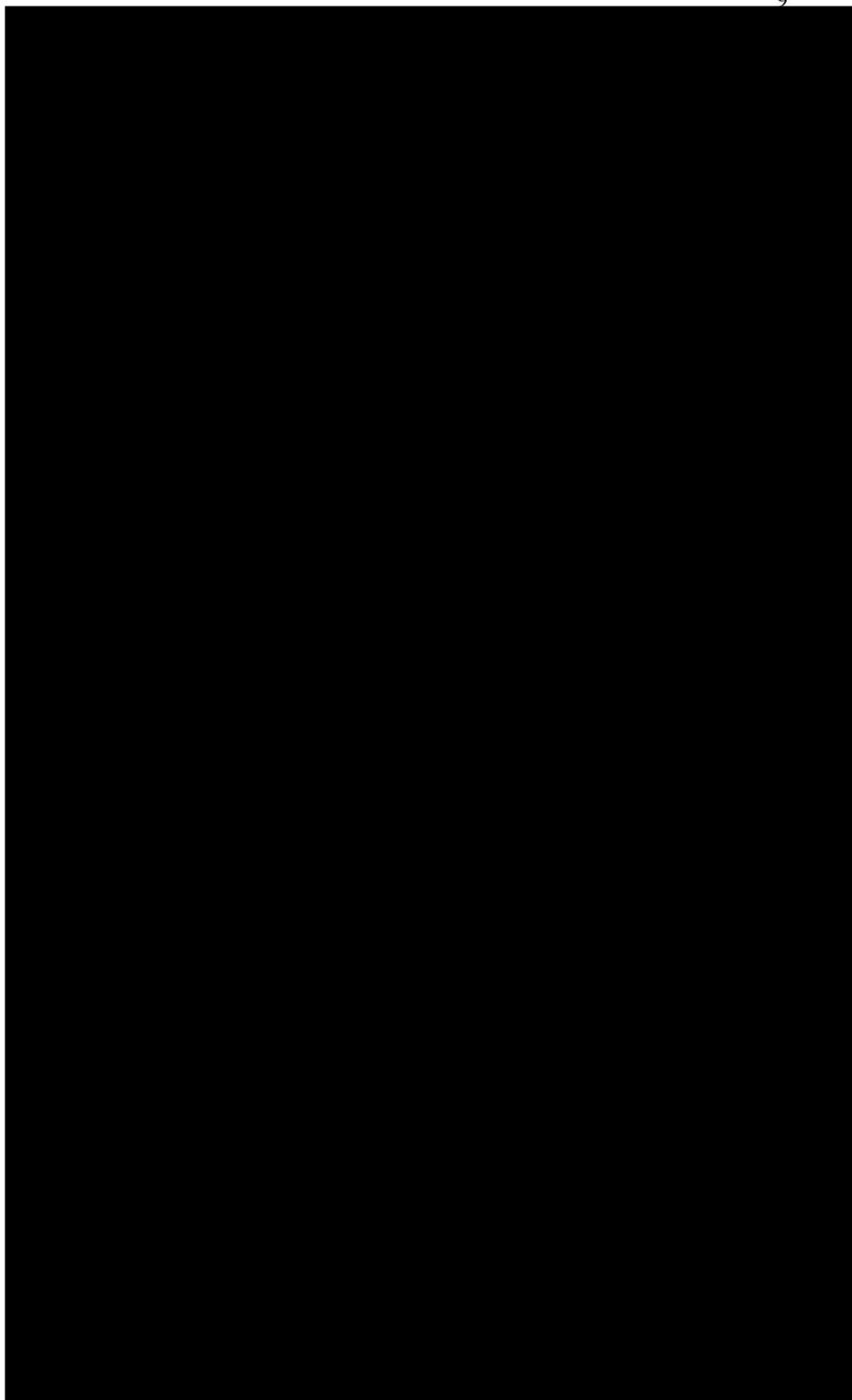
No Please now recall your most recent experience of discomfort / pain

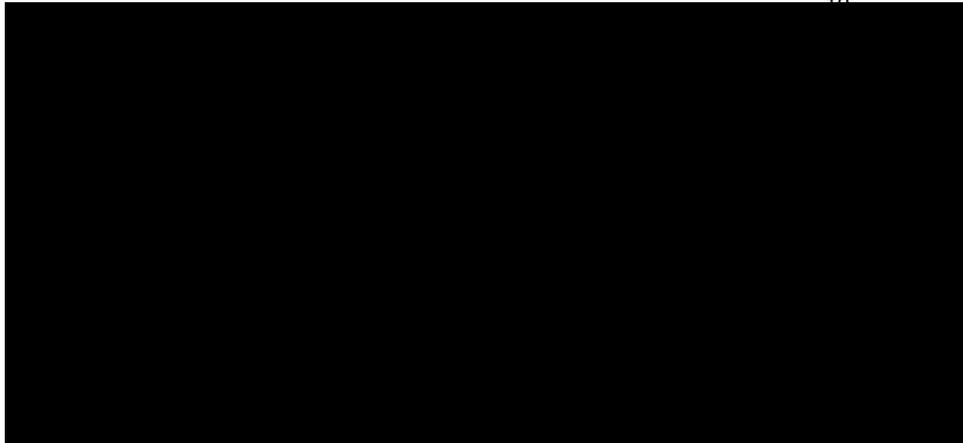
a) When did this experience take place? Please be as precise as possible

.....
.....
.....
.....
.....

Questions 4-6 ask you to describe your discomfort / pain. If it is present right now, please describe it as it is now. If it is not present, please use your recall of your most recent experience with it, as referred to in question 3a.

4. Please mark on the drawings where you feel / felt the discomfort / pain.





15. Have you noticed any change in the intensity of the discomfort / pain during Orientation Week? Yes
 No

If yes, please elaborate.....

Section Five: Violin Supplement

1. Do you play with a shoulder rest? Yes No

a) If yes, who fitted it for you?

No-one A shop attendant A violin maker
 I did My violin teacher A physiotherapist
 Other (please specify)

2. Approximately what proportion of your individual practice time is spent playing whilst sitting down?

None 1-25% 26-50% 51-75% 76-100%

3. Is there any particular reason that you sit down to practice? No reason
 I get tired
 I only need the muscles in my upper body
 It's more comfortable
 I can't be bothered standing

Optional Comment.....

Section Six: Attitudes

Please indicate whether you believe the following statements to be either True (T) or False (F) by circling the appropriate letter

1. I am interested in learning more about the causes of musician's health problems T / F
2. I feel that I have adequate physical and psychological strength to cope with the demands of playing the violin T / F
3. This is the first I've ever heard of playing-related injuries T / F
4. I am sceptical of people who complain of pain when playing their instrument T / F
5. I don't think that I play with excessive tension T / F
6. I believe that pain is caused by faulty technique T / F
7. I am determined to do whatever it takes to play at my best T / F
8. I don't think any of my peers experience pain when they play their instruments T / F
9. The more practice I can do, the better T / F
10. I have suffered a playing-related injury T / F
11. When I can't play the violin I feel as though I am not complete T / F
12. I feel that being a musician is the most important thing in the world to me T / F
13. I feel that I am well equipped to deal with any health issues that may arise throughout my musical study T / F
14. If I experienced some type of physical problem I would feel comfortable discussing it with my teacher T / F
15. Music making is an emotional rather than physical activity T / F
16. I believe that I have control over my own wellbeing T / F
17. I like to slam my bow / slap my fingers into the strings T / F
18. I tend to cram my practice in close to my lesson / rehearsal / exam T / F
19. I am a positive person T / F
20. I believe that physical discomfort is a part of playing a musical instrument T / F
21. The last year has been particularly stressful for me T / F
22. I am a hardworking person T / F
23. I have greatly increased my practice time in preparation for orientation week T / F
24. I am nervous about starting university T / F
25. I am confident in my abilities as a musician T / F
26. I consider myself to be an anxious person T / F

Appendix F: Correspondence Templates

Sample Email: Ongoing Pain Questionnaire (2007)

Dear [student],

You may remember that in Orientation Week 2007 you filled in a questionnaire regarding your experiences with playing-related discomfort / pain. Thank you!!

As I mentioned then, the purpose of my research is to find out how your discomfort / pain changes as you progress through your degree. This is why I will be contacting you at the beginning and end of each study year.

Unlike with the Initial Questionnaire, all that is required is five minutes of your time. If you could find it in the kindness of your heart to do this it would be a great help because without you my project doesn't really exist!

Every student who participates will go into the running to win one of three \$10 Red Note Café vouchers.

