Integrating theory and user insights: Developing co-design

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Abstract

Adolescent alcohol consumption is an ongoing issue of concern. While latest trends indicate an increase in the number of adolescents choosing to abstain from alcohol, there are subgroups within the population who are drinking at alarming rates (Australian Institute of Health and Welfare, 2017). Of late, unforeseen changes of drinking habits due to increased stress and isolation resulting from the corona virus (COVID)-19 pandemic is also of concern (Chodkiewicz et al., 2020; Dumas et al., 2020). The National Health and Medical Research Council (2009) recommends adolescents avoid consuming any alcohol to avoid associated risks and alcohol-related harm. Existing evidence highlights the importance influence of parenting specific behaviours and attitudes on preventing and minimising underage drinking (Yap et al., 2017). Therefore, parent are key targets in strategies to minimise alcohol related risks in adolescents (Newton et al., 2017).

Social marketing offers an evidence-based approach to the development of health and social change programs. Social marketing programs have successfully been used to influence positive behaviour change (Kubacki et al., 2017), through the use of social marketing benchmark principles which place the user at the forefront of all behaviour change efforts (Andreasen, 2002). Social marketing literature (Rundle-Thiele et al., 2019, Dietrich et al., 2016) and benchmark principles (French and Blair-Stevens, 2006) emphasise the importance of the generation of user insights and the application of behavioural theories during the formative research process. Co-design is increasingly gaining recognition as an approach to develop innovative and user driven design solutions to some of social marketing most complex issues (Kim et al., 2020). However, co-design approaches may be limited by their exclusion of theory (Dietrich et al., 2017). In fact, while social marketing literature instructs the importance of theory (Rundle-Thiele et al., 2019), in practice theory application is often lacking and superficially reported in existing social marketing literature (Pang et al., 2017, Tebb et al., 2016).

Theories may extend program outcomes by focusing on constructs known to cause specific behaviour (Hardeman et al., 2005). Merging inductive and deductive approaches (i.e. user views and theory) is congruent with an abductive approach, thereby allowing insights to be generated by users through a theoretical lens (Meyer and Lunnay, 2013).
Thus, this research aims to close the gap between theory and practice through the examination of an abductive co-design process that integrates behavioural theory with user insights during social marketing program design.

The thesis commences with a systematic literature review to provide an overview of the current state of evidence and identify key gaps in regards to parent alcohol programs. Three research questions guided Study 1

RQ1: What outcomes do parents experience following participation in parent alcohol programs?
RQ2: What is the level of stakeholder engagement in the design process of parent alcohol programs?
RQ3: What is the level of theory application in parent alcohol programs?

A total of 17 studies detailing 13 individual parent alcohol programs were examined in detail. Findings highlight the potential for parent alcohol programs to positively influence alcohol specific parenting behaviours and attitudes. However, results indicate room for improvement with limited stakeholder engagement during program design and limited levels of theory application and reporting.

End users can influence the development of a program through a more audience orientated design such as co-design. Study 2 evaluated a pilot parent alcohol program drawing on insights obtained from co-design research (Hurley et al., 2018), and asked, RQ4: Does a pilot co-designed social marketing program improve alcohol specific parenting factors? A total of 65 parents participated in the pilot program and a repeated measures assessment found that a social marketing program co-designed by parents can deliver positive outcomes for parents, with desired effects observed for all outcomes measured.

Given the importance of theory use in social marketing, Study 3 asked, RQ5: Can theory be applied within the seven-step co-design process? Taking an abductive approach, key constructs of Social Cognitive Theory were integrated into co-design activity cards. Following a seven-step co-design process, two co-design sessions were held with a total of 40 participants. Findings demonstrate that theory can be successfully integrated into the six-step co-design process through the use of theory based activity
cards. Insights from this study led to the development of a more nuanced approach to co-design that increased the theoretical relevance of co-design outputs.

Overall, this thesis contributes to the literature theoretically and practically. Theoretically, this thesis provides evidence to support co-design as an approach to effectively change alcohol specific parenting behaviours. In addition, this thesis contributes to social marketing literature by proposing an abductive co-design approach as a means to develop more user driven and theoretically informed behaviour change programs filling an important gap. Examining co-design through an abductive lens assists social marketing researchers and practitioners in ensuring multiple benchmark principles are applied during program design. Practically this thesis addresses an important problem in present-day society by designing an alcohol education program that is closely aligned with the needs and preferences of the respective target audience.
Acknowledgement

This thesis would not have been possible without the inspiration and support from a number of wonderful individuals. Many thanks and appreciation to all of them for being part of this journey and making this thesis possible. I feel privileged to have had the opportunity to work with my supervisors Dr Timo Dietrich and Professor Sharyn Rundle-Thiele. I thank you both for the opportunities, the guidance and the support you have provided to allow me to succeed at every stage of my PhD. Timo, at those times when the PhD mountain seemed insurmountable, you always provided the necessary words of encouragement and reason to see me venture on. Without your guidance and invaluable insights this thesis would not have been realised. Sharyn, over the last three years of this journey you broadened my thinking and always pushed me to dig deeper. I am forever grateful for the opportunities and experiences that you have opened up to me.

To the researchers and students at the Social Marketing @ Griffith centre, I am grateful for your friendship, support and energetic work environment. You all truly made the experience so much more memorable and I am continually inspired by each and every one of you. To my Mum and Dad, I can never thank you enough for giving me all the opportunities and experiences that have made me who I am, I love you both. To my brother Mark and his wife Cathy, I thank you for your continuous support and love. Matt, you were always beside me to celebrate the happy moments and to push me and motivate me during the hard moments. Thank you for your friendship, encouragement and great humour. To my partner Daragh, thank you for your patience, support and most of all your love. And last but in no means the least, Paige. Thank you for making my life shine brighter. This whole journey is more meaningful with you here beside me, I love you.
Statement of Originality

This work has not previously been 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.

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Acknowledgement of Papers included in this Thesis

Section 9.1 of the Griffith University Code for the Responsible Conduct of Research (“Criteria for Authorship”), in accordance with Section 5 of the Australian Code for the Responsible Conduct of Research, states:

To be named as an author, a researcher must have made a substantial scholarly contribution to the creative or scholarly work that constitutes the research output, and be able to take public responsibility for at least that part of the work they contributed. Attribution of authorship depends to some extent on the discipline and publisher policies, but in all cases, authorship must be based on substantial contributions in a combination of one or more of:

- conception and design of the research project
- analysis and interpretation of research data
- drafting or making significant parts of the creative or scholarly work or critically revising it so as to contribute significantly to the final output.

Section 9.3 of the Griffith University Code (“Responsibilities of Researchers”), in accordance with Section 5 of the Australian Code, states:

Researchers are expected to:

- Offer authorship to all people, including research trainees, who meet the criteria for authorship listed above, but only those people.
- accept or decline offers of authorship promptly in writing.
- Include in the list of authors only those who have accepted authorship
- Appoint one author to be the executive author to record authorship and manage correspondence about the work with the publisher and other interested parties.
- Acknowledge all those who have contributed to the research, facilities or materials but who do not qualify as authors, such as research assistants, technical staff, and advisors on cultural or community knowledge. Obtain written consent to name individuals.

Included in this thesis are papers in Chapters 4, 5 and 6 which are co-authored with other researchers. My contribution to each co-authored paper is outlined at the front of the relevant chapter. The bibliographic details for Chapter 4, 5 and 6, and status for these papers including all authors, are:


Appropriate acknowledgements of those who contributed to the research but did not qualify as authors are included in each paper.

(Signed) ____________________________ (Date) 20.08.2020

Erin Hurley

(Countersigned) _________________________ (Date) 20.08.2020

Supervisor: Dr Timo Dietrich
Chapter 1: Introduction

1.1. Introduction

This chapter provides an outline of the thesis, including a background to the research. To begin, a description of the research context is presented. This includes an overview of adolescent alcohol consumption in Australia and highlights parents as key stakeholders in alcohol prevention efforts. A statement of the research aims and research questions follows. The research design is summarised in a table, presenting the key gaps, objectives, proposed methods and research contributions. A brief overview of the contributions this program of research makes to the field of social marketing follows. Finally, a diagram showcasing the structure of the seven thesis chapters is included.

1.2. Background and research context

Alcohol remains the most commonly used drug among adolescents in Australia (Australian Institute of Health and Welfare, AIHW, 2017) with one fifth of adolescents considered ‘high risk’ drinkers (AIHW, 2017). The National Health and Medical Research Council (2009) recommends adolescents avoid consuming any alcohol to avoid associated risks and alcohol-related harm. Parents are important social influencers in preventing and reducing adolescents’ alcohol consumption (Yap et al., 2017). Research shows that adolescents whose parents have restrictive attitudes regarding underage drinking are less likely to engage in risky drinking behaviours (Bowden et al., 2017). Furthermore, high quality parent-child communication, including the communication of strict alcohol specific rules (Mattick et al., 2017), and parents’ monitoring of adolescents’ activities and whereabouts (Yap et al., 2017) are associated with reduced levels of alcohol consumption among adolescents. Therefore, parents are key stakeholders in alcohol prevention strategies and alcohol specific programs targeting parents remain an important component of multi-faceted approaches to minimising alcohol-related risks for adolescents. Currently, alcohol programs are limited in their inclusion of stakeholder input during program design (Dietrich et al., 2016b). This is concerning given identified differences between expert and user designed programs (Hurley et al., 2018a; Rundle-Thiele et al., 2019b). In addition, low participation and retention rates of parents constitute a serious problem for parent alcohol programs (Axford et al., 2012; Shaykhi et al., 2018), with parents openly admitting they do not see a lot of value in existing programs (Skarstrand et al., 2009).
1.3. Research purpose and research questions

The purpose of this thesis was to understand how expert knowledge and user insights can be integrated to engage end users. Specifically, the thesis sought to examine the usefulness of theory when combined with an audience orientated approach to provide guidance on how theory can assist with social marketing program design. To achieve the main purpose of this thesis, five research questions were developed and reported across three studies (see Figure 1). The identified research gaps for each of the research questions are outlined hereafter.

Figure 1. Overview of research aim, research questions and included studies

Parent programs have shown mixed effects in preventing and minimising adolescent alcohol consumption (Newton et al., 2017). It is unclear to what extent program participation delivers changes in parents that, in turn, may benefit their adolescents due to a lack of reviews examining parenting specific outcome measures (Foxcroft and Tsertsvadze, 2011a; Newton et al., 2017). Reviews that do examine parent alcohol programs report on measures associated with adolescent alcohol use (Newton et al., 2017), and parenting factors as reported by adolescents (Kuntsche and Kuntsche, 2016). Previous systematic reviews did not examine the efficacy of parent alcohol education programs by measuring parental outcome effects as reported by parents. This
A gap in the literature was identified leading to the development of the first research question:

**RQ1: What outcomes do parents experience following participation in parent alcohol programs?**

Given concerns about underage drinking and recognising parents as key influencers in adolescent alcohol consumption, social marketing may offer an effective approach to address alcohol specific parenting factors which, in turn, may prevent or reduce adolescent alcohol consumption. Social marketing seeks a customer orientated and user driven approach to program design, implementation and evaluation (Dietrich et al., 2016a). Through formative research techniques, important insights are generated to guide program design and development by giving users a voice and providing an understanding of their barriers and motivators to behaviour change (Kubacki and Rundle-Thiele, 2016). However, existing parent programs report limited examples of incorporating user insights into the development of the programs (see, for example, Koutakis et al., 2008; Tael-Oeren et al., 2019a). With limited audience orientation, programs are failing to recognise the important insights and value that the parents themselves may offer to program design. In order for researchers to design audience oriented programs, they must be able to readily capture their target audiences’ unique needs and preferences through the formative research principles of social marketing, audience orientation and insight driven design (Kubacki and Rundle-Thiele, 2016). Therefore, it is important to understand the current level of audience orientation in existing parent programs and the following research question is proposed:

**RQ2: What is the level of stakeholder engagement in the design process of parent alcohol programs?**

In line with social marketing, theory takes a user driven approach with a bottom line focus on changing individuals’ behaviours (Lefebvre, 2001). In social marketing and other behavioural change fields, theories are used in the development of programs to effect better outcome change (Michie and Prestwich, 2010) through influencing constructs that are known to cause specific behaviour (Hardeman et al., 2005) and/or behaviour change (David and Rundle-Thiele, 2019). The application of theory in social
marketing remains, however, limited (Truong & Dang, 2017), and studies which do report theory use fail to provide sufficient information affording an adequate understanding of how theory was applied (David and Rundle-Thiele, 2018) and utilised. Evidence suggests that programs underpinned by a theoretical framework are likely to deliver superior outcomes (Willmott et al., 2019; Glanz and Bishop, 2010). Therefore, in order to understand the extent to which theory is applied and reported in existing parent alcohol programs the following research question is proposed:

RQ3: What is the level of theory application in parent alcohol programs?

Concerningly, the rates of parents’ participation and retention in parent alcohol programs are exceedingly low, with parents not engaging with the programs (Hurley et al., 2018b). With parents seeing little value, developed programs are unlikely to achieve any significant effects. End users can influence the development of a program through a more audience orientated design approach, using innovative research techniques such as co-design (Trischler et al., 2019). Co-design has been shown to be a suitable approach in addressing social marketing issues such as alcohol education (Dietrich et al., 2016), wildlife conservation (David et al., 2019) and food waste behaviours (Kim et al., 2020b). Therefore, the development of a co-designed social marketing parent program may provide important user generated insights that can ultimately lead to the development of a more sustainable and effective program. On this basis the following question was formulated:

RQ4: Does a pilot co-designed social marketing program improve alcohol specific parenting factors?

