Title: Person and environmental factors associated with well-being in medical students

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Abstract

Medical students are exposed to demanding academic workloads and are often under considerable psychological strain. This study examined important person and environmental variables that might predict their psychological well-being. Participants were 755 students in years 2 - 6 from 11 Australian medical schools. A web-based survey assessed well-being, personality, professional expectations, lifestyle expectations, barriers, academic stress, and debt. A hierarchical regression analysis demonstrated that extraversion, conscientiousness, professional expectations, and lifestyle expectations were positively associated with well-being, while academic stress, which was the strongest predictor, neuroticism, and concern about debt were negatively associated. Medical students who displayed a disposition that was outgoing, conscientious, and stable, who were less stressed about their academic workload and their level of debt, and who held higher expectations for their future professional career, and expectations of a balanced lifestyle, had better well-being. Medical educators should be aware of these factors and provide support and strategies that promote well-being to students during medical training.

Key Words: well-being; personality; career expectations; career barriers; academic stress; concern about debt.
1. Introduction

During medical school, medical students are exposed to demanding and heavy workloads. Several studies have shown that these students are under considerable psychological strain (Biro, Balajti, Adany, & Kosa, 2010; Dahlin, Joneborg, & Runeson, 2005; Radcliffe & Lester, 2003) and that their mental health declines during the course of their training (Guthrie et al., 1998), although their well-being and well-being trajectory may not be different from students in other courses (Carson et al., 2000; Singh, Hankins, & Weinman, 2004).

Well-being can be defined in terms of happiness and overall life satisfaction. People experience high levels of well-being when they feel pleasant emotions, engage in interesting activities, and when they are satisfied with their life (Diener, 1984). Some individuals will experience a high level of well-being despite adverse environmental conditions, while others will experience low levels despite favourable conditions (Seligman & Csikszentmihalyi, 2000). Well-being theorists suggest that personality, cognitions, goals, and coping efforts all play a role in influencing well-being (Diener, Suh, Lucas, & Smith, 1999).

Understanding factors that contribute to the well-being of medical students is important as this might allow appropriate support systems to be implemented. Despite a strong body of evidence from the international literature investigating medical students’ levels of stress, anxiety, depression, and burnout (e.g., Dahlin et al., 2005; Dyrbye, Thomas, & Shanafelt, 2005, 2006; Shariati, Yunesian, & Vash, 2007; Tyssen et al., 2007), we know little about the factors that influence their positive state; that is, what keeps medical students feeling well.

1.1. Personality and well-being

Personality is regarded as one of the strongest predictors of well-being. Emotional stability and extraversion are typically associated with happiness, well-being, and positive
affect, and neuroticism is associated with distress, poor well-being, and negative affect (Diener et al., 1999). The relationship between neuroticism and vulnerability to stress has been widely studied; however, the majority of studies specifically focus on medical postgraduate samples (e.g., Firth-Cozens, 2003; McManus, Keeling, & Paice, 2004) rather than medical students. Tyssen et al. (2007) examined the relationship between extraversion, neuroticism, and conscientiousness and stress in medical students and found that those high on extraversion and low on neuroticism and conscientiousness were more protected against stress.

1.2. Career attitudes and well-being

There is an increased focus on specialty career choice by the medical education community due to medical students’ career goals changing in response to the changing health system, labour market (Australian Health Ministers’ Conference, 2004), and lifestyle needs (Dorsey, Jarjoura, & Rutecki, 2005). These changes have significant long-term implications for career development, lifestyle and quality of life; however, it is only in recent years that researchers have begun to study well-being in relation to career goals (Lent & Brown, 2008; Uthayakumar, Schimmack, Hartung, & Rogers, 2010). We aimed to advance this line of inquiry by examining the relationship between career expectations and well-being, and between career barriers and well-being.

1.2.1. Career expectations. The outcomes of performing particular behaviours are dependent on the importance placed on the outcome by the individual (Lent, Brown, & Hackett, 1994). For example, if an individual believes they are able to attain their goal of working in a particular medical specialty, they might have positive expectations regarding achieving a certain amount of professional success and/or leisure time to pursue personal activities. Thus, expectations serve as a source of satisfaction, personal fulfilment, and happiness, which are principal elements of well-being (Diener, 1984).
1.2.2. Career barriers. Whilst beneficial conditions, such as a supportive environment, are assumed to increase the likelihood of enacting goals, perceived environmental barriers are likely to have a negative effect on setting and pursuing goals, and limit a person from achieving their potential. Consequently, perceived barriers restrict career options and impair an individual’s capacity to make optimal career decisions (Lent et al., 1994). Thus, when goals are thwarted, well-being is affected negatively (Lord, Diefendorff, Schmidt, & Hall, 2010).