I will be attending workshops, hanging around practice room and sending emails in the hope of catching you. If you have a spare five minutes in your timetable, whether whilst waiting for a class or lesson, I would be only too happy to use it up. There are several ways you can contact me:

Ph: 51 41 11 11 11



Thanks for your time. I look forward to hearing from you soon.

Sincerely,
Megan Waters
8/10/2007

Sample Email: Ongoing Pain Questionnaire/interview (2011)

Dear [student],

I hope you are well.

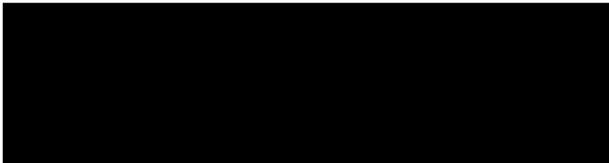
You may remember that, over the past few years, you have filled in questionnaires regarding your experiences with playing-related discomfort / pain as part of my research project. Thank you for doing this!!

As I mentioned then, the purpose of my research is to find out how your discomfort / pain changes as you progress through your degree. This is why I am contacting you again.

During the next few weeks I hope to catch up with every fourth year string student. Please don't be alarmed! Again all that is required is about 10 minutes of your time. During this time we will have a general chat about your experiences and fill in a brief questionnaire. If you could find it in the kindness of your heart to do this it would be a great help because without you all my project doesn't really exist.

As you all know I have been having difficulties getting around and so won't be in the building as often this year. I will be in on May 3 and 10, so if you are able to see me on either of these days it would be greatly appreciated. If you have a spare few minutes in your timetable, whether whilst waiting for a class or lesson, I am only too happy to use it up. If this is not possible, we can make an appointment for an alternate time and day.

There are several ways you can contact me:



Thanks for your time. I look forward to seeing/hearing from you soon.

Sincerely,
Megan Waters
April, 2011

Template of Initial Letter for Major Study Teachers (2006)

Perceptions of playing-related discomfort / pain among tertiary string students: A longitudinal study (QCM/23/06/HREC)

Dr. Stephen Emmerson (principle supervisor)
Queensland Conservatorium, South Bank

Dr. Scott Harrison (associate supervisor)
Music Education, Mt. Gravatt

Megan Waters (student researcher)
Queensland Conservatorium, South Bank

Dear [teacher],

My name is Megan Waters and I am a PhD student at the Queensland Conservatorium of Music. I completed my Bachelor of Music in Performance and Pedagogy with Honours (violin) in 2005.

Along with my supervisors Stephen Emmerson and Scott Harrison, I am investigating playing-related discomfort among string players. I am not a qualified medical professional so I am not able to diagnose or treat any such discomfort / pain. However, as a musician and researcher, I am able to study the environment in which it may develop.

During my research I will be investigating the wide variety of influences that students are exposed to in their musical training. These will include peers, teachers, the institution and musical culture in general.

Let me explain a little about how I plan to do this. As I am a part-time student doing the degree over 6-8 years, I am in the unique position where I can study one intake of string students through their degree, and still have time to write up my thesis. I am planning to follow the first-year string students starting in 2007.

The study will begin in Orientation Week of that year. With the help of Teacher A, a portion of one Chamber Music Rehearsal has been reserved for students to fill out a comprehensive survey. The survey will ask them about their general and musical backgrounds, practice, experiences with and attitudes toward playing-related discomfort / pain. One section of this survey will contain several established self-assessment tools to measure the type and severity of any pain a student may feel. These tools will then be reused at various times throughout the degree, to establish under what circumstances a student may experience discomfort / pain. The survey will take approximately 30 minutes to complete.

Depending on what I discover through this survey, the study could go in several directions. Please be reassured that I am not in any way looking to criticise any teacher or teaching method. No teacher will be identified in the questionnaire. What I am

interested in is the whole picture: researchers now understand the physiological causes of injuries, but they don't understand the complex environment in which these physical circumstances arise.

Where the study goes depends very much on two things. The first I've already mentioned above: the results of the first survey. The second is how many students participate. The study is voluntary but if we are to get a better understanding of the issues it is really important that as many students as possible take part.

In later years I will be approaching the students with follow-up surveys. These shorter surveys will aim to find out about any changes in personal circumstances. I also anticipate asking students to participate in interviews. This will be important if I plan to get the whole picture. This will not occur until the students are several semesters into their degree.

There have been numerous studies of musician injuries in the past 25 years yet there have been no published longitudinal studies. There have also been very few case studies. The results of a study such as the one planned here could have a significant impact on the current literature and our understanding of the issues.

As I mentioned before, it is important that I get as many students as possible to participate. That's why I think it is important that the teachers at the conservatorium know a little about the project and what it involves. If you are interested in knowing more about the research project please don't hesitate to contact either my supervisors or myself. Our contact details are at the top of this letter.

Thank you for your time,

Sincerely,

Megan Waters

Dr. Stephen Emmerson

Dr. Scott Harrison

Template of Letter for Major Study Teachers RE Ongoing Pain Questionnaire

Dear [teacher],

I hope you are well. You may recall that earlier this year I wrote to you regarding my PhD project. Just to refresh your mind, I am researching the incidence of playing-related pain among string students. My project involves following the first-year string students from this year and next year as they undertake a music degree.

My first round of data collection took place in Orientation Week 2007. As planned, I will be collecting a second lot of data in the next few weeks.

My challenge now is to get as many of the students as possible to stay in the project. Participation involves completing a questionnaire approximately 5 minutes in length. Each participant will go into the draw to win one of three \$10 vouchers for the Red Note Café.

I have already put up notices around the conservatorium alerting the students that I will be approaching them in the coming weeks. If you would be so kind as to encourage your first-year students to participate it would be a great help.

If you have any questions about my research project please contact me. My email is [REDACTED] Alternately, you are welcome to contact my principle supervisor Stephen Emmerson at [REDACTED]

Please feel free to pass on this letter / email along with my contact details to any of your students.

Thank you for your time.

Sincerely,
Megan Waters
5/10/2007

Follow-Up Letter: Withdrawals

Dear [student],

I hope you are well. You probably don't remember me as we only met briefly. I am a PhD student at the Conservatorium of Music, Griffith University. In Orientation Week 2007 you filled in a questionnaire as part of my research into playing-related discomfort / pain among string students. Thank you!

During the past few weeks I have been collecting data again and have discovered that you are no longer enrolled at the institution. I realise that there are many possible reasons why this may be. I am contacting you in the hope of finding out specifically whether your experiences of playing-related discomfort / pain factored into your decision.

In the event that they did, would you be willing to talk to me about your experiences? In recent years it has become increasingly evident that playing-related pain is a serious issue for many musicians. Any information that you could give us would really help us to gain a better understanding.

We could do this any number of ways. I could email you questions, arrange a time to ring and speak with you, or meet with you at a time and place of your choosing. All information that you give me is strictly confidential.

In order to protect your privacy, I am not allowed to contact you directly without your permission. However, I can give you my contact details. You can contact me directly by emailing [REDACTED]

If you could let me know either way I would be really grateful. I look forward to hearing from you soon and hope you enjoy the holiday season.

Sincerely,

Megan Waters

Appendix G: Poster Templates

Attention: First year string students

You may recall filling in a questionnaire about your experiences of playing-related discomfort / pain in Orientation Week 2007.

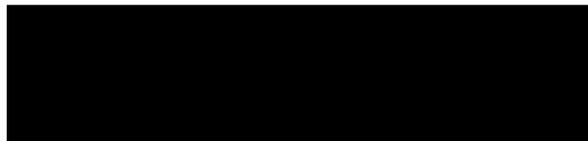
**Your help is needed
again!**

Over the next month I am hoping catch up with you again. **Please do not be alarmed!** I literally need only **five minutes** of your time.

I will be staking out workshops, email boxes, practice corridors and teacher rooms in the hope of snaring every single one of you because

**YOU ARE ALL VITAL TO MY RESEARCH
PROJECT!!!!**

I look forward to seeing you soon



Attention: Third and fourth year string students

You may recall talking to me about your experiences of playing-related discomfort / pain as part of an ongoing PhD research project.

Over the next three weeks I am hoping to catch up with you again.

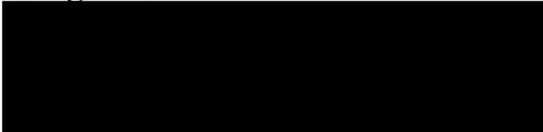
Please don't be alarmed! As before, I need only five to ten minutes of your time.

I will be staking out workshops, email boxes, practice corridors and teacher rooms in the hope of snaring every single one of you because

YOU ARE ALL VITAL TO MY RESEARCH PROJECT!!!