Co-design facilitates user involvement in program design (Sanders and Stappers, 2008). However, co-design approaches may be limited by their exclusion of theory (Dubois and Gadde, 2002). As one of social marketing’s benchmark criteria, theory use in social marketing program design is considered important (French and Blair-Stevens, 2006) since theories may extend program outcomes by focusing on constructs known to cause specific behaviour (David and Rundle-Thiele, 2018). Merging inductive and deductive approaches (i.e. theory and user views) is congruent with an abductive approach (Morgan, 2014), thereby allowing insights to be generated by users through a theoretical lens. Therefore, an abductive approach provides the opportunity to examine
the role and relevance of theory in an existing seven-step co-design process (see Dietrich et al., 2017), providing researchers with a guide to how to bring theory into co-design sessions with users. Responding to calls for improvements in theory use and reporting in social marketing (David and Rundle-Thiele, 2018), and to support social marketers to apply behavioural change theories in program design (Firestone et al., 2017; Rundle-Thiele et al., 2019a), this research aims to understand how theory can be applied within the co-design process for a social marketing program. Given the importance and benefits of applying a customer orientated approach to social marketing (Andreasen, 2002), integrating theory into an existing co-design process may extend co-design insights and deliver a method outlining how a theory-based social marketing program can be co-designed. Accordingly, the fifth research question was developed:

*RQ5: Can theory be applied within the seven-step co-design process?*

### 1.4. Research design

This PhD program of research features three studies each guided by a mixed methods design delivered in an iterative process of formative research and evaluation that, together, seek to strengthen co-design outputs and, in turn, program effectiveness. One evidence review, a co-design study, and a program evaluation are included in this research program, as outlined in Table 1.
Table 1. Summary of gaps, objectives, research questions, proposed methods, and research contributions

<table>
<thead>
<tr>
<th>Study</th>
<th>Research gaps</th>
<th>Objectives</th>
<th>Research questions</th>
<th>Methods</th>
<th>Study contribution</th>
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</table>
| Formative study 1          | Lack of existing reviews of parent alcohol programs that examine efficacy of parent reported outcome measures. Limited understanding of level of stakeholder engagement during parent alcohol program design. Limited understanding of level of theory application and reporting in parent alcohol programs. | To evaluate existing parent alcohol education programs with a focus on outcomes experienced by parents, stakeholder engagement during program design and theory application. | RQ1: What outcomes do parents experience following participation in parent alcohol programs?  
RQ2: What is the level of stakeholder engagement in the design process of parent alcohol programs?  
RQ3: What is the level of theory application in parent alcohol programs? | Data collection: Systematic literature search following PRISMA guidelines (Moher et al., 2009)  
Analysis: Narrative review | Provided mixed evidence as to the efficacy of parent alcohol programs, and highlighted the need for more theory application and stakeholder engagement during program development. |
| Pilot program study 2      | Limited evidence of parent alcohol social marketing programs.  
Lack of evidence examining the effectiveness of co-designed programs. | To test the effectiveness of a co-designed social marketing program on alcohol specific parenting factors. | RQ4: Does a pilot co-designed social marketing program improve alcohol specific parenting factors? | Data collection: Pre- and post-survey (n=65)  
Analysis: SPSS - Descriptive and inferential statistics | Implemented and evaluated a traditional co-design approach verifying its usability in designing and implementing more user oriented social marketing programs that positively influence |
<table>
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<tr>
<th>Study</th>
<th>Research gaps</th>
<th>Objectives</th>
<th>Research questions</th>
<th>Methods</th>
<th>Study contribution</th>
</tr>
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<tbody>
<tr>
<td>Formative study 3</td>
<td>Limited application of theory in the development of social marketing programs. Lack of understanding on how to integrate user insights and behavioural theory in a co-design process.</td>
<td>To examine the application and usefulness of theory in a seven-step co-design process following an abductive approach.</td>
<td>RQ5: Can theory be applied within the seven-step co-design process?</td>
<td>Data collection: Co-design sessions (n=40) following seven-step co-design process (Trischler et al., 2019) Analysis: Abductive thematic analysis</td>
<td>Outlined a method to integrate behavioural theory and user insights in a co-design process following an abductive approach.</td>
</tr>
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</table>
1.5. Overview of contributions to theory and practice

The overall contribution of this thesis stems from the examination of co-design through an abductive lens, allowing theory and user insights to be intertwined in order to improve the quality of co-design outputs. As a novel approach to co-design, an abductive process may improve the quality of co-design outputs by examining user insights in relation to relevant behavioural theory. Through this process, this study contributes to social marketing theory and practice in several ways, including a proposed process for mapping behavioural theory to program strategies tested in co-design which ultimately leads to the emergence of theory in co-design outputs. In addition, the thesis delivers a clear example of how user generated insights are translated into final program design techniques and strategies, building on limited research in this area (Eyles et al., 2016; Trischler et al., 2019).

In addition, Study 2 extends evidence as to co-designs efficacy (David et al., 2019) by providing empirical evidence demonstrating the effectiveness of co-design as an approach to parent alcohol program design. Ultimately, Study 2 shows that co-design, if fully utilised and users are empowered to contribute actively, can allow for the design of program solutions that are more aligned to the specific user needs and successfully change desired behaviours. Given the importance of applying key social marketing principles (Carins and Rundle-Thiele, 2014; Xia et al., 2016), this research contributes by providing a clear process for social marketing researchers and practitioners to follow ensuring that three key social marketing principles (customer orientations, insights and theory) are embedded into program design. Further contributions include improved understanding of the abductive methodology from a design perspective and offering practical implications to inform the development of future parent alcohol programs. Thereby, this thesis addresses an important problem in present-day society by designing an alcohol education program that is closely aligned with the needs and preferences of the respective target audience.

1.6. Structure of thesis

This thesis, comprising seven chapters, is structured as a series of published and unpublished papers and one forthcoming book chapter. Three studies (one published, one forthcoming, and one under review after revisions have been submitted) are presented in journal article format in Chapter 4, Chapter 5 and Chapter 6 and form the foundation of this thesis. Figure 2 below outlines the thesis structure.
Figure 2. Overview of Thesis Structure

<table>
<thead>
<tr>
<th>Chapter 1: Introduction</th>
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<tr>
<td>Overview of research context, purpose and design.</td>
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<th>Chapter 2: Literature Review</th>
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<tr>
<td>Synthesis and critical analysis of current evidence base, identification of research gaps, and formulation of research questions.</td>
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<th>Chapter 3: Research design and methodology</th>
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<tr>
<td>Description of the research context, explanation and justification of the research paradigm, description of data collection and analysis processes.</td>
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<th>Chapter 4: A systematic literature review</th>
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<th>Chapter 5: Proof of concept study</th>
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<th>Chapter 6: An abductive approach to co-design</th>
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<th>Chapter 7: Discussion and conclusion</th>
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<tbody>
<tr>
<td>Integration of results to address the research questions, contributions of research to theory and practice, implications and future research directions.</td>
</tr>
</tbody>
</table>

The first chapter, **Chapter 1**, provides an introduction to the thesis, outlining the research context, purpose and design. **Chapter 2** presents a synthesis and critique of current literature with a focus on social marketing and the importance of developing theoretically underpinned and user centred programs. The review discusses co-design as an approach to empowering end users to contribute to program design. This chapter considers how the method could benefit from the integration of theory through an abductive approach. **Chapter 3** provides an overview of the research context and gives a brief history of the research project. The pragmatic stance adopted by the researcher is justified and an overview of the methods
applied in each of the three included studies is presented in turn. Chapter 4 reports on the systematic literature review conducted to form a better understanding of the current evidence base surrounding parent alcohol programs with a focus on outcomes experienced by parents, stakeholder engagement during program design and the level of theory application. Chapter 5 describes a proof of concept study that evaluated the effectiveness of co-design as an approach to social marketing program design in the context of parent alcohol programs. Chapter 6 reports on a formative research study that examined how theory could be integrated into a traditional co-design process in order to improve co-design outcomes. In Chapter 7, the overall contributions of the research program are outlined and a discussion of the results in light of the research questions is provided. Areas for consideration by future research and an overall conclusion are presented at the end of the chapter.

1.7. Conclusion

This chapter has provided an overview of the PhD program of research reported in this thesis. It gave the background and research context, and overviewed the research purpose, research questions and research design. The contributions this program of research offers for theory and practice were then briefly summarised. Lastly, the structure of the thesis was outlined. The next chapter examines the literature relevant to the research in order to identify the research gaps, forming the foundation of the research questions.
Chapter 2: Literature Review

2.1. Introduction

This chapter presents a review of existing academic knowledge with a focus on the social marketing discipline and more specifically, the usefulness of theory and user insights to guide program development. The chapter begins by introducing the context of adolescent alcohol consumption and targeting parents in mid-stream efforts to reduce risks associated with underage drinking. Next, social marketing as an approach to addressing societal issues such as underage drinking is discussed and its underlying principles are examined. The importance and relevance of behavioural theory in the social marketing planning process and integration of user insights through a co-design methodology is then critically synthesised and discussed. Following on, the chapter examines abduction as an alternative to the more commonly applied inductive and deductive research approaches, and an abductive approach is suggested as a means to improve the theoretical relevance of co-design outputs. Finally, following the review of the literature, the research gaps are summarised in conjunction with the proposed research questions for this thesis.

2.2. Parent alcohol programs

2.2.1. Adolescent alcohol consumption

Alcohol and a culture of drinking has deep historical roots in the Australian DNA, starting with the introduction of spirits and wine when the First Fleet arrived in 1788 (McIntyre and Germov, 2013). As the colony and settlements began to grow, merchants quickly realised the potential for alcohol sales and Sydney was established as an important trading post for Rum (Dingle, 1980), which became a principal currency for paying local workers (Room, 1988). As the Australian population grew with the gold rush of the 1850s, an inclination towards heavy drinking and drunkenness among young men was prominent, and has remained a tradition for subsequent generations (Room, 1988). In fact, the important role of alcohol in Australian culture has been widely documented throughout the years (Kirkby, 2003; Dingle, 1980), and drinking is still commonly accepted as a national characteristic (Fox, 2015).

Alcohol remains the most commonly used drug among adolescents in Australia (AIHW, 2017) and is a significant public health concern globally (World Health Organization, 2014), with adverse health, social and economic outcomes (Roche et al., 2016; Peacock et al.,
2018; Ciobanu et al., 2018). Positive trends in Australia and around the world show a decrease in adolescent alcohol consumption (Livingston et al., 2020). In Australia, these encouraging trends indicate that more adolescents are choosing to abstain from alcohol and the age of initiation has increased from 14.7 in 2001 to 16.1 in 2016 (AIHW, 2017). However, despite this increase in the number of younger adolescents abstaining from alcohol, this positive shift does not extend to later adolescence (16-19 year-olds), where rates of alcohol consumption are increasing at a significantly faster pace than in previous cohorts (Callinan et al., 2019).

In addition, of the adolescents choosing to drink there is a group who are participating in alarming and harmful rates of consumption (National Drug Research Institute, 2017). Concerningly, nearly one fifth of adolescents report drinking monthly or more often and consuming more than five standard drinks in one sitting (AIHW, 2017), placing them at greater risk of immediate and long-term harm. These high-risk drinkers typically initiate drinking at 14 years of age, two years earlier than the general population, and on average consume 13 standard drinks in one sitting (National Drug Research Institute, 2017). This dangerous level of drinking can be seen in the hospital visits by adolescents, who account for almost twice the number of emergency department presentations compared to other age cohorts (Livingston, 2015). The National Health and Medical Research Council (2009) recommends that adolescents should avoid consuming any alcohol at all due to a number of associated risks, including but not limited to health risks (e.g. depression, anxiety and other mood disorders and memory problems) and alcohol-related harm (e.g. crime, traffic-related injuries, blackouts and violent behaviour) (Hall et al., 2016).

Advances in imaging technology over the last two decades have resulted in clearer understanding of adolescent brain development, and heightened concerns about adolescents’ susceptibility to alcohol exposure (Salmanzadeh et al., 2020). As brain development continues throughout the adolescent period, the introduction of alcohol can disrupt key periods of transitions that occur as the brain undergoes critical cognitive and emotional development (Degenhardt et al., 2016). In fact, evidence suggests that teens who drink heavily have a smaller prefrontal cortex (De Bellis et al., 2005) and hippocampus (Brown and Tapert, 2004) than their peers who do not drink. Associated consequences include cognitive deficits in learning, attention and communication skills, disruptions in memory, increased susceptibility to anxiety and increased risk of substance use disorders later in life (Salmanzadeh et al., 2020). These impairments of brain function caused by alcohol use during adolescence can have long-lasting
effects into adulthood (Salmanzadeh et al., 2020). Given concerns related to underage drinking and harms associated with early alcohol exposure, prevention efforts to minimise and delay adolescent alcohol consumption continue to be warranted to counter Australia’s alcohol drinking culture.

2.2.2. Parental influence on adolescent drinking

A review of the existing literature demonstrates a strong link between parenting factors and adolescent behaviour. Previous research suggests that there are three key parenting factors that influence adolescents’ alcohol usage: a) parental monitoring (Yap et al., 2017) including family rule setting (Parsai et al., 2010); b) parent-child communication (Kuntsche and Kuntsche, 2016); and c) parental attitudes (Tael-Öeren et al., 2019b). Research suggests that parental monitoring (e.g. being more aware of adolescents’ activities, whereabouts and friends) has the greatest impact on adolescent alcohol use (Yap et al., 2017; Dever et al., 2012). For example, studies showed that low parental monitoring is related to increased alcohol use by adolescents (Bahr, Hoffmann & Yang, 2005; Latendresse et al., 2008). High parental monitoring increases adolescents’ drinking refusal self-efficacy which, in turn, reduces intentions to drink (Mynttinen et al., 2017) and decreases the likelihood of their engaging in risky drinking behaviours (Dever et al., 2012). However, Parsai et al. (2010) suggest that parental monitoring in itself may not be enough, with rules and consequences attached to misbehaviour providing greater protective benefits. In fact, family environments which do not enforce strict rules in relation to alcohol specific practices and expectations are associated with higher levels of adolescent alcohol usage (Lam et al., 2017; Mares et al., 2012).

Furthermore, parent-child communication that specifically addresses alcohol-related topics has been identified as an important component in preventing and reducing adolescent alcohol usage (Kuntsche and Kuntsche, 2016). Frequent and open communication between parents and adolescents that specifically addresses alcohol-related topics can reduce adolescents’ alcohol usage, while also increasing their perceptions of the negative consequences associated with alcohol use (Miller-Day and Kam, 2010). Additionally, parent-child communication fosters positive family environments which, in turn, increases adolescents’ self-efficacy to refuse alcohol (Nash et al., 2005). Finally, research indicates a strong link between parents' attitudes towards alcohol consumption and adolescents’ attitudes (Yap et al., 2017; Berends et al., 2016; Bowden et al., 2017), with strict parental attitudes regarding underage alcohol consumption having a protective effect on adolescent drinking...
behaviours (Mares et al., 2011). In a review, Yap et al. (2017) found strong evidence supporting positive association of favourable parenting attitudes towards alcohol drinking with alcohol initiation and misuse in adolescents. Similarly, in a meta-analysis of studies reporting on the association between parental attitudes and adolescent alcohol use, Tael-Öeren et al. (2019b) found that less restrictive attitudes were associated with increases in alcohol use onset and frequency. That is, adolescents who perceive that their parents approve of their drinking are more likely to consume alcohol more frequently (Bahr et al., 2005; Schwinn and Schinke, 2014) and heavily (Mares et al., 2011; Lam et al., 2017).

Taken together, evidence indicates parents remain one of the most important social influencers in preventing and reducing adolescents’ alcohol consumption (Newton et al., 2017). Several studies indicate a positive association between specific parenting factors (e.g. parental norms and attitudes) and adolescents’ alcohol use (Kuntsche and Kuntsche, 2016; Yap et al., 2017). With concerns about harms associated with adolescent alcohol consumption and research suggesting that parents are a key factor in explaining adolescent alcohol use, parents provide an opportunity for targeted alcohol prevention. The next section will discuss how previous parent programs in prevention science and social marketing have aimed to address these influencing factors.

2.2.3. Targeting parents to reduce underage drinking

Alcohol specific programs targeting parents have been identified as an important component in minimising alcohol-related risks in adolescents (Newton et al., 2017; Onrust et al., 2016). Previous systematic reviews have examined the efficacy of parent alcohol programs in different ways (Foxcroft and Tsertsvadze, 2011a; Newton et al., 2017; Yap et al., 2017). Foxcroft and Tsertsvadze (2011b) conducted a review of universal multi-component prevention programs for alcohol misuse in young people. The review focused on parents as agents in multiple-component programs and reported outcomes for alcohol use in adolescents. Its findings indicated that multi-component programs can be effective, with 12 out of 20 trials assessed showing positive results for preventing or reducing alcohol use in adolescents (Foxcroft and Tsertsvadze, 2011b). Similarly, Foxcroft and Tsertsvadze (2011a) conducted another review of family-based programs with the findings showing that nine out of 12 included studies demonstrated positive results for preventing alcohol misuse in adolescents. Focusing, however, on parents as agents in multi-component or family-based programs, these previous reviews did not specifically examine parent alcohol prevention programs in schools.
To address this gap, Newton et al. (2017) examined the efficacy of combined student and parent-based programs in school settings and found that eight out of the ten programs included in the study demonstrated effectiveness in reducing alcohol use in adolescents. However, these reviews focused solely on program effects on adolescent alcohol consumption and did not examine important factors associated with parent outcomes such as parental attitudes. Furthermore, they did not examine important processes that have been shown to improve program design such as the integration of audience insights and application of theory.