1.3 Academic stress and well-being

Stress associated with the academic learning environment has been linked to depression, poor health, and poor academic performance. A heavy workload, examinations, and clinical performance were found to be the most significant causes of stress among medical students (Saipanish, 2003; Stewart, Lam, Betson, Wong, & Wong, 1999). Saipanish (2003) reported that medical students worry about their examinations, falling behind in their learning, and receiving lower than expected marks. In addition to these concerns, Vitaliano, Russo, Carr, and Heerwagen (1984) found that peer competition, mastering the vast amount of knowledge, and the long hours of study were also causes of anxiety.

1.4. Debt and well-being

Debt has been found to produce stress and anxiety in medical students and to affect their well-being and career choices (Morra, Regehr, & Ginsburg, 2008; Shariati et al., 2007). Students experience increased levels of stress and poor academic performance as a result of financial debt (Dyrbye et al., 2005), and students who worry about debt are more at risk of stress and poor performance (Ross, Cleland, & Macleod, 2006).

1.4. Gender and well-being

Studies investigating gender differences in the mental health of medical students have produced mixed results (see Dyrbye et al., 2006, for a review of US and Canadian literature),
with some researchers finding that psychological distress is higher among female medical students (Dahlin et al., 2005; Shariati et al., 2007; Tyssen et al., 2007), while others have found no gender differences (Hojat, Glaser, Xu, Veloski, & Christian, 1999; Richman & Flaherty, 1990). The vast majority of studies have focused on symptoms of anxiety and depression in male and female medical students, although few studies have tested potentially important person and environmental correlates (Dyrbye et al., 2006).

1.5. The present study

The aim of the present study was to identify person and environmental factors that were associated with optimal psychological functioning of medical students. Based on previous theory and research, it was hypothesised that well-being would be positively related to extraversion, conscientiousness, agreeableness, professional expectations, lifestyle expectations, and gender (being male), and negatively associated with neuroticism, career barriers, debt, and academic stress. Further research aims were to determine whether there were relationships between well-being and openness to experience, age, and year level.

2. Method

2.1. Participants

Medical students in years 2 - 6 from 11 Australian medical schools across all States/Territories participated in the study. These were drawn from approximately 1000 students who were recruited between 2007 and 2009 as part of a wider project tracking the career choices of medical students and junior doctors.

2.2. Materials

2.2.1. Psychological well-being. This was assessed using the 5-item World Health Organisation (WHO-5) Well-Being Index (World Health Organization, 1998). The scale measures positive mood, vitality, and general interest over the past few weeks. Students responded to items such as, “Over the last two weeks. I have felt cheerful and in good spirits”
/ “I have felt calm and relaxed”, using a 6-point response format with endpoints of 0 (almost none of the time) to 5 (almost all of the time), with higher scores representing more well-being. The WHO-5 has been translated into many languages (World Health Organization, 1998), has been used with adolescents (De Wit, Delemarre-Van De Waal, Pouwer, Gemke, & Snoek, 2007) and adults (Henkel et al., 2003), and compares favourably with other general health questionnaires (Bech, Olsen, Kjoller, & Rasmussen, 2003; Henkel et al., 2003). Internal reliability has been reported at .82 (De Wit et al., 2007) and .84 (Bech et al., 2003).

2.2.2. Personality. The 10-item Big Five Inventory (BFI-10; Rammstedt & John, 2007) was used to assess extraversion, agreeableness, conscientiousness, neuroticism, and openness. The BFI-10 is a shortened form of the BFI-44 (John & Srivastava, 1999). It contains two items per scale, each reflecting opposite ends of each personality dimension. Rammstedt and John (2007) reported a 5-factor structure for the BFI-10 and demonstrated convergent validity with the BFI-44 and the NEO-PI-R (Costa & McCrae, 1992), external validity with peer-ratings, and sound test-retest reliability. Items included, “I see myself as someone who …is reserved” (extraversion) / “…is generally trusting” (agreeableness), with a 5-point response format of 1 (disagree strongly) to 5 (agree strongly).