**The fun begins in workshop Sept 21, 2010.
I look forward to seeing you soon!**

Megan Waters



Appendix H: Ongoing Pain Questionnaires and Interviews

Ongoing Pain Questionnaire (2007)

1

Ongoing Pain Questionnaire

Name:.....

1. Since starting university, how much individual practice do you estimate undertaking each day?

<1 hour 1-2 hours 2-3 hours >3 hours

a) On average, how many days per week did you not practice at all?

0 1 2 3 >3

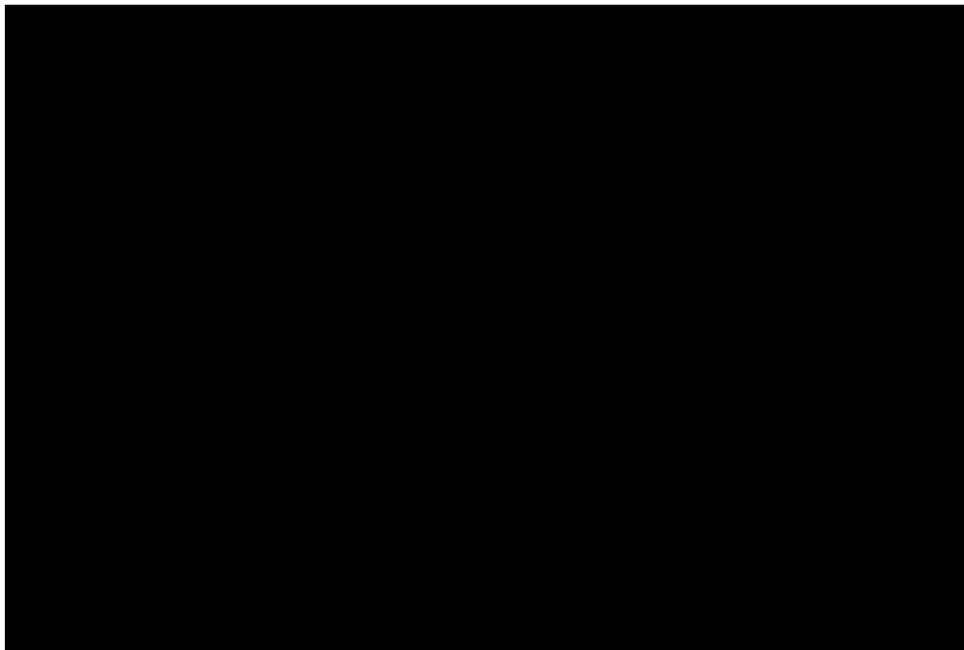
b) To what extent does your daily practice vary? (Please describe)

.....
.....
.....
.....

2. Have you experienced any playing-related discomfort / pain since Orientation Week?

Yes
No

You are not required to fill out any more of this questionnaire. Thank you.



5. Are you feeling any playing-related discomfort / pain right now?

Yes Please go to question 5

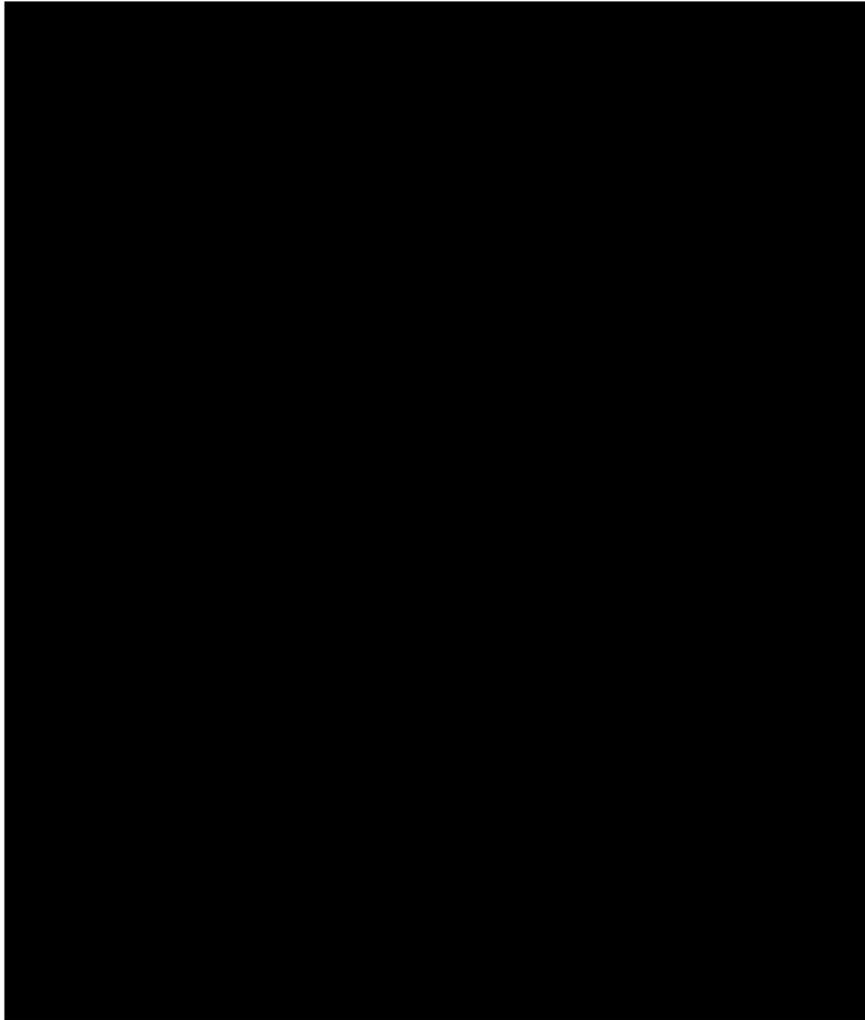
No **Please now recall your most recent experience of any playing-related discomfort / pain**

a) When did this experience take place? Please be as precise as possible

.....
.....
.....
.....
.....
.....
.....
.....

Questions 6 and 7 ask you to describe your playing-related discomfort / pain. If it is present right now, please describe it as it is now. If it is not present, please use your recall of your most recent experience, as referred to in question 5a.

6. Please mark on the drawings where you feel / felt the discomfort / pain.



9. About how many days, if any, since Orientation Week 2007, have you been kept from your normal practicing routine (or had to alter it) because of the discomfort / pain?

.....
.....
.....
.....
.....

Thank you for your ongoing participation in this research project. Your opinions and experiences matter!

Ongoing Pain Questionnaire (2008)

1

Ongoing Pain Questionnaire

Name:.....

1. Since you last completed this survey:

a) How much individual practice do you estimate undertaking each day?

<1 hour 1-2 hours 2-3 hours >3 hours

b) On average, how many days per week did you not practice at all?

0 1 2 3 >3

c) To what extent has your daily practice varied?

.....

d) What has been your average total playing time per day (including ensembles, gigs, teaching etc)?

<2 hours 2-4 hours 4-6 hours >6 hours

e) To what extent has your total playing time varied?

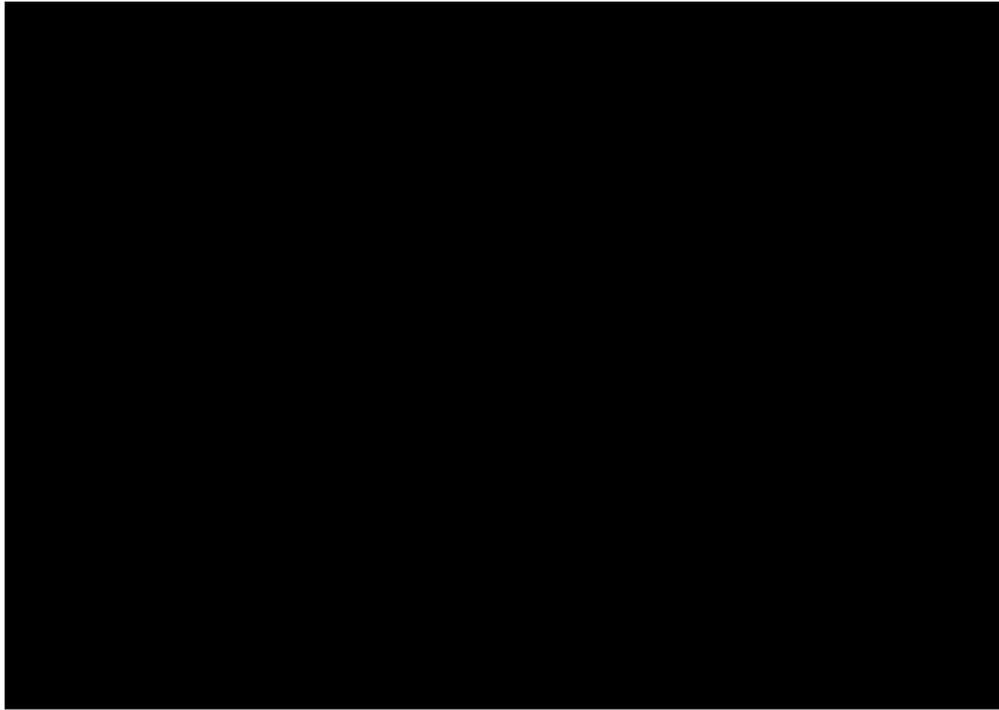
.....