In addition to understanding program effects on adolescent drinking, several reviews examined measures associated with parenting specific factors (e.g. monitoring and family rule setting). For example, Kuntsche and Kuntsche (2016) analysed the effectiveness of parent-based programs in preventing, curbing or reducing substance use among ten- to 18-year-olds and also considered parenting specific factors such as general parenting and substance-related parenting factors. Their findings indicated desirable effects of parent factors such as rule-setting, monitoring and parent-child communication. However, similarly to previous reviews (Newton et al., 2017), the reported outcome measures were based on adolescents’ self-reports rather than measuring parental responses directly. Given that discrepancies exist between parent and adolescent reports of parenting behaviours (Augenstein et al., 2016; De Los Reyes et al., 2013), evaluating program effectiveness from a parent perspective may allow for a more comprehensive understanding to emerge.

Although active participation of parents is crucial to program success (Garcia-Huidobro et al., 2018; Mewton et al., 2018), a key concern is that participation in programs targeting parents to reduce alcohol consumption among adolescents is generally low (Newton et al., 2017; Tael-Oeren et al., 2019a). A reason for low participation rates in parent alcohol programs is that parents perceive little need for the program (Pettersson et al., 2009). This perception might be due to parents lacking awareness of the role they have in influencing their adolescents’ attitudes towards alcohol and drinking behaviours (Jones et al., 2015). This may, additionally, reflect parents’ poor perceptions of their own drinking behaviours and incognisance of what constitutes binge drinking (Spencer et al., 2018), in a culture where drinking to excess prevails (Fox, 2015).

In addition, parents with less restrictive attitudes concerning alcohol are less likely to participate in alcohol-related programs (Skarstrand et al., 2009), and are more likely to drop
out of the programs prior to completion (Koutakis et al., 2008). Parents with less restrictive attitudes also tend to have negative influences on adolescents’ drinking (Yap et al., 2017). Finally, and arguably most importantly, it needs to be noted that parent alcohol programs suffer from a lack of audience orientation; parents have openly admitted that they don’t see a lot of value in the existing programs (Adolfsen et al., 2017; Skarstrand et al., 2009). This is concerning given the low participation and retention rates of parents in these programs. A lack of parental engagement limits program impact and inhibits long-term sustainability (Gross and Bettencourt, 2019). These challenges underline the need for innovation in program design. It is not enough for programs to reach only those who already have the required knowledge and skills. For sustainable change to be realised we need innovative strategies that uncover new ways to successfully capture at risk families who are the hardest to reach (Spencer et al., 2018; Díaz et al., 2006).

Approaches which employ ‘bottom-up’ techniques have been found to generate ideas that differ from ‘top-down’ or expert driven approaches (Rundle-Thiele et al., 2019b; Hurley et al., 2018a), and successfully achieve desired behaviours (David et al., 2019). However, expert driven strategies dominate alcohol programs (Koutakis et al., 2008; Tael-Oeren et al., 2019a). With its customer-centric approach to program development, social marketing may offer a systematic means of encouraging parents to participate in a program that can reduce permissive attitudes to alcohol supply, and positively influence alcohol specific parenting behaviours (e.g. improve parent-child communication and parental monitoring practices).

2.3. Social marketing

2.3.1. Social marketing as an approach to behaviour change

For almost half a century (Kotler and Zaltman, 1971), social marketing has been successfully applied to a range of behaviour change contexts, including wildlife conservation (Green et al., 2019; David et al., 2019), physical activity (Aceves-Martins et al., 2016; Gordon et al., 2006b), organ donation (Čož and Kamin, 2020), substance misuse (Stead et al., 2006; Kubacki et al., 2015) and teenage pregnancy (Wakhisi et al., 2011). Originating from commercial marketing, social marketing has evolved throughout the years since it was first defined by Kotler and Zaltman (1971) as “the design, implementation, and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution, and marketing research” (p. 5). Since its
inception, there has been a shift in the focus of social marketing, with Andreasen (1994) arguing that social marketing is about more than increasing the acceptability of a social idea. The late 1980s and early 1990s saw social marketing move beyond the notion of merely promoting societally beneficial ideas (Fine, 1981) to placing a strong emphasis on influencing behaviour change (Andreasen, 1994), now considered the ultimate goal of all social marketing programs. In 2014, a consensus definition for social marketing, reached between peak social marketing bodies, states that “social marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviour that benefit individuals and communities for the greater social good” (ESMA et al., 2017). This updated definition highlights social marketing’s extended scope and application with a focus on integrating and listening to other disciplinary approaches to achieving voluntary behaviour change.

Critical changes in more recent years have come through the integration and adaption of knowledge and core concepts from related fields that share social marketing’s core value of customer centricity, such as Service Dominant (SD) logic (Vargo and Lusch, 2008), service design (Gordon et al., 2013b) and transformative service research (Previte and Robertson, 2019). For example, SD logic and its concepts of value co-creation reshaped understanding of how users interact with and engage in social change processes (Domegan et al., 2013). Value first emerged as a key concept in social marketing when Kotler and Lee (2008, p. 7) defined social marketing as a process used to “deliver value in order to influence target audience’s behaviour”. In this novel way of thinking, through a process of value co-creation, users actively engage in the development of program strategies and become joint collaborators in adopting or quitting behaviours as opposed to targeted for exchange (Domegan et al., 2013). Thus, an increased focus on investigating bottom-up approaches gained prominence in social marketing literature (French and Russell-Bennett, 2015; Dietrich et al., 2016a).

Social marketing distinguishes itself from other disciplines by focusing on developing voluntary solutions. Over time, scholars have come to understand that social marketing can be distinguished through delivery of solutions that people value in response to social problems (Lefebvre, 2013). For example, while commercial marketing primarily focuses on achieving end results that benefit the company or organisation, social marketing distinguishes itself by aiming to improve individual and community welfare (Gordon et al., 2006a) for the greater social good (ESMA et al., 2017). Furthermore, social marketing distinguishes itself from education by moving beyond standard education and information approaches (Rothschild,
1999) with its aim to achieve behaviour change outcomes (Lee and Kotler, 2015). Public health programs often focus on the communication and education of consumers, creating awareness by informing people of the benefits of adopting healthy behaviours (Grier and Bryant, 2005). However, these approaches can often stigmatise population groups, alienating target audiences who are most in need of behavioural change (Brennan et al., 2016). While social marketing may inform as one component within a program, it moves beyond the assumption that once provided with information the target market will accept the idea and be motivated to act (Andreasen, 2002). Furthermore, public health programs typically take a ‘one size fits all’ approach to program design and messaging (Grier and Bryant, 2005), while social marketers use segmentation principles to tailor programs to specific audience segment needs (Keihner et al., 2011; Kamada et al., 2013). For example Kamada et al. (2013) applied segmentation in order to satisfy groups within the target audience. When developing a program to improve physical activity among older adults, two segments were identified as having different needs and abilities (i.e. women who do not currently engage in regular walking behaviour and women who engaged in strength or flexibility activities) and program offerings developed were tailored to the specific needs of each group.

In addition, social marketing uses formative research to understand motivators and barriers for target audiences, recognising that different groups may exist (Rothschild et al., 2006, Carins et al., 2016). This audience orientation is an essential feature of social marketing, and sways from the traditional expert driven approaches (French and Blair-Stevens, 2005), which typically characterise public health programs where experts/professionals determine the customer’s needs (Könings et al., 2014).

In an effort to distinguish social marketing from other disciplines and to guide social marketing practitioners and researchers in program development Andreasen (2002) developed six principles that characterise a social marketing program, which include:

1. Behaviour change as the core focus of program efforts.
2. Audience research to understand the target audience’s experiences, values and needs.
3. Segmentation of the target audience to ensure maximum program efficacy.
4. Creating attractive exchanges with the target audience.
5. The strategic application of the marketing mix.
6. Analysing the *competition* of the behaviour and utilising strategies to minimise competing forces.

The six principles were later expanded by French and Blair-Stevens (2006) to further include:

7) The application of behaviour *theories* to understand the target audience and inform program design, implementation and evaluation.
8) Identifying actionable *insights* to inform program development.

The addition of *theory* recognises the importance of theory driven research and practice, while *insights* propose to further refine the formative research process (i.e. separation of customer orientation and insights) ensuring the occurrence of a strategic approach that places the wants and needs of the target audience at the heart of programs (French and Blair-Stevens, 2006). The addition of insights as a social marketing principle reflects contributions from the service marketing discipline which emphasise the value of co-creating with end users in order to identify and satisfy customers’ needs and wants (Vargo and Lusch, 2008).

Examination of the principles *customer orientation* and *insights* highlights very similar points of inquiry. With formative research at their core, both aspire to uncover a deeper understanding of the customer in order to inform program strategies. For example, customer orientation is described as developing an understanding of the customer through formative research methods to uncover and identify customers’ barriers, motivators, desires and unique needs (French and Blair-Stevens, 2006). A further refinement, insights are described as gaining deep understanding and penetration into what moves and motivates the customer through the identification of emotional and physical barriers that may influence particular behaviour (Kim et al., 2020a). For example, Kim et al. (2020a) uncovered insights from an end user perspective through the use of an online survey and co-design sessions. Insights gained informed program development through improved understanding of behaviours, strategies and food waste types valued by end users (Kim et al., 2020a). Thus, insights (i.e. actionable pieces of understanding that lead to program development) are the outcome of the formative research process.

However, formative research in social marketing often trades theoretical knowledge in favour of generating user driven insights to inform program development (Kim et al., 2020b). When theory is applied during formative research it is often in the context of target audience
segmentation (Hennink-Kaminski et al., 2018) or to inform the development of survey instruments (Rundle-Thiele et al., 2019b) (see Table 2). Systematic reviews of social marketing often analyse studies in light of their application of the eight social marketing principles (see, for example, Čož and Kamin, 2020; Alhosseini Almodarresi et al., 2020; Kubacki et al., 2017). Resulting research indicates that change is more likely to occur when more of the social marketing principles are applied (Carins and Rundle-Thiele, 2014; Xia et al., 2016). Therefore, it is recommended that as many social marketing principles as practicable are applied to extend program effectiveness. Application of three social marketing principles in a selection of social marketing studies are reported in Table 2.

Table 2. Formative research in Social Marketing

<table>
<thead>
<tr>
<th>Author</th>
<th>Context</th>
<th>Formative research approach</th>
<th>Customer orientation</th>
<th>Insight generation</th>
<th>Theory application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim et al. (2020)</td>
<td>Household food waste</td>
<td>Online survey; co-design</td>
<td>✓</td>
<td>No theory</td>
<td></td>
</tr>
<tr>
<td>Rundle-Thiele et al. (2019b)</td>
<td>Koala and dog interactions</td>
<td>Survey; co-design</td>
<td>✓</td>
<td>Survey designed based on theory</td>
<td></td>
</tr>
<tr>
<td>Hennink-Kaminski et al. (2018)</td>
<td>Healthy eating and physical activity</td>
<td>Focus groups</td>
<td>✓</td>
<td>Theory used for audience segmentation</td>
<td></td>
</tr>
<tr>
<td>Buyucek et al. (2018)</td>
<td>Alcohol consumption</td>
<td>Observations</td>
<td>✓</td>
<td>No theory</td>
<td></td>
</tr>
<tr>
<td>Finnell and John (2017)</td>
<td>1% milk consumption</td>
<td>Survey; focus groups</td>
<td>✓</td>
<td>Survey design based on theory</td>
<td></td>
</tr>
<tr>
<td>Carins et al. (2016)</td>
<td>Eating behaviour of military personnel</td>
<td>In depth interviews; observations, store audits</td>
<td>✓</td>
<td>No theory</td>
<td></td>
</tr>
<tr>
<td>Hull et al. (2014)</td>
<td>HPV vaccination</td>
<td>Focus groups; interviews</td>
<td>✓</td>
<td>Theory used for audience segmentation</td>
<td></td>
</tr>
<tr>
<td>Hull et al. (2013)</td>
<td>Homophobia</td>
<td>In depth interviews; focus groups; concept testing</td>
<td>✓</td>
<td>Message construction guided by theory</td>
<td></td>
</tr>
<tr>
<td>Evers et al. (2013)</td>
<td>Asthma</td>
<td>Survey; pre-test focus groups</td>
<td>✓</td>
<td>No theory</td>
<td></td>
</tr>
</tbody>
</table>

Formative research methods employed in social marketing are dominated by researcher driven approaches (e.g. surveys, focus groups and interviews) (Kubacki and Rundle-Thiele, 2016). These methods typically rely on the researcher driving the line of questioning, with a
restricted focus on understanding what people think and feel. Thus, approaches which place
the user at the heart of discoveries may overcome bias and blinkered viewpoints. Co-design,
for example, is a user driven approach which emphasises the empowerment of participants to
uncover latent user needs (Sanders and Stappers, 2008), but has received limited attention as a
social marketing formative research method (Kubacki and Rundle-Thiele, 2016).

In summary, these eight principles provide a deeper understanding of core social
marketing concepts to design behaviour change programs (Andreasen, 2002; French and Blair-
Stevens, 2006). Given the importance of a wider application of the social marketing principles,
clear examples showing researchers and practitioners how to successfully apply multiple
principles to program development are needed.

As social marketing gains prominence for its ability to develop solutions to some of the
world’s most pressing social (McKenzie et al., 2010), health (Kubacki et al., 2017), economic
(Lee and Kotler, 2009) and environmental issues (David et al., 2019), the importance of
developing theoretically mapped, effective and practically useful programs is becoming
increasingly clear. Specifically, for researchers and practitioners to develop effective evidence-
based programs they must be able to capture target audiences’ unique needs and preferences
through user driven formative research methods while also drawing on relevant theories and
models. The importance and application of theory in social marketing is examined next.

2.3.2. Theory use in social marketing

A theory is a fact-based framework which can be used to clearly describe a current
behaviour, predict a behaviour occurring in the future (Brennan et al., 2014), or offer insights
into the causal determinants of behaviour change (David and Rundle-Thiele, 2019). Rimer and
Glanz (2005, p. 4) describe theory as “…a systematic way of understanding events or
situations. It is a set of concepts, definitions, and propositions that explain or predict these
events or situations by illustrating the relationships between variables”. McMillan and Chavis
(1986) outline four common components of theory as: 1) definitions of concepts, 2) a domain
where the theory applies, 3) a set of relationships among concepts, and 4) specific predictions.

In social marketing, theories are used in the development of programs to effect better
outcome change through influencing constructs that cause specific behaviour and/or behaviour
change (David and Rundle-Thiele, 2019). Though it is widely accepted that the end goal of
social marketing programs is behaviour change (Andreasen, 1994), research attention is nonetheless dominated by a focus on behaviour (Rundle-Thiele et al., 2019a). Behaviour and behaviour change are conceptually and operationally distinct, with the key point of difference lying within temporal considerations (Ployhart and Vandenberg, 2010). While behaviour is seen as a measure taken at one point in time (i.e. static), behaviour change is about modifying behaviour over time. Thus, assessments of behaviour change consider behaviours over time to identify if, and in which direction change occurs (David and Rundle-Thiele, 2019). Michie et al. (2008) state that programs are likely to be more effective when they focus on determinants of both behaviour and behaviour change.

A theoretical understanding of behaviour and behaviour change allows us to focus on the constructs we need to influence for a change of behaviour to occur (Michie and Prestwich, 2010). As a relatively new discipline, social marketing draws on theories of behaviour from a range of other disciplines (Brennan et al., 2014) such as psychology (Rosenstock et al., 1988), marketing (Kotler, 2011) and computer science (Kemp et al., 2010). Example theories which dominate social marketing practice focus on explaining and predicting behaviour (David and Rundle-Thiele, 2018, Pang et al., 2017), such as the transtheoretical model (Prochaska et al., 1994), the health belief model (Rosenstock et al., 1988), the theory of planned behaviour (Ajzen, 1985) and the social cognitive theory (Bandura, 1998) do. For example, the theory of planned behaviour is used to explain and predict influences of behaviour at a single point in time, but it does not offer insights into how behaviour changes (Ajzen, 2011). Given this over-reliance on behavioural theories in social marketing which draw on static measures, David and Rundle-Thiele (2019) call for researchers to expand their investigations to take in theories of behaviour change and adopt methodologies that move beyond cross-sectional data to ensure research is focused on first, understanding if change occurs and subsequently, whether observed changes are in the desired or undesired direction.