2.2.3. Career expectations. Participants completed a 12-item scale that assessed professional and lifestyle expectations relevant to choosing a medical specialty (Rogers, Creed, & Searle, 2009). Sample items were: “I expect that my choice of specialty will: let me practice clinical skills that best suit my perceived abilities?” (professional expectations) / “…allow me to have my desired work/recreational balance?” (lifestyle expectations). Scale endpoints were 1 (strongly disagree) and 5 (strongly agree). Rogers et al. reported internal reliability coefficients of .84 and .83 for professional expectations, and .89 and .92 for lifestyle expectations across two studies of medical students (Rogers, Searle, & Creed, 2010; Rogers et al., 2009).
2.2.4. **Barriers.** We assessed career barriers relevant to choosing a medical specialty. The 14-item barriers scale was developed for the current study and informed by the medical specialty choice literature, which shows that family and lifestyle considerations, male domination, hours of work, and number of training positions are factors associated with selecting medical specialties (Buddeberg-Fischer, Klaghofer, Abel, & Buddeberg, 2006). The scale contains endpoints of 1 (*strongly disagree*) to 5 (*strongly agree*) with higher scores indicating more perceived barriers. Sample items were: “To what extent do you agree that the following will be a barrier to pursuing your preferred medical specialty: length of training / my gender”.

2.2.5. **Academic stress.** We asked students to complete a 4-item scale assessing academic workload and performance, which was developed specifically for the study. Sample items included, “I feel overwhelmed by the amount of work I have to do”, and, “I feel stressed about how I am performing”. Endpoints were 1 (*strongly disagree*) to 5 (*strongly agree*) with higher scores indicating greater training workload and performance stress.

2.2.6. **Concern about debt.** Students responded to the question: “At this stage of your medical education/training, how concerned are you about the level of debt you will have accrued at the end of your training?”, by selecting between 1 (*not at all concerned*) and 4 (*greatly concerned*).

2.3 **Procedure**

Participants were recruited to the larger study through posters, leaflets, and emails distributed by participating medical schools. A web-based survey was administered in 2010, and those who returned a completed survey were entered into a draw for the chance to win a store voucher. Ethics approval was provided by the authors’ university ethics’ committee.
3.0. Results

Participants were 755 medical students aged between 18 and 57 years ($M = 24.6, SD = 5.5$). There were 119 in year 2, 251 in year 3, 281 in year 4, 73 in year 5 and 31 in year 6. The sample was predominantly Caucasian, and 66% were women. Based on participation in the larger cohort study, the response rate in 2010 was 87%.

3.1. Predicting well-being

A hierarchical multiple regression analysis was conducted to test the relationship between the person and environmental predictors and the outcome variable of well-being. All predictors (except agreeableness and openness) were significantly, bivariately correlated with well-being (see Table 1). Year level and age were not significantly associated with well-being, and thus, along with agreeableness and openness, were not included in the analysis. Gender was entered at Step 1. The person variables of neuroticism, extraversion, conscientiousness, professional expectations, and lifestyle expectations were entered at Step 2. The environmental variables of career barriers, concern about debt, and academic stress were entered at Step 3.

Gender at Step 1 was significant, $F(1, 753) = 6.01, p < .05$, with males reporting better well-being. At Step 2, the person variables accounted for a further 15.8% of the variance, $F_{Ch}(5, 748) = 26.68, p < .001$. Significant individual predictors were extraversion, neuroticism, conscientiousness, professional expectations, and lifestyle expectations. Students, with higher levels of extraversion, conscientiousness, professional expectations, and lifestyle expectations, and lower levels of neuroticism, also reported better well-being. Gender was no longer significant. At Step 3, barriers, concern about debt, and academic stress accounted for a further 12.7%, $F_{Ch}(3, 745) = 44.02, p < .001$. At this final Step, all variables accounted for 28.5% of the variance. Students with higher levels of extraversion, conscientiousness, professional expectations, and lifestyle expectations, and lower levels of...
neuroticism, concern about debt, and academic stress also reported better well-being. Career barriers was not significant. See Table 2.

4.0. Discussion

Identifying the person and environmental factors associated with well-being in medical students represents an important step in raising awareness of health issues, and creates the opportunity for providing support to students during medical school. Our findings supported the hypothesised relationships between well-being and the person variables of extraversion, conscientiousness, neuroticism, professional expectations, and lifestyle expectations, and between well-being and the appraised environmental variables of academic stress and concern about debt. Based on these findings we can identify that medical students who display a disposition that is outgoing, conscientious, and stable, who have higher expectations for their future professional career and lifestyle, who are less stressed about their academic workload, and who are less concerned about their level of debt, experience better well-being.