2

2. Have you experienced any playing-related discomfort / pain since you last completed this survey?

Yes
No

You are not required to fill out any more of this questionnaire.
Thank you.



5. How much do your experiences of playing-related discomfort/pain concern you?

Not at all

1	2	3	4	5
---	---	---	---	---

 A great deal

.....
.....
.....
.....
.....

6. Are you feeling any playing-related discomfort / pain right now?

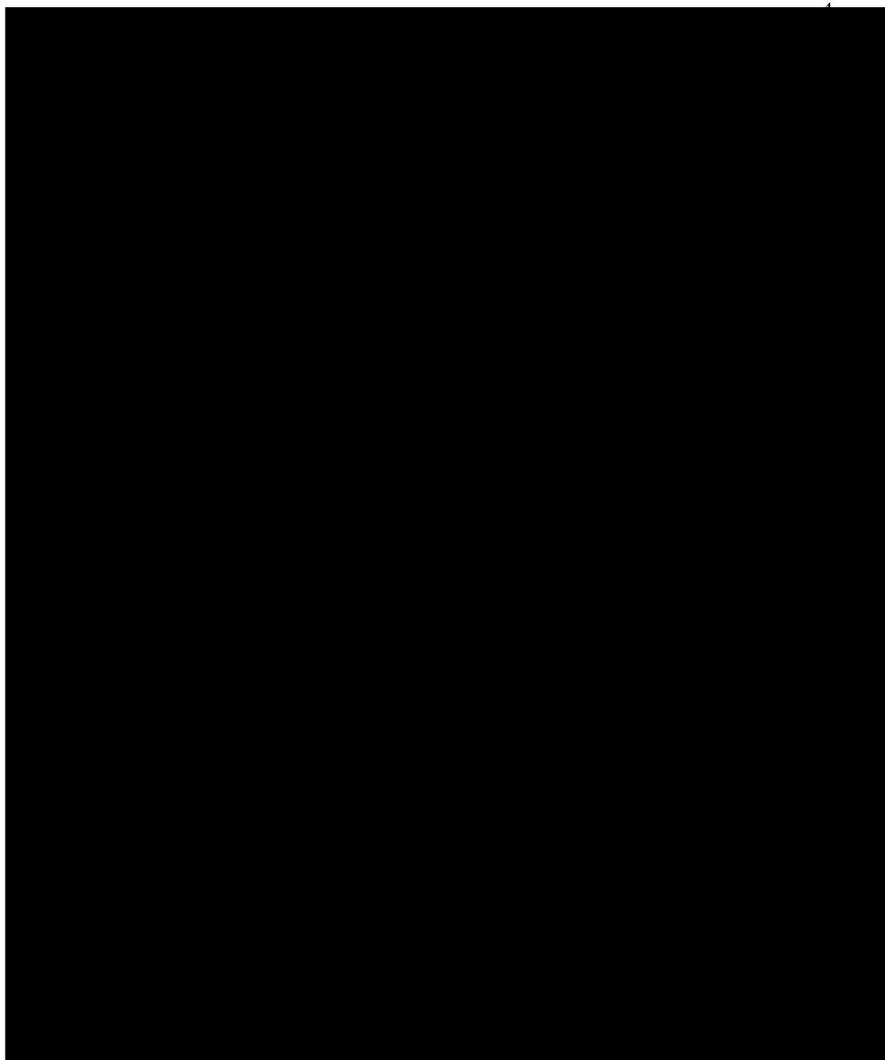
- Yes Please go to question 7
- No **Please now recall your most recent experience of any playing-related discomfort / pain**

a) **When did this experience take place? Please be as precise as possible**

.....
.....
.....
.....
.....
.....
.....

Questions 7-9 ask you to describe your playing-related discomfort / pain. If it is present right now, please describe it as it is now. If it is not present, please use your recall of your most recent experience, as referred to in question 6a.

7. Please mark on the drawings where you feel / felt the discomfort / pain.



10. Since you last answered this survey, approximately how many days, if any, have you been kept from your normal practicing routine (or had to alter it) due to playing-related discomfort / pain?

.....
.....
.....
.....

**Thank you for your ongoing participation in this research project.
Your opinions and experiences matter!**

Ongoing Pain Questionnaire (2009-2011)

1

Ongoing Pain Questionnaire

Name:.....

1. Since you last completed this survey:

a) How much individual practice do you estimate undertaking each day?

<1 hour 1-2 hours 2-3 hours >3 hours

b) On average, how many days per week did you not practice at all?

0 1 2 3 >3

c) To what extent has your daily practice varied?

.....
.....
.....
.....
.....

d) What has been the most you've had to play in a single day (including ensembles, gigs, teaching etc)?

<2 hours 2-4 hours 4-6 hours >6 hours

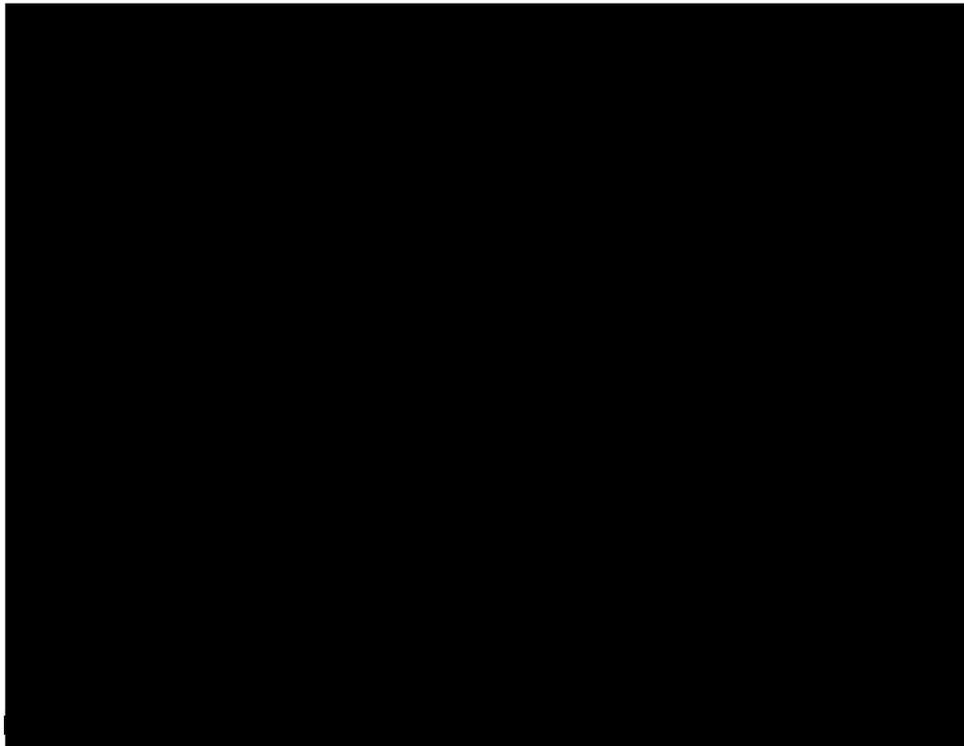
.....
.....
.....
.....
.....

2

2. Have you experienced any playing-related discomfort / pain since you last completed this survey?

Yes
No

You are not required to fill out any more of this questionnaire.
Thank you.



5. How much do your experiences of playing-related discomfort/pain concern you?

	1	2	3	4	5	
Not at all	<input type="checkbox"/>	A great deal				

.....
.....
.....
.....

6. Are you feeling any playing-related discomfort / pain right now?

- Yes Please go to question 7
- No **Please now recall your most recent experience of any playing-related discomfort / pain**

a) **When did this experience take place? Please be as precise as possible**

.....

.....

.....

.....