The inclusion and application of theory is advocated as an important component of social marketing, as evidenced in social marketing literature (Rundle-Thiele et al., 2019a) and benchmark principles (The National Social Marketing Centre, 2010). Theory can be helpful, if not crucial, to every stage of the social marketing planning process. Theories can serve as valuable frameworks to guide the process of program development through informing and influencing the design, implementation and evaluation of social marketing programs (Luca and Suggs, 2013). French and Blair-Stevens (2006) state that an appropriate theory should be
identified following audience orientation research to inform and guide the marketing mix (i.e. product, price, place and promotion), and its assumptions tested as part of program pilot testing. In social marketing, theories are commonly used for audience research and segmentation (Ibrahim et al., 2017; Rundle-Thiele et al., 2017), program development (Hunter et al., 2015), message construction, promotion (Hunter et al., 2015; Hull et al., 2013) and evaluation (Rundle-Thiele et al., 2015; Truong, 2014). Theory can be helpful at every stage of the formative research process including the program planning and development stages (Levit and Cismaru, 2020). During the formative research phases, theories may be useful to assist in setting explicit aims and objectives, segmenting target audiences (French and Gordon, 2015), identifying messages that resonate with the target audience and detecting important barriers and benefits (Hull et al., 2013). Ultimately, the emphasis on theory-led practice is valued in social marketing practice to save money, time and effort (Brennan et al., 2014) and deliver superior program outcomes over time (Kim et al., 2019).

Despite the emphasis on theory and reported advantages, evidence for its usefulness is mixed. While there is increasing evidence suggesting that theory-based programs are more effective than those which do not utilise theory (Glanz and Bishop, 2010; Willmott et al., 2019; Green et al., 2019), this claim is not undisputed. For example, although a review of weight management programs by Willmott et al. (2019) concluded that linking at least one theoretical construct to program strategies improved program outcomes, the Park-Higgerson et al. (2008) review of school-based violence prevention programs failed to find evidence that programs based on theory were more effective than those that were not. Similarly, De Gruchy and Coppel (2008) used theory in a social marketing program design and evaluation but did not report any significant behaviour change. However, reviews that aim to examine the effectiveness of theory typically do not consider the level of theory application in program development (Michie & Prestwich, 2010). Furthermore, theory is assessed across multiple programs and theory use is not limited to the same program or study setting. Moreover, evaluating evidence is difficult due to a significant proportion of social marketing programs lacking theoretical guidance or delivering low levels of theory reporting (Chillón et al., 2011). Hence, conclusions as to the utility of theories are premature as they fail to provide meaningful comparisons.

Absence of theory is a common methodological weakness of behaviour change programs (Pang et al., 2017; Tebb et al., 2016; Painter et al., 2008) and more specifically, the social marketing field (Truong, 2014; Luca and Suggs, 2013; David and Rundle-Thiele, 2018;
Almestahiri et al., 2017). For example, in a review of social marketing programs in global health by Firestone et al. (2017), theory was the least used of the eight social marketing benchmark criteria. Similarly, the Truong and Dang (2017) review highlights the lack of theory use in social marketing programs, finding that only 23% of 166 social marketing studies explicitly mentioned theory. Furthermore, in studies which do report theory use, inconsistent measures and constructs are used (David and Rundle-Thiele, 2018), and information is insufficient to allow an adequate understanding of how the theories were applied to inform formative research, program build and evaluation efforts (Willmott et al., 2019).

In the two decades since Lefebvre (2000) called for improved reporting and application of theory in social marketing, little progress has been made. The limited and inconsistent application of behaviour change theory highlights a theory-practice gap, igniting continued calls for more actionable guidelines on ‘how’ to incorporate theory during the social marketing process (Rundle-Thiele et al., 2019a). In an attempt to address this gap, Manikam and Russell-Bennett (2016) proposed a four-stage process to guide the selection and application of theory to the social marketing program planning process. The process incorporates information search, evaluation of past interventions, theory selection and theory-based design (Manikam and Russell-Bennett, 2016). Alternatively, Michie and Prestwich (2010) developed a method for assessing the extent of theory application in behaviour change programs. They proposed a Theory Coding Scheme (TCS) which is made up of 19 items that allow researchers to reliably describe the theoretical base of programs (Michie and Prestwich, 2010), aiding in the reporting and comparison of theory application examined in systematic literature reviews. For example, Willmott et al. (2019) utilised the TCS to examine the level of theory use in electronic health weight management programs. While findings showed that the majority of studies (75%) mentioned theory, most of these (77%) failed to indicate how program techniques were related to the theoretical base (Willmott et al., 2019). Similarly, when utilising the TCS to examine theory use in physical activity and dietary programs, Prestwich et al. (2014) found that 90% of studies did not report links between theory and program techniques. The authors go on to conclude that more extensive application of theory was unlikely to improve program outcomes (Prestwich et al., 2014). However, to advance understanding of the usefulness of theory in behaviour change programs, improved application and reporting is needed to allow for a more accurate assessment.
Taken together, with social marketing emphasising the need for a customer-centric approach, this evidence does not necessitate that theory be abandoned in order to centre programmatic decisions on consumer preferences (Thackeray and Neiger, 2000). In the absence of a theoretical foundation, psychological processes that are integral to behaviour change may be unknowingly omitted, jeopardising program effectiveness (Michie and Prestwich, 2010). While evidence as to theories’ usefulness is complex, given the low quality of theory application and reporting, the role of theory remains contested (Rundle-Thiele et al., 2019a). While evidence evaluating the application of theory on program effectiveness suggests theory informed programs may produce greater outcomes (Kim et al., 2019), evidence also suggests that social marketing programs designed with a focus on customer orientation (to the exclusion of theory) can successfully achieve positive outcomes (David et al., 2019). Given the mixed evidence base, more work is needed to determine the usefulness of theory. Thus, the purpose of this research is to examine the usefulness of theory when combined with an audience-orientated approach to understand if this blended approach can be successfully applied to gain insights that can inform program design. This can be achieved through the integration of theory into a co-design process. The following section discusses co-design as an approach to social marketing program design.

2.4. Empowering participants through a co-design approach

2.4.1 From user centred design to co-design

Lefebvre (2012) states that social marketers should be actively seeking knowledge and insights from those at whom the programs are aimed. End users can influence the shaping of a program through a more user centred design approach (Kubacki and Rundle-Thiele, 2016). Through various techniques (e.g. focus groups, usability testing, observations and interviews) participants are given the opportunity to evaluate expert-generated design solutions and provide feedback in an iterative process used to refine programs (Kubacki and Rundle-Thiele, 2016) to ensure they better meet the needs of the users (French and Blair-Stevens, 2006). While participant involvement is an important concept of user centred design, the degree to which it is applied in the design process varies depending on the method employed. Traditionally, user centred design methods involve the participants being passive objects of the study removed from the design stage and, in its best case, given a voice through the researchers (Abras et al., 2004). Through methods such as observations and interviews, trained researchers learn about the needs, wants and limitations of the users in relation to existing programs or prototypes of
developed concepts (Kubacki and Rundle-Thiele, 2016). This information is then interpreted by the researcher and contributes to program design, a process which may further involve the researcher collaborating with other professionals (e.g. designers, drug and alcohol specialists, educators) (Gordon et al., 2006a).

While user centred design approaches typically focus on designing for users (i.e. users as passive subjects to be interviewed and observed), the intent of participatory design methods is designing with users (i.e. users as partners in collaborative processes) (Sanders and Stappers, 2008). Thus, participatory design allows users to take on a more active role in the design process. The approach emerged in Scandinavia in the 1970s and acknowledges that those who are affected by the design should ultimately have a say in the design process (Ehn, 2008). Participatory research seeks to empower participants, involving not only end users but also other important stakeholders (e.g. alcohol experts and teachers) in the design process and in doing so gives them the opportunity to directly contribute to the outcome of the design (Satcher, 2005). Although participatory research has been identified as an effective approach to enhancing health and wellbeing (Salimi et al., 2012; Hanson-Easy and Sher, 2018; McElfish et al., 2017), a lack of research that evaluates the effectiveness of participatory research against more traditional research methodologies is evident.

Participatory design represents the basis for the concepts of co-creation and co-design (Sanders & Stappers, 2008). Co-creation remains a somewhat ambiguous concept through a lack of consensus on its definition and application (Pearce et al., 2020), although definitions remain similar in their agreement that co-creation involves a process of equitable collaborations between stakeholders (Greenhalgh et al., 2016; Anderson et al., 2016; Sanders and Stappers, 2008). From a design theory perspective, co-creation refers to an act of creativity that is shared by two or more people (Sanders and Stappers, 2008). In recent years, and particularly through the influence of the service-dominant logic (Vargo and Lushc, 2008), co-creation has become a more general concept that “encompasses all the specific theoretical and empirical occurrences in which companies and customers generate value through interaction” (Gummesson et al., 2014, p. 644). This includes the close collaboration and interaction with users during the innovation process (Gemser and Perks, 2015), an approach that starkly contrasts that of traditional market research whereby researchers ‘listen in’ to explore new combinations of customer needs (Witell et al., 2011). Thereby, users co-create value by actively contributing with their unique experiences, skills and knowledge, which might not only enhance insight and
engagement, but may also offer opportunities for program innovation (Gustafsson et al., 2012; Domegan et al., 2013).

As a specific instance of co-creation, co-design refers to the collective creativity of designers and participants during the design process (Sanders and Stappers, 2008). Co-design has an important impact on the roles played by different actors throughout the design process. During the co-design process, the expert (i.e. researcher or designer) takes on the role of facilitator, while those who are traditionally not a part of the design process (i.e. users and other program beneficiaries) take on the role of designers, contributing value through their own unique expertise and experiences (Hurley et al., 2018a). Co-design facilitators stimulate and enhance participants’ creativity using specific co-design tools and techniques to allow participants to confidently express their ideas for future program design solutions (Sanders and Stappers, 2014). Thus, co-design insights exist beyond the validation and evaluation of design concepts, as participants are inspired to generate innovative, interesting and viable program solutions (Trischler et al., 2019).

An important concept of co-design is empowerment (Dietrich et al., 2017). Co-design methods aim to empower participants, giving them the tools to express themselves in a design process they have not traditionally been a part of (Mattelmäki and Visser, 2011). By challenging top-down approaches, co-design breaks down traditional hierarchies as people are taken out of their usual roles and given opportunities to contribute to the development of change (Clarke et al., 2017). Thus, providing users and other key stakeholders a platform to contribute empowers them through increased knowledge, skills and confidence in their daily lives (Slattery et al., 2020). In addition, when user input and contributions are represented in final design solutions, a sense of program ownership is instilled within participants (Hussain, 2010), in turn creating a stronger sense of empowerment among participants (Palmer et al., 2019). For example, Nastasi et al. (2000) found that empowerment of participants can have a greater impact on their motivation to contribute to the success of the program even post its completion. Thus, through co-design participants are empowered to communicate their own ideas, while they design solutions that are beneficial to others like them as well as to themselves (Hussain, 2010).

Finally, in contrast to traditional research methods, the process of co-design allows participants to identify solutions to their own needs as they occur, making it easier to uncover
and understand their latent needs. User experiences can be uncovered through methods focused on what people say (e.g. survey and interviews), what they do (e.g. observations), or what they make (e.g. co-design activities) (Sanders and Dandavate, 1999). Attending to what people make allows knowledge that may not be as readily expressed in words to be captured (Brandt et al., 2012). Thus, while engaged in co-design activities, users become aware of and learn about their own needs, producing insights and ideas that stem from their personal experiences (Hurley et al., 2018a).

2.4.2 Co-designing programs for behavioural change

Over the years, growing attention has been paid to the potential value of co-design in behavioural science (Gordon et al., 2013a), witnessed in the increasing application of co-design approaches to social marketing program design (Rundle-Thiele et al., 2019b; Kim et al., 2020b; Hastings and Domegan, 2017). To date, co-design has proved a successful approach to social marketing in a variety of contexts such as alcohol education (Dietrich et al., 2016a), marine wildlife conservation (Domegan et al., 2019) and food waste behaviour (Kim et al., 2020b). Examining the recent application of co-design in social marketing, the term is often used ambiguously and with limited reporting, precluding a comprehensive understanding of how the approach was utilised (Díaz-Perdomo et al., 2019; Mehmet et al., 2020). Studies which do report co-design methodological details prominently describe the use of co-design sessions where participants are presented with cards detailing existing program components and asked to evaluate activities (Dietrich et al., 2016a; Domegan et al., 2019), before designing new concept ideas (Kim et al., 2020a; Rundle-Thiele et al., 2019b). This process of utilising activity cards allows expert knowledge, gained through systematic literature reviews (Mehmet et al., 2020) and expert interviews (Rundle-Thiele et al., 2019b), to be fed to participants during the co-design sessions, albeit that a lack of behavioural theory within reported co-design processes is observed (see Table 3).
<table>
<thead>
<tr>
<th>Author</th>
<th>Context</th>
<th>Co-design participants</th>
<th>Co-design approach</th>
<th>Co-design tools</th>
<th>Integration of expert knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mehmet et al. (2020)</td>
<td>Digital strategy and website to support program to improve the physical health of those living with a mental disability.</td>
<td>People living with a mental disability, and their carers.</td>
<td>Semi-structured focus group: Identify user needs in relation to digital form and functionality (e.g. content, digital channels, goals, barriers). Co-design sessions: Evaluation of options.</td>
<td>Not reported.</td>
<td>Resourcing: Systematic literature reviews to identifying existing programs.</td>
</tr>
<tr>
<td>Kim at al. (2020)</td>
<td>Household food waste reduction campaign.</td>
<td>Household end users.</td>
<td>Co-design session: Identify preferred program characteristics (e.g. preferred types of food waste, behaviours to change, tools, and program strategies).</td>
<td>Word association exercise, activity cards detailing previous programs, design 'make tools'.</td>
<td>Resourcing: Systematic literature review to identify existing programs.</td>
</tr>
<tr>
<td>Rundle-Thiele et al. (2019b)</td>
<td>Campaign to reduce dog and koala interactions.</td>
<td>Dog owners.</td>
<td>Co-design sessions: Understand program strategies valued by dog owners.</td>
<td>Activity cards detailing previous programs, design 'make tools'. Activity cards detailing previous programs, design 'make tools'.</td>
<td>Expert interviews and systematic literature review to identify existing programs. n/a</td>
</tr>
<tr>
<td>Frederiks et al. (2015)</td>
<td>Engaging customers with energy efficiency programs.</td>
<td>Household end users.</td>
<td>Co-design sessions: Understand household needs and desires when it comes to engaging with energy efficiency programs.</td>
<td>Not reported.</td>
<td></td>
</tr>
</tbody>
</table>
Despite the increasing prominence of co-design as an approach to develop more sustainable behaviour change programs (Domegan et al., 2019; Mehmet et al., 2020), a lack of experimental testing of cooperatively generated designs is observed. In fact, in a systematic review of co-designed mHealth programs, Eyles et al. (2016) found that program effectiveness was not assessed by any of the included studies. To address this gap, Rundle-Thiele et al. (2019b) examined co-design in the context of wildlife conservation. Co-design proved to be an effective and innovative way to capture creative and actionable insights from the target audience that differed from existing expert driven approaches (Rundle-Thiele et al., 2019b). The program was implemented in the community and outcome evaluations demonstrated program effectiveness (David et al., 2019). However, due to the lack of a control group, and given the program was not compared and contrasted to an expert designed solution, it is difficult to directly assess the effectiveness of co-design.