The strongest predictor of well-being was academic stress. Considering the complex information to be learned, the large workload, and the academically stressful and competitive environment of medical school, this finding may not be surprising. Our results show that students who appraise their workload as stressful or threatening and worry about their performance also report lower levels of well-being. Research that can identify the specific academic stressors that affect health and well-being during medical school is recommended. Also, it would be helpful if coping strategies that promote an awareness of academic stress and its consequences be developed and incorporated into medical education and student counselling services.

In our analysis of the relationship between personality and well-being, we replicated previous findings by demonstrating positive relationships between extraversion and
conscientiousness and well-being, and a negative relationship between neuroticism and well-being (Tyssen et al., 2007). Neuroticism was the second most important predictor after academic stress. High levels of this trait predispose a person to experience negative emotional responses that are out of proportion to circumstances and which are detrimental to well-being (McCrae & Costa, 2003). Medical educators should consider implementing interventions that target medical students who worry excessively, given the significant association with both mental and physical health (Lahey, 2009). In contrast, high levels of extraversion and conscientiousness were associated with better well-being. Extraverts typically seek social support, experience more pleasurable events, and are happier people (Costa & McCrae, 1980). Conscientious students tend to be achievement oriented, committed, and cautious in their approach to work, and, thus, more likely to manage the demands of their studies and to have better levels of well-being (Hayes & Joseph, 2003).

Concern about debt was the third most important predictor. Given that medical students usually graduate with a high level of debt in comparison to students in other degrees (Jolly, 2005), and that previous research demonstrates an association between worry about financial stress and increased levels of general stress (Ross et al., 2006), it is not surprising that concern about debt has a negative effect on well-being. Medical educators need to take this factor into consideration when advising students about fostering and maintaining well-being.

Professional expectations and lifestyle expectations were also significant predictors of well-being. Although these life variables had a small effect, it suggests that aiming for professional success and a work/life balance is associated with satisfaction and personal fulfilment. This finding supports the need for delivering career and life planning services that provide realistic information on the demands and rewards of medical training. This would
enable students to clarify their professional and lifestyle expectations and to plan for their future.

Whilst the bivariate correlation supported the hypothesis that being male was associated positively with well-being, this relationship was not evident when tested in the context of the other variables used in the study. This finding is consistent with others who found no gender differences on psychological distress during medical school (Hojat et al., 1999; Richman & Flaherty, 1990). Similarly, while career barriers were negatively, bivariately correlated with well-being, they were not a significant factor in the model. A possible explanation for these non-significant findings is that the personality and career expectations variables may mediate the effect that barriers have on well-being.

4.1. Strengths, limitations, future research, and implications

Our study advances the literature on the well-being of medical students in several ways. We identified that certain personality traits were associated with the well-being of medical students, and that there were well-being effects for attitudes and perceptions toward career and lifestyle factors. While participants were self-selected, the sample was large and diverse, drawing on students from 11 medical schools across multiple year levels and all Australian States and Territories.

The cross-sectional, correlational design limits the capacity to identify causality in relation to well-being, although the causal direction we proposed is consistent with well-being theory and longitudinal well-being research (Ryan & Deci, 2001). Additionally, we used the short BFI-10 inventory to assess personality. Rammstedt and John (2007) reported 8-week, test-retest reliability coefficients ranging from .68 to .83; yet, several of the subscales in our study had low internal reliability coefficients (e.g., agreeableness = .31). While low internal reliabilities are to be expected given that each subscale contained two items only, and the two items represented opposite ends of the personality dimension (i.e., there was broad
coverage of each dimension; see Cortina, 1993), future studies might confirm these results using longer scales.

We also used specifically devised scales for career barriers, academic stress, and concern about debt. These scales were associated with other scales in the study in the expected direction (e.g., career barriers was negatively correlated with professional expectations and lifestyle expectations, and academic stress and debt concerns were negatively correlated with well-being), which supports construct validity. However, they need to be used by future researchers in other settings to confirm their usefulness.

To build on the present findings, researchers also might consider a longitudinal approach to identify the specific causes of medical student well-being and to ascertain if, and how, well-being changes over time. Finally, as coping responses can influence an appraisal of a demanding situation, and are relevant to person-environment models (Edwards, Cable, Lambert, & Shipp, 2006), we suggest that future researchers include measures of coping and support when examining student well-being.

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Web References