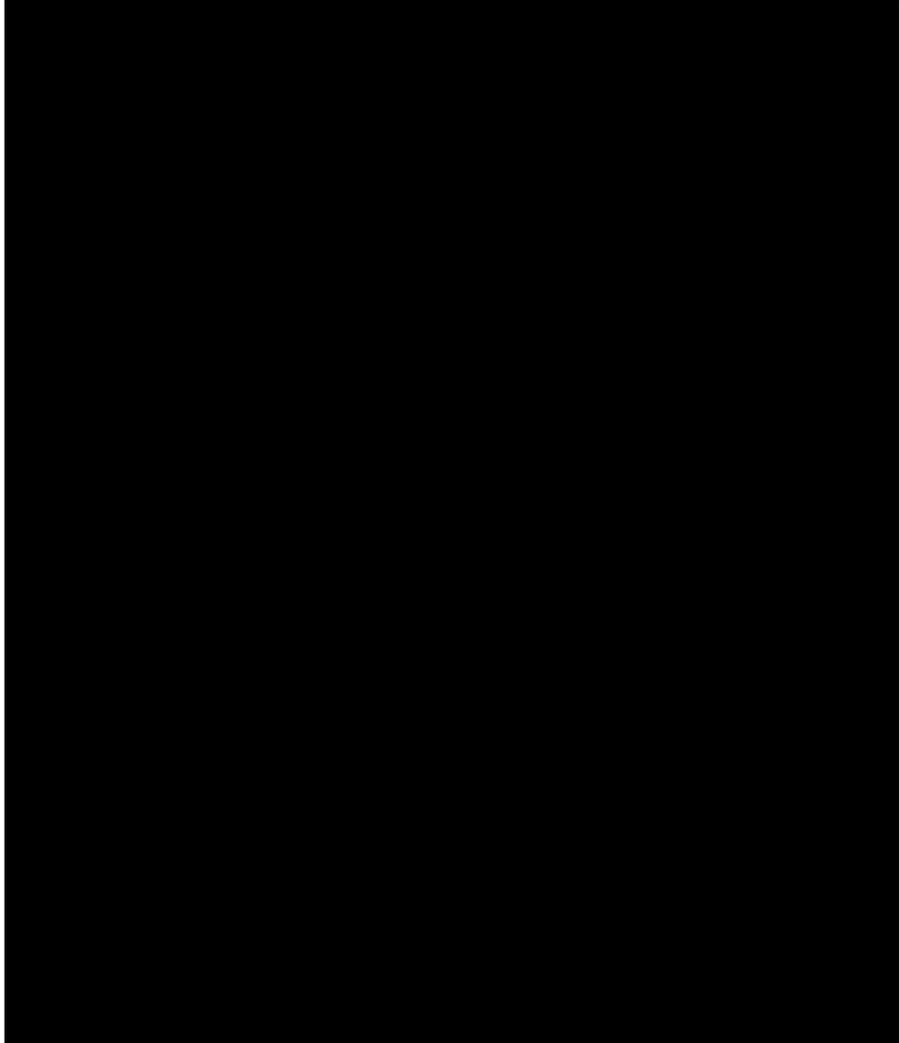
.....

.....

.....

Questions 7-9 ask you to describe your playing-related discomfort / pain. If it is present right now, please describe it as it is now. If it is not present, please use your recall of your most recent experience, as referred to in question 6a.

7. Please mark on the drawings where you feel / felt the discomfort / pain.



10. Since you last answered this survey, approximately how many days, if any, have you been kept from your normal practicing routine (or had to alter it) due to playing-related discomfort / pain?

.....
.....
.....
.....

Thank you for your ongoing participation in this research project.

Your opinions and experiences matter!

Ongoing Pain Questionnaire/interview: Common Questions

Common questions for Ongoing Pain Questionnaires (SEM 2 - SEM 8)

1. Have you noticed any changes in the severity/intensity of your discomfort/pain since we last spoke?
2. Are you taking breaks during your practice?
3. Do you take breaks because you are already feeling discomfort/pain?
4. Do you do a warm-up and what does it entail?
5. Have you discussed your experiences with your teacher or anyone else and what did they say?
6. Do you have any new strategies for preventing/dealing with your playing-related discomfort/pain?
7. Are you concerned by your experiences of playing-related discomfort/pain?
8. Are you exercising?
9. Are you currently employed?
10. Is there anything else you would like to add?

Ongoing Pain Questionnaire/interview: Finishing Students

1. **In general, what changes to your levels of playing-related discomfort/pain have you noticed as you have progressed through your program?**
 - Have your levels of discomfort/pain increased or decreased?
 - At what stage of your program would you say they were the most severe?
 - Had you experienced any discomfort/pain at all before you came to the institution?
2. **Before you came to the institution, had you ever thought about the whole issue of playing-related discomfort/pain (and who have you discussed it with since coming to the institution)?**
 - Had you ever discussed it with your peers/teachers, and have you now?
 - Do you think it would be beneficial if there was a course that all first-year students were to take regarding playing-related discomfort/pain etc.?
 - Has being a part of this study been helpful in any way?
3. **Since being at the institution, have your ideas as to the causes and current rates of playing-related discomfort/pain among string players changed?**
 - What do you see as being the causes of playing-related discomfort/pain?
 - Do you think many of your peers are affected? Why/why not?
4. **During your time at the institution, what are the biggest changes you have noticed in your playing, and what, if any affect have these changes had on your playing-related discomfort/pain?**
5. **What has been your most vivid experience of playing-related discomfort/pain?**
 - What body parts were involved?
 - When did this experience take place?
 - In your opinion, what was the cause of this experience?
 - What did you do when it happened?
6. **What new strategies, if any, have you learned (in regard to playing-related discomfort/pain) since coming to the institution (and who did you learn them from)?**
 - What are your opinions as to the importance of warm-ups, breaks during practice, exercise, general health, etc.?
7. **How, if at all, have your career aspirations changed during your time at the institution, and why?**
8. **In relation to orchestral rehearsals, have they had any impact on your levels of playing-related discomfort/pain, and why?**
 - Do you have any suggestions as to how the structure of the Orchestra course at the institution could be adapted?
9. **Do you have any suggestions as to how the structure of the Bachelor of Music program could be changed to better address any challenges you have faced?**

Appendix I: Feedback Form

Perceptions of playing-related discomfort / pain among tertiary string students: A longitudinal study (QCM/23/06/HREC)

Anonymous feedback form

Comments and suggestions

.....

.....

.....

.....

.....

.....

.....

.....

Concerns

.....

.....

.....

.....

.....

.....

.....

.....

Please use the enclosed self-addressed, reply paid envelope to return.

Appendix J: Focus Group Quotations

Focus Group 1 (25/08/2009)

Selected extracts relating to Orchestra

One thing I noticed about last Orchestra, Symphony rehearsal with [Teacher C]... We had Strauss for the first, half. We got through all of that, and [Teacher C] chucked a big fit and got everyone scared and all, said things which he probably should not have like, "If you guys don't know your parts next time I'm going to retire" and...people were, you know, scared and they came back from the break, and they played um, Wagner 'Die Meistersinger' the overture, and, they were just like, blaring it out and it was like, people knew the music and it was, kind of scary how that might had motivated them towards, just ... the fear. (Tim, Focus Group 1)

One thing I find with those rehearsals too is that sometimes, because we get a break in the three hours but sometimes we will get a break, after, two hours and fifteen minutes, and we will have a fifteen break and then we will come back and do a half an hour and...by the time we have got that break... we're just, so past it, and, sometimes then we have a break after forty-five minutes then... that's not good either because then we come back and we have still got two hours to go. (Wendy, Focus Group 1)

Tim: "I have a night job from 5:00 till 10:00. Um, I have had to call in the boss and say I couldn't do this, couldn't do this day couldn't do this day, and then [Teacher C] would have like a surprise

rehearsal... and I'd be like 'Oh... can't do this day either...' work would get angry with you..."

Wendy: "...Yeah and then you would say to [Teacher P] 'I can't come because I've got work' and he was like 'Well this rehearsal has been up' and you say 'No it hasn't. You just put it up yesterday.'"
(Focus Group 1)

Tim: "I think we should look, into other universities and institutions abroad and see what they do like [sounds of agreement] most of the time, it is weekly rehearsals... at the moment, since it is project based... it feels as though we are not moving at all, because we don't have many concerts a year. It's, like, you spend, I dunno, seven rehearsals [sounds of agreement] and everyone is just sort of just learning their notes [sounds of agreement] it really drags you down..."

Susie: "... I always found having the same orchestra for the whole year, you get to know people so then that emotional connection is in there [sounds of agreement] so then you actually put in a little bit more..."

Wendy: "... And people get more comfortable with each other..."