Taken together, while existing research suggests that co-design can benefit social marketing researchers and practitioners (Gordon et al., 2013a; Dietrich et al., 2016a), a recent review of co-design in health programs found that evaluations typically focused on co-design benefits to users and researchers and no program evaluations have comparatively qualified the use of a co-design methodology against more traditional research processes (Slattery et al., 2020). Given that co-design research is predominantly qualitative in nature, with few studies adopting quantitative approaches (Dudau et al., 2019; Voorberg et al., 2015), Dudau et al. (2019) call for the “constructive disenchantment with the magic that surrounds co-design” (p. 1577), highlighting the need for empirical examination that expands debates beyond conceptual explorations.

Finally, evidence highlights a lack of detailed reporting to demonstrate how co-design activities are implemented (Slattery et al., 2020), and how co-design insights are transformed into viable program solutions (Eyles et al., 2016; Trischler et al., 2019). Thus, while co-design is increasingly recognised as a viable option to apply in social marketing program design, due to the use of variable methods claimed to be co-design and a lack of transparency and reporting in the processes of insight generation and subsequent program creation, current understanding is limited and warrants research attention.
2.4.3 Co-design tools to facilitate creative contributions

To facilitate and support creative engagement among participants, appropriate tools and processes must be provided (Dietrich et al., 2016a). Design tools are material components used to facilitate participants’ contributions during design workshops (Sanders and Stappers, 2014), supporting participants in expressing their knowledge in a way that can be easily interpreted (Mattelmäki and Visser, 2011). A variety of co-design tools are available to assist researchers and designers to support specific design activities and purposes. For example, design probes are useful tools during pre-design stages (Sanders and Stappers, 2014). Based on self-documentation, such probes are designed to allow participants to record specific events, interactions, or personal experiences and can include the use of any type of artefact such as cameras, diaries or post it notes (Tosi, 2020). Similarly, generative tools that focus on what people ‘make’ are important tools during the ‘fuzzy front end’ of co-design when the goal is to discover what is to be designed (or not designed) (Sanders and Stappers, 2008). While prototypes are often the objective of traditional design methods which focus on concept evaluation, generative tools that signify what people make allow non designers to express their needs in terms of future use scenarios (i.e. concept generation) (Brandt et al., 2012). For example, design toolkits comprising of ‘make tools’ are used to produce visual representations of participants’ ideas and feelings, and have been found to be an effective device in uncovering participants’ latent needs (Trischler et al., 2018).

Design tools may further be used for engaging participants in activities through the use of ‘telling’ actions (i.e. talking, telling and/or explaining). For example, activity cards may be employed to enable participants to organise their ideas (Logler et al., 2018), develop team collaborations and begin the process of idea generation (Dietrich et al., 2016a) and are a useful way to communicate insights from existing literature (Villalba et al., 2019). In fact, the use of cards as design tools is increasingly favoured in co-design research practice (Peters et al., 2020), availing a great diversity of formats (e.g. cards consisting of prompts, concepts or existing program strategies) (Trischler et al., 2019; Clatworthy, 2011). In a recent study conducted by Hurley et al. (2018a), a card sorting method was employed in the development of a co-designed alcohol education program for parents. Participants were provided with cards detailing activities from existing parent alcohol programs and asked to sort, rate and discuss each card. It was found that the application of a card-sorting method empowered participants, encouraged engagement,
and led to the development of program ideas that differed from existing expert designed programs (Hurley et al., 2018a).

When conducting co-design activities, researchers and designers must select the appropriate tools to enable users to effectively express themselves as a part of the design team (Hurley et al., 2018a). Hence, for participants to creatively contribute to the design process of an alcohol education program, the appropriate tools, which encourage creative contributions from participants in a manner that can be easily interpreted by the researchers, must be provided. In addition to the selection of suitable co-design tools, appropriate processes must be followed in order to maximise co-design effectiveness. These processes are discussed next.

2.4.4 An exploration of the co-design process

Specific processes and procedures for undertaking a co-design method are required to effectively plan and conduct sessions as well as evaluate generated ideas (Sanders and Westerlund, 2011; Trischler et al., 2019). Co-design can be approached in a variety of ways, with researchers having explored numerous approaches over the years (Trischler et al., 2019; Ind and Coates, 2013). For example, Steen et al. (2011), examine different co-design approaches in terms of expected goals and benefits. They state that to realise the maximum potential of benefits from co-design activities, desired goals must first be identified and articulated, and then aligned with co-design activities and their associated benefits. When planning and implementing co-design, Sanders and Westerlund (2011) recommend considering such important aspects as the recruitment of participants, sensitising participants to encourage creative thinking, the preparation of material to evoke idea generation, and reflection post event. In turn, Ind and Coates (2013) consider the facilitation process and propose that co-design practitioners should specifically focus on creating an atmosphere that evokes a sense of trust within participants to increase productivity.

Most co-design processes involve a sequential process whereby an understanding of participants’ needs develops, followed by concept development (Bowen et al., 2013; Trischler et al., 2019). Bowen et al. (2013) propose a five-step process including 1) understanding and sharing experiences, 2) exploring blue-sky ideas, 3) selecting and developing blue-sky concepts, 4) converging to practical proposals, and 5) prototyping
and evaluating. Similarly, Boyd et al. (2012) suggest 1) engagement, 2) planning, 3) exploring, 4) developing, 5) deciding, and 6) changing. Dietrich et al. (2017) examined the previous co-design literature and proposed a six-step sequential co-design process as a possible framework for successfully facilitating co-design sessions with vulnerable users. This framework was later refined by Trischler et al. (2019) to reflect a collaborative and iterative process allowing for multiple iterations and close stakeholder consultation during the fuzzy front and back ends of the process. The framework is organised into seven steps, namely, resourcing, planning, recruiting, sensitising, facilitating, reflecting and building for change (Trischler et al., 2019). The seven steps are described briefly below.

**Step 1 - Resourcing**

First, relevant input for the co-design sessions are sourced from peer-reviewed articles and a secondary literature search across major search engines (Dietrich et al., 2017). This may involve the identification of co-design tasks, including the sourcing of existing program components (e.g. activities) and identification of key themes surrounding the investigated topic (Dietrich et al., 2017). The resourcing step also informs the development of co-design tools (Clatworthy, 2011).

**Step 2 - Planning**

Meetings are held with the research team to co-ordinate the planning of the co-design sessions (Dietrich et al., 2017). This includes planning each of the five following stages, i.e. recruitment procedures (e.g. venue locations), facilitation (e.g. design tools, format, run-sheet), and evaluation (Visser et al., 2005). The planning stage is of particular importance since it allows the research team to plan for each stage and aims to better handle unexpected events that may occur during the session due to the sensitive nature of the topic (e.g. approaching sensitive topics, managing possible scenarios of participants dropping out or disengaging from the activities or their assigned group).

**Step 3 - Recruiting**

Identifying suitable users who are willing and capable of contributing to new ideas that are not too specific but appealing to the broader user base is key (e.g. Hoyer et al., 2010; Poetz and Schreier, 2012). For example, a pre-screening survey may be used to ask potential participants about their attitudes and behaviours with regards to the issue being
investigated, the core focus of the research, and their degree of creativity or innovativeness. Strong networks are needed when recruiting ordinary users who may not necessarily see themselves as suitable co-design participants owing to their lack of interest and knowledge in the underlying topic (Hurley et al., 2018a). This fuzzy front end of the co-design process (i.e. resourcing, planning, and recruitment) is an iterative process that may involve multiple cycles due to unforeseen challenges relating to participant recruitment that, in turn, require planning and resourcing stages to be revisited and adjusted (Trischler et al., 2019).

**Step 4 - Sensitising**

The sensitising process prepares participants for planned co-design sessions, encouraging them to think about and reflect upon aspects of their personal situations and experiences, thus maximising the quality of the insights and knowledge gained from participants during the sessions (Visser et al., 2005). Mattelmäki and Visser (2011) found that the sensitising stage fostered empowerment of the participants and allowed them to familiarise themselves with the underlying topic.

**Step 5 - Facilitation**

The duration of co-design sessions can vary depending on the participants involved and the design task to be addressed (Steen et al., 2011; Dietrich et al., 2017). However, during facilitation, an introduction to the session, ice-breaker activities and design toolkits (e.g. post-it notes, masking tape, stickers, markers, butcher paper, activity cards, props) are essential to develop trust, empower participants and encourage discussion, creativity and collaboration among team members (Sanders and Stappers, 2008).

**Step 6 – Reflecting**

Co-design outcomes provide user driven insights to be built upon in consultation with key stakeholders. Thus, the focus of the reflecting stage is on the analysis of co-design outputs in order to develop clear recommendations for program design, to be built upon in consultation with other stakeholders (i.e. those who are responsible for creating and implementing final ideas) (Trischler et al., 2019). A range of methods may be applied to evaluate the co-design outcomes. For example, a five-phase cycle recommended by Yin (2015) may be applied to develop themes out of the qualitative data.
Step 7 – Building for change

As the last step of the process, building for change requires researchers, designers and other key stakeholders to assess the feasibility and realisation of proposed design ideas (Trischler et al., 2019). In an iterative process, the research team (in consultation with stakeholders) may need to revisit user insights through ongoing reflection on and conceptualisation of design ideas before a suitable solution to the design problem is ultimately created (Trischler et al., 2019).

While this process represented an important milestone to help social marketers understand how users can contribute to the design of social marketing programs, the authors do not mention the importance or necessity of incorporating theory into the co-design process. This is surprising given the importance and value that social marketing places on incorporating theory prior to, during and after program design (Truong, 2014). Theory offers the potential to focus program development on mechanisms known to influence specific behaviour change (Michie and Prestwich, 2010). Thus, while program development may benefit from the generation of co-design insights, the absence of theory may result in existing tried and tested behavioural predictors and influences being overlooked. One method for integrating theory with user insights is an abductive approach, which is discussed next.

2.5. Abductive reasoning

2.5.1. Characteristics of abductive reasoning

Charles Sanders Peirce (1903) proposed the idea of abduction as a distinct type of reasoning that exists outside of extant known inductive and deductive approaches. All types of logical reasoning can be classified into three unique categories including abductive, deductive, and inductive reasoning, with each type of reasoning responsible for distinctly different ways of producing knowledge (Peirce, 1980). Peirce (1980) proposed abduction as a process of generating and selecting explanatory hypotheses to explain a surprising fact or phenomenon. Removed from the formal rules of logic, whereby deduction proved something to be true and induction showed something to be operative, abduction arises from an interplay between theory and data (Nenonen et al., 2017), and is the only form of reasoning capable of producing new ideas (Dorst, 2011).
In order to evaluate the suitability of generated hypotheses, Peirce (1980) put forward a set of three criteria which include 1) testability (i.e. without the capacity to be verified it remains simply a suggestion), 2) explanatory (i.e. it should provide an explanation of why the phenomenon exists), and 3) economic (i.e. it is impractical to test an innumerable amount of hypotheses). The practice of selecting among alternative hypotheses gained prominence in discussions pertaining to abduction as scholars further explored and expanded upon the concept over the years (Lipton, 2004; Harman, 1965). Notably, in addition to Peircean definitions of abduction as hypothesis generation and evaluation, more modern notions of the concept examine abduction as hypothesis justification. For example, Harman (1965) continued Peirce’s work on abduction through the concept of ‘inference to the best explanation’. Inference to the best explanation (IBE) corresponds to abduction, placing emphasis on selecting the hypothesis that better explains the phenomenon than does any other proposed hypothesis (Folger and Stein, 2017). In later years, Lipton (2004) expanded upon Harman’s notion of IBE by arguing that we are bound by our existing knowledge and as such can only infer hypotheses based on this existing knowledge and expertise. Thus, it is not possible to select from all available hypotheses, only those which we are able to generate based on evidence available to us (Folger and Stein, 2017). As such, abduction relies heavily on the ‘prepared mind’ of the researcher, who is constrained in their ability to recognise the potential theoretical relevance of data by the scope of their knowledge and expertise (Timmermans and Tavory, 2012). In summary, while Peirce’s account of abduction generates and evaluates a novel hypothesis, abduction in the sense of IBE selects the best possible hypothesis among available alternatives (Kroll and Koskela, 2019).

While scholars have considered abduction through both theory generation and theory justification lenses, certain characteristics of the approach are widely agreed upon. Each aspect recognises the creative and novel contributions provided by the abductive methodology and its unique ability to intertwine theory and data better than inductive and deductive approaches can (Leeflang, 2017) (see Table 4).
Table 4. A comparison of methods of reasoning

<table>
<thead>
<tr>
<th></th>
<th>Abduction</th>
<th>Induction</th>
<th>Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim</strong></td>
<td>Creating a testable hypothesis that best explains the surprising phenomenon.</td>
<td>Justifying a hypothesis with empirical data.</td>
<td>Evaluating a theory driven hypothesis.</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>• These beans are white. • All beans in that bag are white. • Therefore, these beans are from that bag.</td>
<td>• These beans are from that bag. • These beans are white. • Therefore, all beans in that bag are white.</td>
<td>• All beans in that bag are white. • These beans are from that bag. • Therefore, these beans are white.</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td>Plausible explanation: Suggests that something may be.</td>
<td>Generalised conclusion: Draws conclusions to show practical evidence.</td>
<td>Guaranteed truth: Proves that something is true or false.</td>
</tr>
<tr>
<td><strong>Implication for new knowledge</strong></td>
<td>Introduces new knowledge to explain why something is occurring.</td>
<td>No new findings as it relies on available data.</td>
<td>No new ideas as the findings are presented in the premise.</td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td>Hypothesis created requires verification through subsequent empirical testing to provide truly meaningful explanations.</td>
<td>Offering superficial conclusions but not ‘the bottom of things’ since an observation about the specific establishes a general rule in an incomplete sense.</td>
<td>Incapable of discovering new knowledge as the conclusion has already been embedded in the premise.</td>
</tr>
</tbody>
</table>


Deductive reasoning, or theory driven research, is used to prove or disprove a theory (Meyer and Lunnay, 2013). This approach is, however, limited in its capacity to consider findings that fall outside of the original theoretical framework. For example, expert driven programs that apply pre-existing solutions to similar problems fail to adequately capture the unique needs and preferences of target audiences (Mason et al., 2018). Alternatively, inductive or bottom-up approaches place emphasis on explaining phenomena since they use evidence to support conclusions (Hurley et al., 2018a), but lack theoretical relevance.
While inductive and abductive approaches are similar in that they do not provide deductively guaranteed truths, an abductive approach allows a more nuanced understanding because it seeks to improve understanding of both theory and data (Meyer and Ward, 2014), using theory as a mediator for deriving explanations (Richter et al., 2018). Thus, abduction attempts to provide meaningful explanations or ‘educated guesses’ to explain surprising phenomena, offering more solid evidence than inductively derived conclusions (Green et al., 2007). Therefore, an abductive approach has the potential to yield more credible conclusions than inductive approaches have as we are permitted to capture the character of theoretical concepts and the empirical world both (Dubois and Gadde, 2002), improving the quality of outputs.