Susie: "... Yep. I mean I've played, this is going to sound really horrible, orchestras for thirteen years, and I've found that, since coming to The Con where you are just in and out, [sounds of agreement] I've

lost that much, like that, [sounds of agreement] sort of, connection to it. It's all just, part of Uni." (Focus Group 1)

- Susie: "If we stood up and said 'Look, we don't think this is working'... they do kind of turn around and say 'Well it's been working for plenty of years...'"
- Wendy: "... Yeah [sounds of agreement] and 'This is how it's going to be in the real world, so...'"
- Susie: "... But we are not in the real world we are at Uni and, okay we have got to get a taste of it but..."
- Researcher: "... Course the question is, is it like that in the real world because, professional orchestras have all kinds of, [interjections from students] health and safety guidelines like they have to have breaks every so often..."
- Susie: "... I talked to [Teacher O] about it and... he doesn't think that it is structured in a way that um, promotes healthy playing, and that, we don't actually at the end of it, we haven't, progressed as well as we could have, because we haven't given, been given that sort of nurturing, but also that chance to develop. So he thinks if it was changed around a little bit more, we would..."
- Tim: "... I saw the, Chamber Orchestra, playing, I don't know, two weeks ago or so, and I was sitting in the audience, the first time I have done this for quite a while... [interjections from other students] and

only a few people in the orchestra, sitting there smiling and really enjoying themselves. It kind of, put me off a bit...”

Susie: “... We don’t enjoy ourselves [sounds of agreement]... it actually shows...”

Tim: “... It really affects the music as well...”

Researcher: “... So do you think part of the reason you are not enjoying it is because it is just too much at once like because you are tired...?”

Group: “...Yes.” (Focus Group 1)

[Another orchestra] camp’s on the Saturday, we start, tutorials at 8:00 and it goes till 11:00 and then you have morning tea, and then you have, like, two hours, of tutorials and then you have a break and then lunch and then you have a rehearsal, then you have dinner and then you have a rehearsal before bed. (Susie, Focus Group 1)

Researcher: “If you are having problems, in Orchestra or whatever, are they happy to accommodate you or are they just ‘get on with it?’...”

Susie: “... [Teacher P] says ‘Just sit there and if [Teacher C] says anything’, or he says ‘I will go and tell [Teacher C] that you are having pain’, but I mean, the only time that I have actually been able to go up, to a conductor or anything and they have actually said you know, ‘If you are in pain, go home because we need you to play in the concert’ was when, um, [Teacher N]... [sounds of

agreement]... he was really good and he didn't keep us in there he got what he wanted done done..."

Tim: "... You could hear the result as well from the orchestra... [sounds of agreement]..."

Susie: "... And he only did what needed to be done and he actually took into consideration that hey we have been practising, all week twice a day... he doesn't want half his orchestra falling over, and not being able to play on the day of the concert.... [sounds of agreement]... so he sent me home." (Focus Group 1)

Rachel: "What I found was like in [the recital hall], um, lots of the violas in like the symphony, um, it seems to be more squished when there is like ten violas..."

Wendy: "... Especially when there is like twelve cellos and they all back-up behind you..."

Rachel: "... And when you have brass behind you, brass or woodwind... you feel very squished... and then, you get into the, theatre and then there is so much more room... ideally I think it would be better if we could rehearse in the theatre..."

Tim: "... Yes... we'd get used to the chairs we were going to use in the concert..."

Wendy: "... If you actually rehearsed with the chairs you would get into the habit of knowing, [sounds of agreement] how they needed to be

positioned rather than sitting down like, the night before and going
‘Oh...’”

Tim: “... Yes it is obviously a bit off-putting to like, a week before the concert you have got these new chairs you have to fiddle around with.” (Focus Group 1)

Tim: “There is no way for feedback either... it feels like there is no way...”

Susie: “... And even... the evaluations at the end of the, the semester, they do nothing you can’t really say anything but I mean, rehearsals are straight down to business.” (Focus Group 1)

Selected extracts relating to Practice

Susie: “I was told that there was like a maximum, number of hours that anyone should play in a week, with, like, without putting their body through so much strain [sounds of agreement], and anything over that, you started actually physically hurting yourself so, [sounds of agreement] I used to get to the point that, if I was having, 12, 16 hours of rehearsals in a week, I wasn’t practising, [sounds of agreement] because then that would end up, and I wouldn’t be able to play the week after anyway because I had hurt myself...”

Wendy: “... Yeah [sounds of agreement], I am going to take it really easy next week...”

Group: [All laughing.]

Tim: "... I'm putting more practice on top of this, um, ah orchestral commitment now but only because I am, have the, um, have the same goals working at the same time I've got my solo repertoire and I've got the, um, orchestra stuff and sometimes I just can't take a break. You know it's, and then, you know, I do, I sleep eight hours a day it's, it's not like I'm stressing myself too much but, at the same time, you know, I have to, keep it separate, you know..."

Susie "... Yes. Do you find at the end though that you fall in a heap...?"

Group: [All laughing.]

Tim: "... Yeah but that is better than lying up at night thinking about things and I mean like to be able to, finish a day and just, crash, at the end of it is such a, good feeling..."

Group: [All laughing.]

Researcher: "... So do you feel, like you are ready to do it all again the next day, after you sleep...?"

Wendy: "... Yeah [sounds of agreement] because that would be the thing for me like, you go to sleep and then it feels like about five minutes later you wake up and it's like, 'Uh, go to do it all again...!'"

Susie: "... Gets too repetitious, [sounds of agreement] and you get bored."

(Focus Group 1)

Susie: "Quality is better than quantity, I found out [sounds of agreement] I mean I used to practise eight hours a day and I ended up with, all

sorts of problems then I learnt how to practise properly in half an hour, was the equivalent to two of the hours I used to do...”

Wendy: “... Yeah [Teacher D] said to us in cello class last semester that we really only needed to do two hours a day if we are doing proper practice, he's like ‘That’s all you have to do...’ [sounds of agreement]... not just playing through pieces like working, in detail on little bits [sounds of agreement]... he is really big on technique and technical work and stuff...”

Susie: “... My students, they, progress a lot further when I sit there and say ‘Okay. So these bits are the bits you are having trouble with so only practise those’, [sounds of agreement] ‘because if you practise everything else, these bits only get up to here but everything else has gone up here...’”.

Wendy: “... Yeah, and often um, when you have got a hard bit like that even if it is different from something else in the piece, if you work on that, the other things just get better I don't, it's just one of those...”

Susie: “... And scales, [sounds of agreement] if you do scales, your pieces get better.” (Focus Group 1)

Susie: “I play something, totally, out of, nowhere I’ll pick up a piece from, Grade Two or something and just play something really easy just to warm my fingers up and get myself in the mood...”

Wendy: “... The way [Teacher D], does, technical work with us, we always start with really slow scales like a crotchet equals 50, semibreves,

four octaves, up and down, and that takes like six minutes [laughs] and then you do like speed it up like Galamian system, that's a really good warm-up, [sounds of agreement] and then arpeggios and everything double stops and then like half an hour is gone and I think like 'okay I am warm now.'" (Focus Group 1)

Susie: "I have to be careful because I, have, a problem where I over stretch. I'm very flexible so if I stretch and then I go to play... I'm too, loose..."

Rachel: "... I find that if I stretch before I play, my body is in better condition, to play and I'm in a better frame, frame of playing. Whereas if I don't stretch, I find, the practice to be very, sort of, just a very, like, very, like angry or not angry but..."

Tim: "... It can be frustrating [sounds of agreement] if you don't have the mobility [sounds of agreement] that you have had in the past and you, then you can hear it, you can hear it and [sounds of agreement] then you can sort of, if you don't know that it is just because you are not warmed-up [sounds of agreement] you get frustrated and..."

Wendy: "... And then it makes it worse..."

Tim: "... Yeah, yeah so, to be ready, at all times, I don't know I just wake up and do scales and then, you know some stretches." (Focus Group 1)

Researcher: “So when you guys practise, like do you think it is important to have breaks and stuff like that...?”

Group: ... [Sounds of agreement]...

Wendy: “... Definitely, not only for physical but also for mental [sounds of agreement], if you don’t you just lose it, [sounds of agreement] you lose concentration and you just don’t care, because you get tired.”

(Focus Group 1)

Selected extracts relating to Technique

Wendy: “On bad days like when you are practising and, when the pain starts, most often it’s because your technique has let you down...”

Tim: “... Yeah it’s like being lazy in anything, if you are lazy with your technique [sounds of agreement] then you sort of... same with when you are working on a computer if you, [“Yeah.”] sort of slouch back you are going to get pain after a while, [“Yeah.”] but if you maintain, good posture and...

Researcher: “... So how do you know what is good posture is though...?”

Tim: “... Well that is for everyone to find out... learn for themselves isn’t it...?”