2.5.2. Generating design knowledge through an abductive approach

Drawing from the works of Charles Sanders Peirce (Peirce, 1980), the generation of new design knowledge is driven by abductive reasoning (Dorst, 2011). March (1976) was the first to introduce the concept of abduction to design. He proposed abduction as the key mode of reasoning in design, calling the process “productive reasoning” (March, 1976). He went on to distinguish between the use of abduction in science versus the use of abduction in design by highlighting the differences between the desired goals of each process (March, 1976). While the goal of abduction in science is to produce logical propositions (Peirce, 1980), the goal of abduction in design is to produce design proposals (March, 1976). Thus, rather than generating hypotheses, abductive processes in design are concerned with generating solutions to a design problem based on previous knowledge and theory (Kroll and Koskela, 2017). Roozenburg (1993) continued to examine abduction in the context of design more precisely by introducing two alternative views, including ‘explanatory abduction’ and ‘innovative abduction’. Explanatory abduction is in line with what March (1976) described as a scientific view of abduction (and follows the traditional notion of Peirce’s abduction), and he proposed innovative abduction as the core of design (Roozenburg, 1993). Thus, while explanatory abduction generates an exploratory hypothesis in response to a surprising phenomenon, innovative abduction generates creative solutions that are triggered by a design problem (Kroll and Koskela, 2019).

The innovative nature of abduction makes it synonymous with co-design (Steen, 2013), whose purpose is to introduce new design concepts and envision innovative
solutions (Dietrich et al., 2016a) that will ultimately influence behaviour. However, while abduction has been recognised as the foundation for design thinking (Dorst, 2011), little attention has been paid to the role of abduction in co-design processes. Typically, design thinking is focused on a hierarchical structure, whereby design experts are at the head of the innovation process (Micheli et al., 2019). Abduction is noted to be a key attribute of design thinking (Micheli et al., 2019), as design experts lead the innovation process, supported by a diverse range of disciplinary expertise informed by user insights (Dorst., 2011). However, user voices may be shouted out in a process that places experts at the forefront of all innovations (Lefebvre, 2012). Additionally, theory lacks mention in design thinking literature (Micheli et al., 2019). Similarly, co-design often falls short of a balanced approach, since insights are often limited to those of end users (e.g. to the exclusion those of other valuable stakeholders in differing areas of expertise) (Hurley et al., 2018a) and not considered within a theoretical framework (Kim et al., 2020b). Thus, co-design may benefit from a more balanced approach to program design offered through the examination and application of an abductive process.

While previous research has integrated expert knowledge into co-design research, understanding how an abductive methodology can be applied is yet to be reported and clearly demonstrated through a sequential step-by-step process. For example, O’Brien et al. (2016) introduces existing literature into co-design sessions through the use of ‘evidence statements’ which communicate existing knowledge to participants and guide discussions. Similarly, Villalba et al. (2019) and Dietrich et al. (2017) implemented the use of activity cards to communicate relevant insights from the literature to participants. However, while studies attempt to integrate existing expert knowledge into the co-design process, insights derived from the literature are not specifically mapped to a behaviour change theory and consequently, abductive reasoning processes remain underexamined.

**users actively engage in the development**

**2.6. Proposition development and research questions**

This section highlights and summarises the key knowledge gaps established as a result of the literature review and poses the research questions for each of the three studies. The core proposition of this research is that behavioural theory may be integrated
into co-design utilising an abductive methodology. This approach will be examined in the context of parent alcohol programs designed to reduce underage drinking.

Study 1 – Gaps and research questions

Early initiation of alcohol markedly increases the risks associated with alcohol use. Effective prevention efforts during the adolescent period are crucial to delay alcohol use initiation and minimise harms associated with underage drinking. Evidence suggests a strong link between parenting factors and risky behaviours in adolescents, including underage drinking (Yap et al., 2017). Therefore, alcohol specific programs targeting parents have been identified as an important component in minimising alcohol-related risks in adolescents (Newton et al., 2017, Glatz and Koning, 2016). While parent programs have shown some success in preventing and minimising adolescent alcohol consumption (Newton et al., 2017), it is unclear as to what extent specific parenting behaviours are influenced due to a lack of reviews examining parenting specific outcome measures (Foxcroft and Tsertsvadze, 2011a; Newton et al., 2017). Reviews that do examine parent alcohol programs report on measures associated with adolescent alcohol use (Newton et al., 2017), and parenting factors as reported by adolescents (Kuntsche and Kuntsche, 2016). However, previous systematic reviews did not examine the efficacy of parent alcohol programs by measuring parental outcome effects as reported by parents. A gap in the literature was identified, leading to the first research question:

**RQ1: What outcomes do parents experience following participation in parent alcohol programs?**

Andreasen (2002) proposes that from the outset, audiences’ unique needs, wants and perceptions have to be taken into consideration when developing social marketing programs. It is these considerations and insights that are used to inform program design because the target audience is at the centre of all behaviour change efforts (Dietrich et al., 2016a). Current parent alcohol programs are, however, largely expert driven, as important insights into user needs and preferences are overlooked. In order to understand the theoretical and practical relevance of existing parent programs, the following research questions are proposed:
**RQ2:** What is the level of stakeholder engagement in the design process of parent alcohol programs?

**RQ3:** What is the level of theory application in parent alcohol programs?

**Study 2 – Gaps and research questions**

Social marketing research has followed a largely positivist epistemology with quantitatively based surveys dominating social marketing research practice (Kubacki and Rundle-Thiele, 2016), and more limited use of traditional qualitative methods such as focus groups and interviews. Thus, when formative research is undertaken, it is typically restricted to understanding what people think and feel with researchers driving the line of questioning. Limited application of participatory methods is reported in wider social marketing literature (Hull et al., 2014) and limited application of co-design approaches is evident in alcohol education programs (Dietrich et al., 2016a). Thus, opportunities exist for using innovative methods (Zainuddin and Gordon, 2020), such as co-design. Active user involvement through co-design has been shown to be a suitable approach in addressing social marketing issues such as alcohol education (Dietrich et al., 2016a), yet within the context of parent alcohol programs its application is scarce. Given the mixed program effects observed (Mewton et al., 2018), it is proposed that a co-design methodology may offer a solution for designing and implementing programs more valued by parents, as the following research question encapsulates:

**RQ4:** Does a pilot co-designed social marketing program improve alcohol specific parenting factors?

**Study 3 – Gaps and research questions**

Responding to calls for improvements in theory use and reporting in social marketing programs, and to support social marketers to apply behavioural change theories in their program design (Firestone et al., 2017), this research aims to understand how social marketing principles of audience-orientation and theory can be blended through an abductive co-design process. Over the years, while co-design has received increasing attention in the social marketing literature, to the best of this author’s knowledge there are no current studies which examine the application of theoretical constructs ensuring complete assimilation of a theory within the co-design process.
An abductive approach provides the opportunity to examine the role and relevance of theory in an existing seven-step co-design process (see Dietrich et al., 2017), guiding researchers on how to bring theory into co-design sessions with users. Theory has the potential to solidify each stage of the co-design process through the incorporation of theoretically driven constructs that are associated with greater behaviour change outcomes. For example, during the planning stages theory would be invaluable in setting and articulating co-design aims and outcomes, determining which audience segments to focus on and assisting in creating co-design tools that are aligned with the constructs of the theory. Furthermore, in accordance with the principles of the selected theory, key messages that resonate with the target audience may be identified and ultimately incorporated in the facilitation stage of co-design. Finally, post co-design sessions, researchers could be guided throughout the actual design phase without losing sight of the key constructs of the theory while building the program. Theory application and abductive reasoning processes in co-design are underexamined in the literature and this marks an important research agenda for social marketers wanting to generate meaningful insights from co-design sessions to build more audience orientated and theoretically mapped social marketing programs. Thus, the final step would be to examine the application of behaviour change theory to a co-design process. This prompted the final research question:

**RQ5: Can theory be applied within the seven-step co-design process?**

### 2.7. Conclusion

This chapter has reviewed the existing literature relating to the research proposed for this thesis. The key principles of social marketing were discussed focusing on the importance of a customer-centric and a theoretically driven approach to behaviour change. In addition, the benefits of a co-design approach to social marketing program design were examined and, in turn, abduction was discussed as a research approach that may offer potential to intertwine theory and data. Taken as a whole, the review of the literature suggests that an abductive approach to co-design warrants investigation. The proposition was formed that theoretically informed co-design outputs may emerge when theory is embedded in the co-design process. This thesis aims to provide empirical data
to support that proposition. The next chapter discusses the research design and methodology for the studies presented in this thesis.
Chapter 3: Research design and methodology

3.1. Introduction

Social marketing literature (Rundle-Thiele et al., 2019a; Dietrich et al., 2016a) and benchmark principles (French and Blair-Stevens, 2006) emphasise the importance of the generation of user insights and the application of behavioural theories during formative research and other stages of the process. Drawing on the idea that program solutions can be improved by involving users in program design, co-design methods are increasingly being adopted by the discipline. However, given the bottom-up approach of co-design, expert knowledge, including behaviour change theories, are often left underutilised. In fact, while the importance of theory is stressed in the literature (Rundle-Thiele et al., 2019a), it is often not translated into practice, with social marketing and broader behavioural science often criticised for a lack of theory application and reporting (Willmott et al., 2019; Truong and Dang, 2017). This research has been designed to help close the gap between theory and practice by examining how theory can be applied in a co-design process.

This chapter justifies the approach taken to answer the research questions. This commences with discussion of the research context, selection and justification of the research paradigm, and a brief description of each of the three included studies, respectively describing the purpose of each study and outlining the process of data collection and analysis utilised. To begin this chapter, the research context is presented to provide a brief history and understanding of the included research project.

3.2. Research context

Adolescent alcohol consumption is an issue of ongoing concern in Australia (AIHW, 2017), and alcohol education initiatives are an important component in the Australian school health curriculum (The State of Queensland: Department of Education, 2020). However, existing school-based programs are frequently criticised for their lack of engagement (Lee et al., 2016) and limited theory application in program design (Almestahiri et al., 2017). In response, the Blurred Minds Program was developed. Blurred Minds is an innovative gamified alcohol education program that utilises gamification strategies to engage students and encourage repeat play while teaching
important and relevant information to adolescents. The Blurred Minds Program aims to reduce and delay adolescent drinking through evidence-based knowledge and practical strategies to increase knowledge, reduce peer pressure susceptibility, increase resilience and equip students with tactics and strategies to stay away from harmful environments. Co-created with adolescents to improve program relevance (Dietrich et al., 2016a; Dietrich et al., 2017) and based on several behavioural theories (e.g. social learning theory, gamification and social norms theory), the program is constantly evolving through an iterative process of refinements and improvements. For example, in response to user and stakeholder feedback, program materials were strengthened to include not only face-to-face delivery components, but also online educational resources and a downloadable teacher’s kit enabling program implementation independent of program facilitators.

While downstream programs which seek to change adolescent drinking behaviours from the individual level have shown some success (Dietrich et al., 2016b), evidence supports the benefits of incorporating midstream influences such as offering parent specific components to program strategies (Newton et al., 2017). Several studies examining the relationship between the parenting environment and adolescent behaviours have indicated a positive association between specific parenting factors (e.g. parental norms and attitudes) and problem behaviours such as adolescents’ behaviour towards alcohol use (Yap et al., 2017; Bowden et al., 2017; Tael-Öeren et al., 2019b). Previous research suggests there are three key parenting factors that influence adolescents’ alcohol use: a) parental monitoring including family rule setting, b) parent child communication, and c) parental attitudes (Yap et al., 2017). Thus, as part of the ongoing advancement and refinement of the Blurred Minds Program, the development of a Blurred Minds Parent Program was recognised as a key opportunity to provide a more holistic approach to prevention efforts. As such, this research was conducted to inform the design of the Blurred Minds Parent Program.

3.3. Research paradigm

Understanding the philosophical positioning of the research is important as it contains several core assumptions that underpin the research strategy (Saunders et al., 2007). The research philosophy relates to “the development of knowledge and the nature of that knowledge” (Saunders et al., 2007, p. 101), and can be further delineated with a
A research paradigm is a system of beliefs and practices that guide our decisions as researchers (Saunders et al., 2007). It influences the kind of knowledge explored by researchers and the methods used to collect, analyse and interpret evidence (Morgan, 2007), through assumptions regarding epistemological, ontological and methodological positions (Guba and Lincoln, 1994). Ontological assumptions concern the nature of reality and what can be known about it (e.g. Does reality exist independently of human understanding or are multiple realities constructed though our individual perceptions of it?); epistemological assumptions consider what constitutes acceptable and valid knowledge (e.g. Is only measurable and observable evidence credible or are we interested in the narratives and opinions of different social actors?); and methodological assumptions concern how we go about discovering what is believed to be known (e.g. What methodology will be used to collect and analyse data?) (Guba and Lincoln, 1994).

There are several paradigms that guide social research practice (e.g. positivism, constructivism, pragmatism) with each distinguished through different assumptions regarding their epistemological, ontological and methodological positions.

For instance, the positivist perspective, deriving from the objectivist approach, believes in a single, objective reality which exists independently of individual perceptions and interactions (Ryan, 2018). The purpose of positivist research is scientific explanation, and this approach views the social world similarly to the physical world, a measurable, concrete structure that exists only as one truth (Bryman, 2012). Thus, this approach uses mostly quantitative methods as only measurable and observable evidence is deemed credible (Saunders et al., 2015). In contrast, constructivism, which derives from the subjectivist approach, believes that reality is subjective and socially constructed through culture and language (Brinkmann, 2018). It is believed that multiple realities exist since each individual perceives and interprets social situations differently as a consequence of their own worldview (Saunders et al., 2015). Knowledge is gained through personal experiences arising from particular situations, contained in narratives, stories, perceptions and interpretations.

If these two dominant research paradigms (i.e. positivism and constructivism) were placed on a paradigm continuum they would sit at opposing ends; and with many scholars debating the usefulness and superiority of each approach (Zyphur and Pierides, 2017; West, 2018). Alternatively, rather than getting involved in the ‘paradigm wars’ or
contentions over objectivity and subjectivity, pragmatists remove themselves from this dichotomy, instead embracing the two extremes. However that pragmatists may contest that there is an external, objective reality, it is nonetheless interpreted based on an individual’s unique perceptions and experiences (Morgan, 2007).

As a philosophical position, pragmatism places attention on the link between action and truth (Nenonen et al., 2017), examining practical consequences and empirical findings to better understand real-world phenomena (Johnson and Onwuegbuzie, 2004). Pragmatists claim that knowledge is created through an individual’s unique experiences, and how we perceive the world is shaped by these experiences. Therefore, pragmatism embraces the nature of experiences as opposed to the nature of reality (Kaushik and Walsh, 2019), replacing abstract philosophical arguments about the nature of knowledge with a process-based approach to knowledge (Morgan, 2014) focused on outcome orientated methods of inquiry (Johnson and Onwuegbuzie, 2004). This method of scientific inquiry allows the selection of multiple approaches likely to lead to the most useful results (i.e. are best suited to help the researcher answer their research questions) (Johnson and Onwuegbuzie, 2004). Thereby, pragmatism focuses on problem solving through a process of inquiry that starts with problem identification, definition and exploration and moves to a resolution through the exploration, development and evaluation of possible solutions (Steen, 2013).

This researcher embraces the philosophical principles of pragmatism as a way to bridge research and practice through its linking of truth and action. The philosophical principles provided by pragmatism place emphasis on practical solutions and outcomes, a stance aligned with social marketing research. Social marketing aims for practical real-world relevance with research that does not just ‘observe’ but intervenes in the real world to bring about change in the desired direction. In this way, pragmatism supports the core values of social marketing research and this researcher’s ambition to produce scholarly work with practical relevance. Pragmatism helps to answer the how questions, in line with the aims of this thesis, which seeks to bridge research and practice through improved understanding of how theory can be incorporated into a typically bottom-up/user centred design approach. The pragmatist ontology implies a methodology which is selected based on its usefulness to answer the research questions (Revez and Borges, 2019). This research adopts a mixed method approach, utilising both qualitative and quantitative
methods across the three studies, which is covered in further detail in the research overview provided in the next section.