Wendy: “... It is generally different, for different people...”

Researcher: “... Do you ever find that different teachers like when you change teachers, they say [“Yeah”] something different...?”

Tim: “... [Sounds of agreement] Definitely.” (Focus Group 1)

Susie: “My teacher is very lazy... he doesn't play, with very good posture at all... and he promotes like you know, legs together, feet together, straight up, no moving...”

Tim: “... I find um, talking to different, people who play the same instrument like with different teachers, um, especially, when we have had Master Classes people coming up [sounds of agreement]... it's um, just really helps to see how they, play and if, you are one on one with them they can also help you and that, [“Yep”] it is a good thing you know thinking differently from how to your teachers just kind of telling it to you all the time...”

Researcher: “... Yes so different perspective [“Yep”], you can take different things from different people I guess, [sounds of agreement] yeah.”
(Focus Group 1)

Wendy: “A lot of [Teacher D]'s students, we, [are] all tense in our shoulders...”

Researcher: “... Is that a problem with cellists in general do you think, the shoulders up...?”

Wendy: “... I'd say so probably because, it's, when, when, something's a bit hard that would be the first place that you'd tense up because that, a lot of the, power comes from your shoulders all the way down [“Yeah”] so, if you are playing really quietly it is all right you are going to be relaxed most of the time because it is just a finger or wrist movement but when it's loud and, hard, [sounds of

agreement] as well that's when it's going to get, [sounds of agreement] you know, tense." (Focus Group 1)

Tim: "Just um, repetitive, methodical action without thought. Like a belief that there is method through the madness of just playing the same way over and over again. Like getting caught up in that, I think causes the most amount of pain..."

Susie: "... It's not being aware, it's the playing over and over and over and over and over and knowing that there is something wrong with your technique or you are getting tired and that sort of stuff and everything just goes downhill so it not knowing when to stop. Being told that you have to get this done so you keep going. You have your eye on the target and you need to just keep going." (Focus Group 1)

Selected extracts relating to Other Influencing Factors

Tim: "Also diet, I think ["Yes"] you have to make sure you are, eating properly, and sleeping properly..."

Wendy: "... That's very true..."

Tim: "... Eating and sleeping is a very big thing because you, need them..."

Wendy: "... I think, diet is really important you have to, eat well so your mind's there, [sounds of agreement] because then you are not like

falling asleep, while you are practising or thinking, ‘Oh this is too hard!’ It has to be, you have to be, at your best so you can do your best like that sounds really corny but that's...”

Susie: “... That’s true...”

Tim: “... Um I think musicians have been put in the same light as athletes, recently [sounds of agreement].” (Focus Group 1)

Researcher: “So what about physical exercise... do you think that’s important..?”

Tim: “... I think it is very important [laughs]...”

Susie: “... You need fitness to play [sounds of agreement]. As much as people think that playing instruments is not that hard, [sounds of agreement] you need it...”

Wendy: “... Yeah you need it.” (Focus Group 1)

Focus Group 2 (20/10/2009)

Selected extracts relating to Orchestra

David: “Maybe [Teacher C] could, get us to stand up every, few minutes or something...”

Sally: “... Maybe it would be more beneficial in general for us to have two smaller sessions of Orchestra during the week...”

Jill: “... Maybe it would be better if you had the proper Orchestra chairs there for every rehearsal instead of the last one [sounds of agreement].” (Focus Group 2)

Researcher: “What about when they structure the Orchestra so that there are... all of a sudden five rehearsals in one week... would you prefer... if they were spread, out...?”

Mark: “... I don't usually have, problems like you feel tired but... I don't ever feel a great deal of pain... [sounds of agreement]...”

Sally: “... It's... stressful and time-consuming...”

Researcher: “... Do you find like the work that you do in Orchestra rehearsals is productive or... not...?”

Mark: “... It depends on the rehearsal...”

David: “... Yeah it's funny how [Teacher C] doesn't really ... rehearse, specific things, he just runs it through generally [sounds of agreement].” (Focus Group 2)

Sally: “I like doing things like... crossing my legs and stuff when we are not playing and if he [Teacher C] sees you doing that then he gets aggro at you because he thinks you are not taking it seriously when really I am just stretching my thighs...”

David: “... I don't think he is always like that though [sounds of agreement]... I think it's usually if he is just cranky that he is like that...”

Jill: “... And it depends who you are... [sounds of agreement]...”

Researcher: “... Okay, so do you think that it is quite stressful then being in Orchestra rehearsal...?”

David: “... I don't find it stressful...”

Mark: “... I don’t find it particularly stressful...”

Jill: “... I found it really stressful for like the first two years...”

Sally: “... It’s really confronting the first time because you are used to high school orchestras where you can get away with murder.”

(Focus Group 2)

Jill: “When you tense up you feel the pain afterwards... [sounds of agreement]... like an anxiety thing...”

Mark: “... If you are that stressed on the spot you probably don’t notice... [sounds of agreement]... even if it is really quite bad...”

Jill: “... But then you do weird things with your technique...”

Mark: “... And often if you can’t play a passage, which is quite often a big problem because it is just so hard... sometimes some of the music we have to do is like way harder than the stuff you do in your lessons... [sounds of agreement] technique goes down the drain.”

(Focus Group 2)

Selected extracts relating to Practice

I practise quite a lot, but I find that I don’t, I’ve never really, you know which I keep, telling you all the time, I don’t really have problems because I sort of, make sure, I mean you can just, if you go through a period of not playing for quite some time like on holidays or something, play just open strings or something for a while just to make the muscles you know, [sounds of

agreement] relaxed, because there is so much more power in being relaxed – in the muscles not the playing. (Mark, Focus Group 2)

Sally: “I decided like in about Grade 12 that I would not practise any more than an hour because... one time I did just go for two hours straight and I was just so mentally exhausted by the end of it I wasn’t getting anything done I was on the verge of tears and I just wanted to you know quit the violin... [Laughter from group]... I’m like, ‘Okay, I need to, cut back on how much I practise, at a time...’”

Mark: “... A lot of people put so much, sort of emotional strain into it, [sounds of agreement] from like all the time as opposed to just, logically and calmly sort of figuring out this is what I need to do, [sounds of agreement] um, what has to be done and just, going through it with a cool and objective point of view, um, and staying calm...”

David: “... I always find though if I do half an hour, like if I in total do like a couple of hours, with a break every half hour I stay pretty, fresh mentally, and physically as well.” (Focus Group 2)

Sally: “I had one teacher tell me that I shouldn’t practise any more than forty-five minutes at a time and I’d have to have a break after forty-five minutes...”

David: “... I was never told anything...”

Mark: "... I was never told anything no, which is a shame." (Focus Group 2)

David: "I just do scales, [sounds of agreement] before I start playing pieces and stuff, [sounds of agreement] I just count that as a warm-up..."

Researcher: "... What about stretching and that kind of stuff...?"

David: "... I have a set routine, with the stretches that I do..."

Researcher: "... And do you always do them...?"

David: "... Yeah. I sort of, I was told that I had to in a way. I think they are pretty important for me... they just sort of stretch out my shoulder muscles and things like that [sounds of agreement] and just make sure I am, loose before I start playing." (Focus Group 2)

Jill: "It's just hard to access the resources, if you don't have a teacher that cares about that kind of stuff..."

David: "... [Sounds of agreement]... that's true actually... I remember when I was learning off [Teacher E] he would have been just like 'Grrrrr' [sounds of agreement] 'Don't worry about it...'"

Mark: "... A lot of those more old fashioned teachers who don't really believe that that is so much of an issue, [sounds of agreement] won't..."

Jill: "... [Teacher A] is really brilliant..."

David: "... Yes she is really good..."

Jill: “... She brought some Alexander teachers into our workshop a few times.” (Focus Group 2)

Selected extracts relating to Technique

Sally: “Generally you just have to do whatever is comfortable... whatever position you can get yourself in where you, are relaxed, and it doesn't hurt but, and that's difficult to do, isn't it...?”

Mark: “... I don't really see why people should experience pain though, in any sense like I know some teachers, insist you should, hold the bow in a particular fashion, or something but, most of the time, if like I mean, with [Teacher D], I have never, experienced, like he's, loosened my playing up so much I have never really had, pain problems and he, sort of hasn't through his whole life so if I do, exactly what he does there shouldn't be any problems, obviously people are different shapes and all that sort of stuff, um, and hand shapes and all that sort of thing matter, matters quite a lot...”

David: “... I reckon ‘technique’ is too broad a thing [sounds of agreement] it's just like if you are doing, anything that causes you to, tense, your muscles [sounds of agreement] in an unnecessary way, because I reckon that is what the problem most people have who get pain is just like they are, [sounds of agreement] too tense...”