3.4. Research overview

3.4.1. Research design

The overall aim of this thesis is to understand how expert and user views can be integrated through a participatory design approach. In order to achieve this, three studies are proposed (see Figure 3). The first study was a systematic literature review examining studies reporting on parent alcohol programs to assess program effectiveness on parenting specific measures, stakeholder involvement during the design process, theories which had previously been utilised and the level of theory application. Study 1 allowed for improved understanding of existing expert based approaches to parent alcohol programs, while also allowing for the identification of dominant behavioural theories used. Moreover, Study 1 identified an absence of application of the use of participatory design methods in the design and development of parent programs. Study 2 is a proof-of-concept study demonstrating application of traditional co-design as an approach to developing a social marketing parent alcohol program. The study consists of an outcome evaluation of a pilot social marketing program that was co-designed by South East Queensland parents (Hurley et al., 2018a). Evaluation of the traditional co-design approach which focused on the incorporation of user insights to develop program strategies (to the exclusion of theory) was important to examine the feasibility of incorporating user views through co-design. The final, third study considers how theory can be incorporated into the co-design process following an abductive approach, facilitating the design of theory-based co-designed social marketing programs. The aim of Study 3 was to understand if expert approaches could be weaved into traditional co-design approaches. Study 3 drew on understanding gained from the systematic literature review (i.e. identification of dominant behavioural theories applied) and it then implemented a co-design approach demonstrating how theory could be incorporated into co-design through an abductive approach. Ethical clearance was obtained for these studies (GU Ref No: 2019/222). These studies are briefly described in turn in sections 3.3.2-3.3.4. Detailed methodologies for each are given in Chapters 4-6.
3.4.2. Study 1: A systematic review of parent based programs to prevent or reduce alcohol consumption in adolescents

Systematic literature reviews aim to “comprehensively locate and synthesize research that bears on a particular question, using organised, transparent, and replicable procedures at each step in the process” (Littell et al., 2008). Thereby, they are a method used to gather large quantities of information in order to interpret and explain what does or does not work on a given topic (Littell et al., 2008), describing insights and identifying existing gaps for future research directions (Palmatier et al., 2018). The systematic review study aimed to complement the valuable existing knowledge base that has sought to understand parenting factors associated with adolescent alcohol misuse and effectiveness of parent alcohol programs, and build on this evidence base to understand outcome variables related to parent-reported measures such as parental attitudes and behaviours. Therefore, the aim of Study 1 was to systematically review parent alcohol programs to identify, describe and evaluate the efficacy of alcohol education programs targeted at parents.

Method: A total of eight databases were searched (EBSCO, Emerald, ProQuest, PubMed, Ovid, ScienceDirect, Taylor and Francis and Web of Science), and to allow for accurate reporting of each individual program, backward and forward searching was
conduct. Specifically, searches using authors’ names and program names were undertaken in Google Scholar. The heterogeneity of the included studies precluded the option to perform meta-analysis (e.g. inconsistent and varied outcomes measures), thus descriptive analyses were conducted. Further methodological details, results and a discussions of the results are provided in Chapter 4.

3.4.3. Study 2: Evaluation of a pilot co-designed social marketing program

A bottom-up approach to program design that involves active user involvement during program design stages has been shown to be a suitable approach for social marketing (Dietrich et al., 2016a; Duane, 2012; Domegan et al., 2013). Co-design processes place users at the centre of the design, allowing participants to collaborate in a creative process that produces tangible program design solutions (Hurley et al., 2018a), albeit typically devoid of theoretical understanding. Thus, a program targeting parents was co-designed and evaluated using a repeated measure design with post evaluations occurring immediately following program participation. The purpose of this study was to showcase how co-design insights can be used to build social marketing programs in addition to examining whether a co-designed program is in fact effective.

**Method:** This study aimed to evaluate a co-designed social marketing pilot program that sought to change parents’ self-efficacy, attitudes and adolescent monitoring practices. The pilot program was developed based on previous co-design research (Hurley et al., 2018a) and the program was trialled in four schools following delivery of a social marketing program targeting adolescents in Australian high schools. Insights from co-design workshops held with parents informed the program design in terms of the duration of the program, content included and method of delivery. A total of 65 parents participated in the trial. A repeated measures assessment of the pilot program was undertaken (pre and post program evaluation) drawing on previous measures of self-efficacy to talk to their teen about alcohol (Connor et al., 2011), parental attitudes towards underage alcohol use (Brown et al., 2014), and parental monitoring strategies (Glatz and Koning, 2016). Basic socio-demographic (i.e. gender, yearly income and employment status) data was also collected. All responses were entered in SPSS and a unique identifier code was used to match parents between both data collection points. Data was analysed using paired sample t-tests. Finally, this study is limited by its lack of theory integration.
Theory is recognised as one of the key social marketing principles (French and Blair-Stevens, 2005), as it is linked to improved program outcomes (Willmott et al., 2019). Thus, the application of theory during a co-design process may enhance co-design outcomes. Further methodological details and results of the study, along with a discussion are provided in Chapter 5.

3.4.4. Study 3: Integrating theory in co-design: An abductive approach

Co-design methods empower participants by giving them a voice as they share their insights and experiences for program ideas and service change. Therefore, co-design is an essential element of social marketing research. However, inductive or bottom-up approaches may be limiting program effectiveness, excluding expert knowledge as would occur in deductive research approaches. Social marketing places an emphasis on the importance of theory in formative research stages (French and Blair-Stevens, 2006), as programs designed with a strong theoretical foundation may strengthen program outputs (Green et al., 2019; Willmott et al., 2019). Merging inductive and deductive approaches (i.e. expert and user views) has not yet been undertaken in co-design. An abductive approach includes theory in user centred design while centring program design on user needs and values. Abduction requires a theoretical lens, encouraging researchers to identify and investigate new ideas that fall outside of the initial theoretical framework. To date, an abductive approach to co-design has yet to be offered. The purpose of this study was to understand how theory can be incorporated into a co-design process.

**Method:** This study applied theory to an existing seven-step co-design process. Specifically, co-design activity cards (i.e. cards detailing existing program activities) were used during the sensitisation and facilitation stages of the co-design sessions. The activities utilised in co-design sensitisation represented Social Cognitive Theory (SCT) constructs (Bandura, 1998). To ensure that each activity offered to participants during the co-design session accurately represented the selected SCT construct, expert judging was utilised. The expert panel was sent to 27 experts who were asked to match a list of 30 unique activities to six identified constructs of SCT.

SCT explains how individuals and the environment interact and influence each other in a process known as “reciprocal determinism” (Bandura, 2004). The core constructs of SCT are intended to predict behavior and are used to guide program
development (Bandura, 1998). The key constructs of SCT included in the expert panel were the following: 1) knowledge of health risks and benefits, 2) observational learning, 3) environmental facilitators, 4) goal setting, 5) feedback, and 6) enlisting social support. Knowledge of health risks and benefits is a prerequisite for behaviour change, however not enough to prompt behaviour change alone (Glanz, 2008). For behaviour change to succeed people must feel competent to perform desired behaviour, which can be achieved through observational learning (Glanz, 2008). Observational learning focuses on an individual’s capacity to learn a new behaviour through exposure to displays of the behaviour (Bandura, 2004). However, while central to SCT, the theory also posits that in order for the benefits of observational learning to be realised, the individual’s environment must support the new desired behaviours. One approach to influencing behaviour through environmental change is facilitation (Bandura, 1998) whereby environmental changes or provisions such as tools and resources are provided that make the behaviour change easier to perform.

Finally, in order for individuals to influence their own behaviour, self-regulation is needed. Self-regulation recognises that an individual’s ability to influence their own behaviour is dependent on their ability to acquire skills to manage and control the behaviour (Glanz, 2008). Ways in which self-regulation is achieved is through (1) the identification and adoption of proximal and distal goals; (2) feedback received on the quality of performance and areas for improvement; and (3) finding social support in people who encourage their efforts (Bandura, 1997).

Following analysis, a total of 12 theory-based activity cards were selected to be used during two co-design sessions, involving 40 participants. A total of 13 program ideas were generated by participants and a cross-rater process was used to assess user generated ideas in relation to SCT constructs. Specifically, each idea was assessed in terms of 1) its direct use of the theory-based activities, 2) adaptive reuse of the theory-based activities, and 3) generation of novel ideas that fell outside of the theoretically mapped activities presented. Finally, this study is limited though its narrow focus on user insights (i.e. parents). While parents bring with them their own unique perspectives and insights, other key stakeholders (e.g. school teachers, drug and alcohol experts) may contribute valuable knowledge from their own areas of expertise to strengthen co-design outputs. Further methodological details, results and a discussion of findings are provided in Chapter 6.
3.5. Conclusion

This chapter has outlined the research design. First, the research context was described followed by an explanation and justification of the pragmatic philosophical approach adopted by the researcher. The first study involved a systematic literature review to gain an understanding of the current evidence base surrounding parent alcohol programs. Next, a pilot parent alcohol program co-designed with parents was evaluated to test the usefulness of co-design as an approach to designing social marketing programs. Finally, in recognition of the importance of theory in social marketing program design, an abductive approach to co-design involving the implementation of theory-mapped activity cards during a co-design process was examined. The following three chapters present each study in turn.
Chapter 4: A systematic review of parent based programs to prevent or reduce alcohol consumption in adolescents

STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper. The bibliographic details of the published coauthored paper, including all authors, are:


My contribution to the paper involved:

- The research design, literature review search and data extraction and analysis;
- Categorisation of the data into a usable format;
- Writing drafts, finalizing edits, submitting the manuscript, and replying to reviewers comments.

(Signed) ____________________________ (Date) 20.08.2020

Erin Hurley

(Countersigned) ____________________________ (Date) 20.08.2020

Supervisor: Dr Timo Dietrich
4.1. Abstract

Background. Adolescent alcohol consumption is an issue of ongoing concern and programs targeting parents have been identified as an important component in minimizing and preventing alcohol related harm in adolescents. This paper aims to evaluate existing parent based alcohol education programs with a focus on understanding parent specific outcomes including parental attitudes, parent-child communication, alcohol specific rule setting and parental monitoring; study quality, the extent of stakeholder engagement in program design and the level of theory application.

Method. A systematic review of electronic databases EBSCO, Emerald, ProQuest, PubMed, Ovid, ScienceDirect, Taylor and Francis and Web of Science was conducted from database inception to August 2019. A total of 4288 unique records were retrieved from the eight databases. Studies were included if they evaluated school based alcohol education programs that included a parent component and detailed outcome measures associated with parent data. The methodological quality of the included studies was assessed using the Effective Public Health Practice Project (EPHPP) quality assessment tool.

Results. In total 17 studies qualified for assessment, detailing 13 individual parent programs. Of these, ten programs demonstrated positive effects in at least one parent reported outcome measure. Stakeholder engagement during the design of programs was lacking with the majority of programs. One third of the programs did not report theory use and when theory was used reporting was weak with three programs applying theory, five testing theory and none building theory. According to the EPHPP tool, overall ten programs were rated as weak, three as moderate and none as strong.

Conclusion. Future studies are recommended to further enhance the effectiveness of parental programs by improving study quality, increasing stakeholder engagement and increasing the level of theory application and reporting.

Keywords: parent, review, alcohol, prevention, schools
4.2. Introduction

Parents remain one of the most important social influencers in preventing and reducing adolescents’ alcohol consumption (Newton et al., 2017). Several studies indicate a positive association between specific parenting factors and adolescents’ alcohol use (Lam et al., 2017; Martins et al., 2008; Kelly et al., 2017). Research shows that adolescents’ whose parents have restrictive attitudes regarding underage drinking are less likely to engage in risky drinking behaviors (Berends et al., 2016; Moore et al., 2010). Furthermore, high quality parent-child communication (Carver et al., 2017), including the communication of strict alcohol specific rules (Mattick et al., 2017; Schinke et al., 2004), and parent’s monitoring of adolescent’s activities and whereabouts (Van Ryzin et al., 2012; Kelly et al., 2017) are associated with reduced levels of alcohol consumption among adolescents. Therefore, parents are key stakeholders in alcohol prevention strategies and alcohol-specific programs targeting parents remain an important component of multi-faceted approaches to minimizing alcohol-related risks in adolescents (Fox, 2015; Newton et al., 2017; Onrust et al., 2016).

While evidence of the protective role that parents can play in delaying or reducing the amount of alcohol consumed by adolescents, and effectiveness of parent alcohol programs exists (Newton et al., 2017; Yap et al., 2017), less is known about the effectiveness of programs from a parent’s perspective, stakeholder engagement during program design and theory utilization. A recent meta-analytic study identified evidence of parent alcohol programs efficacy in preventing or reducing alcohol use (Bo et al., 2018). Other systematic reviews have examined the efficacy of parent alcohol programs on preventing alcohol misuse in adolescents (see for example Foxcroft and Tsertsvadze, 2011; Newton et al., 2017; Yap et al., 2017; Gilligan et al., 2019). For example, Newton et al. (2017) found that nine out of ten combined student and parent alcohol programs showed effectiveness in delaying or reducing alcohol and drug use in adolescents. While these reviews advance understanding of the effect parent alcohol programs delivered within multi-component settings have on adolescents, they do not indicate the impact on parents who participate in programs, thereby limiting insights into how effectiveness for parents may be enhanced.
The Kuntsche and Kuntsche (2016) review focused attention on the efficacy of parent alcohol programs on parenting specific factors. Their findings indicated desirable effects of parent factors such as rule-setting, monitoring and parent–child communication. However, the reported outcome measures were based on adolescent self-reports rather than parental responses directly. A systematic review of studies focused on understanding program effects for parents themselves does not exist. This limits understanding given there may be discrepancies between parent and adolescent reports of parenting behaviors (Augenstein et al., 2016; De Los Reyes et al., 2013). Extending understanding of program effectiveness from a parent perspective allows for a more comprehensive understanding to emerge.

Inclusion of multiple stakeholders across the span of a program can improve behaviour change outcomes (Gregson et al., 2001), through enhanced acceptance and adoption of programs into the community (Gitlin et al., 2015). Stakeholder engagement can occur from early formative research and concept development stages (David et al., 2019a), through to program implementation and evaluation stages (Byrne, 2019; Hodgkins et al., 2019). Freeman (2010) defines stakeholders as “any group or individual who can affect or is affected by the achievement of an organization’s objective” (p.53). This involves the meaningful engagement of individuals or groups who are either affected by program implementation or have the power to affect the outcome of the program (e.g. government, local communities, target user groups, health care providers) (McCarron et al., 2019). For example, stakeholder involvement may involve collaborating with target users and key community members during the formative research process to generate insights to guide program development (David et al., 2019).

However, stakeholder engagement is often limited to single stakeholder perspectives (Hult et al., 2011) and stakeholder participation in program design is often overlooked, limiting program potential (Buyucek et al., 2016). Understanding and providing value for multiple stakeholders can be important indicators of change (Gregson et al., 2001) and may result in better outcomes (Beierle, 2002). Furthermore, processes which empower stakeholders during early design stages may improve program success through the consideration and integration of stakeholder insights in core program elements (Kaur and Lodhia, 2017), maximizing stakeholder support (Buyucek et al., 2016). Importantly, the potential for stakeholders to influence program outcomes may be
greater during initial program development stages when they are provided more freedom to shape program goals and outcomes (Brett et al., 2014). However, current alcohol programs lack the inclusion of stakeholder input during program design (Dietrich et al., 2016c; Buyucek et al., 2016), failing to acknowledge new information, ideas and stakeholder perspectives that are more likely to improve program design (Beierle, 2002).