Mark: “... In a concert I mean, you know you might, sort of like, forget to be relaxed if that makes some sort of sense, because you, to make a big sound you might, you know strain, your muscles or something,

as opposed to using weight or, whatever, [sounds of agreement] but I suppose a lot of, practising technique it might be making what is comfortable natural...”

David: “... [Sounds of agreement] I think that is the whole point isn’t it [sounds of agreement]... because I look at Vengerov he has got the most shocking technique [sounds of agreement and interjections] but he is better than everyone so...”

Sally: “... Have you ever seen Perlman's thumb when he plays, [sounds of agreement] it's like all over the freaking shop...”

Mark: “... But like Vengerov, he he must have an absolutely, ridiculously stuffed neck because, I mean...”

David: “... The way he holds the instrument is really ridiculous, [sounds of agreement] it looks so uncomfortable but [sounds of agreement] oh well...”

Mark: “... Some people then seem to become less affected... mind you that is when they are 30, [sounds of agreement] I mean when they reach 60 it might be sort of a different story, they might be completely ruined.” (Focus Group 2)

Mark: “It’s all about, getting your notes in tune, in the end, [sounds of agreement] I mean...”

David: “... That’s why I sort of react a bit to, like in Pedagogy I react to how, precise [Teacher J] was [“Yeah”] with how she sets everyone, [sounds of agreement] up...”

Mark: "... How everyone has to be so absurdly perfect..."

David: "... Yeah because it's sort of like, [agreements] I refuse to believe that that works for everyone, [agreements] just because everyone is, is different." (Focus Group 2)

Selected extracts relating to "good posture"

David: "I'd just say generally speaking something that, takes less effort... something that's just totally, relaxed... you don't have to try very hard..."

Sally: "... There is still like differences between 'relaxed' and 'good' posture though [sounds of agreement] because like even just sitting in general, like you know this could be very relaxed but it is very bad for your posture, like it is [sounds of agreement] not good for your back like it's, better for you to sit like upright... not putting pressure on certain joints." (Focus Group 2)

Selected extracts relating to Other Influencing Factors

David: "If I'm not, doing music I'm usually, exercising, ["Yeah"] pretty much, it's a bit of a, compulsion, [sounds of agreement] in a way, yeah..."

Researcher: "... I've noticed a bit of like, like some people who exercise do not have much pain but I think it depends what kind of exercise you do as well..."

Sally: "... Yeah like low impact or high impact..."

Researcher: "... Yeah and what, muscles of the body you are using as well..."

David: "... Yeah..."

Researcher: "... Do you do like a lot of weight lifting and stuff...?"

David: "... No I don't do a lot of weights I do a bit of kayaking, which um, does a bit of upper body sort of thing but I don't do anything that sort of really, works out my playing muscles really so ["Yep"] I haven't found that, it's ever had an effect on my playing, [sounds of agreement] I did have, like last semester I went through, um, a fair bit of, playing-related pain, in my, wrist, and down that side of my hand, and I ended up going to the physio about that and it ended up just being that I was, ah, not, I was tight in the, shoulder or something, when I played but, um, yeah that was..."

Researcher: "... Because I can think of, one student in particular who does too much with his hands [sounds of agreement] and has quite a big problem, you know who I'm talking about [sounds of agreement]..."

Mark: "... A very big problem [sounds of agreement]..."

David: "... Is that Tom [Student 7]...?"

Mark: "... Yes you shouldn't say it it is on record..."

David: "... Oh sorry..."

Researcher: "... So he does a different type of exercise and that doesn't really help him at all..."

David: "... Yeah, I know he has told me about that that's not good..."

Mark: "... But also can I just say on that note he, I mean if we are going to say that, he overworks himself like, ["Yeah"] 24 hours of the day like, the poor guy has this like obsession, and when he practices..."

David: "... Yeah, everything is sort of he is just very tense in general. You notice in his playing [agreements]..."

Mark: "... I mean you know he, he, he relies on pure muscles strain if that makes sense ["Yeah"] as opposed to, if that makes sense [sounds of agreement] when he bows, as opposed to using weight, he sort of tenses..."

Sally: "... Instead of working well, he is working hard." (Focus Group 2)

I do have bad posture when I use the computer... [sounds of agreement] when you bring your computer into bed especially. (Jill, Focus Group 2)

Jill: "... Do you reckon standing up like in retail for hours and hours..."

Mark: "... Yeah that is quite a concern [sounds of agreement and interjections]... in the UK now, everyone who works in a supermarket... [sounds of agreement and laughter] who is at the checkout... is actually required to sit down... [sounds of agreement and interjections] because... it really... knocks you around... I am sort of lucky in a department store, I can walk around a bit [sounds of agreement and interjections] but... people who just have to... stand there for... five hours or something in one go before they get a break is pretty terrible..."

Jill: “... Well, there are companies that make it compulsory for girls to wear heels...”

Mark: “... Yeah and that is also really bad... even I know it sounds silly but even some men’s shoes can like, cause pain [laughter from other students] no I am serious... can cause you pain as well and if you are wearing a suit and tails all day as well, that can be painful...”

Jill: “... I think you have to actually build up a level of fitness in your core to be able to wear heels because it pushes your pelvis forward and if you don’t have the tummy muscles then you are crushing your spine.” (Focus Group 2)

I was just thinking on the whole exercise topic and I just remembered like, a couple of times like especially when Opera is on when I have, just gone out and gone for a run after, doing lots and lots of playing, it does like relax a lot of my back muscles and upper body, it relaxes. (Sally, Focus Group 2)

Like a big healthy diet and exercise go together... it is very easy to like not go outside the whole day and not see the sun, [sounds of agreement] not go for a run, then if you have to go in to rehearsal... for up to three hours, your body is not going to like you for that. (Jill, Focus Group 2)

Focus Group 3 (30/03/2010)

Selected extracts relating to Orchestra

Researcher: “When you are in Orchestra, do other students... talk about their experiences...?”

Gary: “... Not, in rehearsal [laughs]. [Teacher C] would go spastic. But um... some people do mention getting a bit of pain... after, like in a break or something...”

Researcher: “... If you were to do something like stop and stretch in the rehearsal, how do you think [Teacher C] would react...?”

Gary: “... He will probably say ‘What are you doing?’” (Focus Group 3)

Selected extracts relating to Practice

Gary: “Going for long stretches of time, rather than, having a break, and going for small amounts of time is detrimental, I've been finding, I think...”

Researcher: “... Yeah and um, have you found that out through personal experience...?”

Gary: “... Yeah, yep [laughs].” (Focus Group 3)

I think I'm finding more, now like it's not so much a, physical really thing, it's just more of a mental thing I think I need some, take breaks otherwise you can't do good practice... [sounds of agreement]... and if you are just not thinking about things may be you could do injury I guess. (Gary, Focus Group 3)

Gary: “[Teacher A] brought in um, [a visiting teacher] to one of the music, classes, oh morning classes, two weeks in a row and that was really good we did like a whole... like yoga sessions, it was very physical it was good...”

Researcher: “... Yep, and do you make an effort to do the stretches...?”

Gary: “... I haven't been but, I've got a list of them and I will do...!”

Researcher: “... Yeah. So it's one of those things you know you should do but, you don't get around to it a lot...”

Gary: “... Yeah...”

Researcher: “... Do you notice any difference in your playing if you do them, or not...?”

Gary: “... Yeah I feel, more relaxed, a bit better.” (Focus Group 3)

Researcher: “So at what stage do you guys think that like playing-related pain becomes a problem...?”

Gary: “... When it gets so bad you can't really, play... oh probably you need to do it before then...”

Felicity: “... Yeah like, when it starts to become difficult to play may be, like not that you can't play...”

Gary: “... Like you're not looking forward to practice because you know it's going to hurt.” (Focus Group 3)

Selected extracts relating to Technique

Gary: “I think bad technique, is probably like doing something, that is not natural I mean, quite obviously playing violin isn't a very natural thing but, you've got to try and make it as natural as possible, by being relaxed and not tense... if you have, technique where you are tense it's going to cause some sort of injury or pain, [sounds of agreement] you've just got to make sure you are very relaxed...”

Researcher: “... So do you think like everyone's technique should be the same...?”

Gary: “... No...”

Felicity: “... Probably not...”

Gary: “... Whatever works for you, in that, what feels natural.” (Focus Group 3)

There's a difference between, something that's painful I think, and something that you are just not used to... doing tenths or something like, might hurt a little bit but if you do more of them you are... more uncomfortable. (Gary, Focus Group 3)