Stakeholder engagement can occur in different forms from less involved methods whereby stakeholders have no power in the decision making process (Cummings, 2001), to more collaborative methods that at the highest level strive for stakeholder empowerment (Steen, 2013). Empowerment is characterized by an organizations willingness and capacity to share power with key stakeholders (Steen, 2013). Empowering stakeholders during program design stages may; 1) allow for conflicts to be resolved before they arise during program design, implementation and evaluation (Laverack and Labonte, 2000), 2) lead to greater program innovation (Späth and Scolobig, 2017), and 3) improve program support resulting in a greater chance for sustainable change (Verhulst and Boks, 2014). Given the above benefits of stakeholder engagement during program design this systematic review evaluated the level of stakeholder engagement during the design stage of parent alcohol programs.

Theories can be used in the development of programs to effect better outcome change (Michie and Prestwich, 2010), through influencing constructs that are known to cause the specific behaviour (Hardeman et al., 2005). French and Blair-Stevens (2006) state that an appropriate theory should be identified to inform and guide program development, implementation and evaluation. The application of behaviour change theories provides a greater understanding of the mechanisms leading to change (Davis et al., 2015) and allows for the identification and selection of appropriate behaviour change techniques (Michie and Prestwich, 2010).

Parent programs are designed to effect change in parenting behaviours associated with underage drinking. Ecological theories of behaviour change such as eco-developmental theory and social cognitive theory (SCT) extend focus beyond individual factors, emphasizing social and environmental contexts (Bandura, 1998; Szapocznik and Coatsworth, 1999). Such theories suggest that adolescents’ social and environmental influences including parents, schools and communities have a profound impact on
adolescent problem behaviours such as underage drinking. For example, ecological theory is focused on targeting specific contextual risk (e.g. parental supply of alcohol) and protective factors (e.g. parental monitoring), to facilitate positive adolescent development (Bogenschneider, 1996). In a review of parent programs for adolescent substance use and problem behaviours Ladis et al. (2019) identified family systems theory and ecological theory as the guiding frameworks used in the majority of identified programs. In line with ecological theories of behaviour change, parent attitudes and behaviours play an important role in influencing adolescent alcohol use and parental attitudes and behaviours have thus been identified as relevant in the design, implementation and evaluation of parent alcohol programs.

However, many programs are not utilizing theory (Truong, 2014; Luca and Suggs, 2013a; Kadir and Rundle-Thiele, 2018) and when theory use is reported the level of theory utilization remains low (Pang et al., 2017, Willmott et al., 2019). Moreover, mixed construct and measure use is observed further limiting scientific advancement (David and Rundle-Thiele, 2018). Without the detailed reporting of constructs and application of consistent measures in parent programs, attempts to synthesize cannot be undertaken. The systematic application of theory extends evidence by allowing the replication of practices across a range of contexts (David and Rundle-Thiele, 2018). With theory use offering the potential to further extend program outcomes (Rundle-Thiele et al., 2019), this review aims to examine the extent of theory use in parent alcohol programs.

Taken together, while evidence indicates that program design should incorporate stakeholder engagement (Sanders and Stappers, 2008) and be theoretically guided (Michie and Prestwich, 2010), available reviews do not provide guidance on the extent of stakeholder engagement and theory use. The aims of this systematic review study are threefold. First, this study aims to understand outcomes experienced for parents participating in parent alcohol programs. Second, it aims to identify the extent of stakeholder engagement in program design. Finally, this review examines the extent of theory utilization to advance understanding of theory use in program design.
4.3. Method

4.3.1. Search strategy

Peer-reviewed literature was systematically searched to identify relevant studies published between database inception and August 2019 from eight databases including: PubMed, EBSCO, Emerald, ProQuest, Ovid, ScienceDirect, Taylor & Francis and Web of Science. A copy of the review protocol was not prospectively registered, however, the systematic search of the literature followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). Due to the heterogeneity of the identified programs in regards to study populations and outcome measures, meta-analysis was not possible (Williams et al., 2001; Estrada et al., 2017). Eight databases were searched using the keywords *alcohol*, *parent* and *school* in combination with *randomized controlled trial*, *intervention*, *program*, and *evaluation*. See Appendix 1 for a detailed list of search terms.

A total of 6837 records were retrieved as summarized in Table 5. Each record was downloaded to Endnote and 2549 duplicates were removed. Inclusion and exclusion criteria were applied to the remaining 4288 unique records to ensure they were accurate representations of studies evaluating parent alcohol programs.

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<tr>
<th>Database</th>
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<tr>
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<tr>
<td>Emerald</td>
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<td>Taylor &amp; Francis</td>
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<tr>
<td>Web of Science</td>
<td>1530</td>
</tr>
<tr>
<td>Total</td>
<td>6837</td>
</tr>
</tbody>
</table>
4.3.2. Inclusion and exclusion criteria

Studies published in English and meeting the following criteria were included in the review: 1) detailed parent reported outcome measures on any factors related to general parenting or substance-related parenting, 2) published between database inception and August 2019, 3) reported results of an alcohol prevention program that involved an element of parent training, 4) included a control or comparison group, and 5) included parents of adolescents’ aged 10-18 years old as substance use typically first occurs in adolescence.

Studies were excluded if; 1) they did not evaluate a universal program (i.e. studies targeting specific populations such as immigrant families), 2) there was no program implemented, 3) they did not assess parent reported outcome measures associated with general or alcohol specific parenting behaviours and, 4) they were not a journal article. The flowchart based on the PRISMA guidelines (Moher et al., 2009) is shown in Figure 4. In total 17 studies detailing 13 individual parent programs were identified prior to forward and backwards searching. To allow for accurate reporting of program development, implementation and evaluation, forward and backward searching was undertaken. Specifically, searches using authors’ names and program names were undertaken in Google Scholar. A further 25 relevant studies detailing further information on the included programs were located. In total 42 studies were included in the analysis of 13 different programs. The full list of the 42 studies for the 13 programs can be found in Appendix 2.
4.3.3. Article screening

Two independent reviewers screened titles, abstracts, and full texts of potential articles. A third reviewer resolved disagreements regarding inclusion of a study. Following the application of the exclusion criteria, 17 studies evaluating 13 universal parent alcohol programs on parent outcome measures were identified.

4.3.4. Data extraction and analysis

The included studies were analyzed in terms of: 1) program effectiveness on parent reported outcome measures, 2) the level of stakeholder engagement in program design, 3) the level of theory use and, 4) the quality of program design and delivery.

Parent outcome measures

Data associated with general or alcohol specific parenting behaviours as reported by parents were extracted from the included studies. Key outcome measures included
parents’ attitudes towards underage drinking, parent-child alcohol specific communications, alcohol specific rule setting and parental monitoring. These factors have been identified as important influencers of adolescent alcohol consumption (Carroll et al., 2016, Kuntsche and Kuntsche, 2016).

**Level of stakeholder engagement**

The framework used to assess the level of stakeholder engagement has been used in previous studies (Kaur and Lodhia, 2017; Sanford and Rose, 2007) and consisted of five levels: 1) Inform, which refers to one way communications with stakeholders to inform or educate; 2) Consult, which refers to gaining feedback and information from stakeholders in limited two-way communications; 3) Involve, which refers to working directly with stakeholders in multi-way communications to ensure concerns are understood and considered; 4) Collaborate which refers to partnering with stakeholders to develop joint plans of action; and 5) Empower which refers to enabling stakeholders to make the final decisions (International Association for Public Participation, 2014).

**Level of theory utilization**

Reported theory use and the extent of theory utilization was extracted and analyzed from the included studies as it has been linked to improved program outcomes (Thackeray and Neiger, 2000). The framework used to assess the level of theory utilization has been used in previous systematic reviews (Pang et al., 2017; Glanz and Bishop, 2010) and is comprised of four levels, namely 1) informed by theory, whereby the study explicitly mentions theory but fails to apply a theoretical framework in study components or measures, 2) applied theory, whereby several theoretical constructs are applied to the study, 3) testing theory whereby at least half of the theoretical constructs are explicitly measured, and 4) building theory, whereby theory is revisited or created (Pang et al., 2017).

**Quality assessment**

The quality of the included studies was assessed using the Effective Public Health Practice Project (EPHPP) quality assessment tool for quantitative studies (Effective Public Health Practice Project, 2019). The EPHPP tool is suitable for evaluating multiple program study designs (Deeks et al., 2003) and has been used to assess the quality of school-based programs in previous reviews (Pang et al., 2017; Hersch et al., 2014; Norris

78
et al., 2015). The assessment tool has been validated (Jackson et al., 2005; Thomas et al., 2004) and is suitable for use in systematic reviews of effectiveness (Deeks et al., 2003). The EPHPP tool rates each study according to six program aspects including selection bias, study design, control of confounders, blinding, data collection methods, and withdrawal and drop-out rates (Thomas et al., 2004). Each individual aspect is rated weak, moderate or strong and an overall rating is applied to each study (Thomas et al., 2004). All studies assessed through the EPHPP tool were rated by at least two researchers and inter-reliability scores exceeded the >80% threshold. Discrepancies were discussed and resolved with all authors.

4.4. Results

4.4.1 Description of included studies

In total, 13 unique programs reported in 42 studies qualified for inclusion. Two programs were culturally adapted. Project Northland was culturally adapted for Russia (Williams et al., 2001), and Orebro (later named Effekt) was culturally adapted for Estonia (Tael-Oeren et al., 2019). The Orebro program was trialed on two separate occasions in Sweden (Koutakis et al., 2008; Bodin and Strandberg, 2011). The majority of programs identified were conducted in the USA (46%, n=6). The sample size of parents ranged from 64 (Skeer et al., 2016) to 2048 (Perry et al., 2002). Parent based programs are typically delivered through means of; workshops (Pettersson et al., 2011; Adolfsen et al., 2017; Park et al., 2000); posting materials via mail (Koutakis et al., 2008, Perry et al., 2002); and take home materials from school (Williams et al., 2001, Beatty et al., 2008, Ennett et al., 2001). The majority of programs focused on reducing parents permissive norms towards underage drinking (Koutakis et al., 2008; Pettersson et al., 2011; Perry et al., 2002; Adolfsen et al., 2017; Tael-Oeren et al., 2019); encouraged parents to set clear alcohol specific rules (Perry et al., 2002; Adolfsen et al., 2017; Park et al., 2000; Skeer et al., 2016; Ennett et al., 2001) and aimed to increase parent-child communication (Perry et al., 2002; Williams et al., 2001; Adolfsen et al., 2017; Koning et al., 2011). The follow-up assessment period ranged from immediately post program (Pilgrim et al., 1998) to 36-months (Koutakis et al., 2008). Standard health education was administered to the majority of the control conditions in each trial, however, informational booklets on different aspects of adolescent development were mailed to control parents in the
Preparing for the Drug Free Years (PDFY) trial (Park et al., 2000). See Appendix 3 for an overview of the characteristics of the studies included in the review.

4.4.2. Efficacy of included studies on parent outcome measures

*Parental restrictive attitudes towards underage drinking*

Parents’ restrictive attitudes towards underage alcohol use was the most commonly measured parenting behavior and significant effects were observed in seven of the nine programs. Parents participating in the Orebro program had more restrictive attitudes towards underage drinking from baseline to 12, 30 (Bodin and Strandberg, 2011) and 36 months (Koutakis et al., 2008). Pettersson et al. (2011) found that parents participating in the Strong and Clear program maintained their restrictive attitudes, while parents in the control group adopted more lenient attitudes towards adolescent drinking over time with a small to moderate program effect size reported. Furthermore, parents participating in both the Project Northland program (Perry et al., 2002) and the Prevention of Alcohol use in Students (PAS) program (Koning et al., 2011) had significantly more restrictive attitudes concerning the degree to which they found it acceptable for adolescents to drink in various situations. While the Youth and Alcohol program reported no program effect on parental attitudes towards alcohol over time, it is important to note that both the program and control groups had quite strict attitudes at baseline and a further increase in the scores was not anticipated (Adolfsen et al., 2017).

*Parent-child communication*

Of the six programs measuring parent-child communication (Adolfsen et al., 2017; Skeer et al., 2016; Ennett et al., 2001; Brown et al., 2014; Beatty et al., 2008; Pilgrim et al., 1998), five demonstrated significant program effects. For example, Beatty et al. (2008) found that intervention group parents were more likely to have a conversation regarding alcohol with their adolescents than those in the control. In addition, the authors found that the conversations were more likely to have occurred recently, included discussion about a larger variety of topics and lasted for a longer duration than control group parents. Furthermore, parents participating in the both the Families in Action and Family Matters program reported having significantly more parent-child discussions regarding the influence of peers and the media on their adolescents’ alcohol consumption (Ennett et al., 2001; Pilgrim et al., 1998). In contrast, Ennett et al. (2001) measured communication using a single item that assessed the extent parents provided their
adolescents with explanations when requesting them to do something, and found no difference between intervention and control groups at three month follow-up.

**Alcohol specific rule setting**

A significant effect was observed in four of the five programs measuring parents’ restrictive rules concerning their adolescents’ alcohol use (Glatz and Koning, 2016; Kosterman et al., 2001; Ennett et al., 2001; Koning et al., 2011). For example, parents who participated in the PAS program reported an increase in the degree of alcohol specific rule setting (e.g. allowing adolescents to drink at home, allowing adolescents to drink at a party with friends) from baseline to 10 months (Koning et al., 2011) and 34 months follow-up (Glatz and Koning, 2016). Similarly, both the Family Matters and PDFY programs observed a significant increase in parents’ restrictive rules regarding their adolescent alcohol consumption (Kosterman et al., 2001; Ennett et al., 2001).

**Parental monitoring**

Across the five programs measuring parental monitoring practices no improvements were observed (Brown et al., 2014; Adolfsen et al., 2017; Kosterman et al., 2001; Perry et al., 2002; Ennett et al., 2001). This lack of effect was observed in both short term and long term follow ups. For example, across various programs participants demonstrated no increase in parental monitoring immediately post program (Toomey and et al., 1996), and at four weeks (Brown et al., 2014), eight weeks (Kosterman et al., 2001), and 24 months (Perry et al., 2002) post program completion. Furthermore, parents participating in the Youth and Alcohol program in Norway reported no increase in their knowledge of their adolescents’ leisure time activities over a 28 month period (baseline to four, six and 28 months) (Adolfsen et al., 2017). However, at baseline parents in both the intervention and control groups reported an already high level of knowledge of their adolescents’ leisure time activities (Adolfsen et al., 2017). Finally, Ennett et al. (2001) saw no significant increase in intervention and control group parents when assessed on their knowledge about their adolescents’ friends, whereabouts after school and use of free time. Of the identified studies, only one failed to observe program effects on any of the parenting specific factors measured (Adolfsen et al., 2017). The Youth and Alcohol program saw no program effects on parental attitudes, parental monitoring or parent-child communication (Adolfsen et al., 2017).
Level of stakeholder engagement

The majority of the identified parent alcohol programs reported limited levels of stakeholder engagement during program design. Specifically, over half of the programs (n=8, 61%) reported methods used to inform stakeholders (Koutakis et al., 2008; Pettersson et al., 2011; Glatz and Koning, 2016; Adolfsen et al., 2017; Kosterman et al., 2001; Tael-Oeren et al., 2019; Skeer et al., 2016; Pilgrim et al., 1998). For example, studies reporting on the Orebro (Koutakis et al., 2008) and PDFY (Kosterman et al., 2001) programs do not mention any form of stakeholder input during program design, reporting instead that an extensive review of the literature was conducted to inform the development of the respective programs. Three programs (23%) reported methods used to consult with stakeholders (Williams et al., 2001; Tael-Oeren et al., 2019; Beatty et al., 2008). When designing the Self-help home ATOD communication program, formative research was conducted with parents involving a self-complete questionnaire and structured small group discussions (Beatty et al., 2008). Parents provided insights into their specific needs in terms of communicating with their adolescent (e.g. what topics to talk about) and their preferences towards the nature and delivery of the program (e.g. interactive, home-based, easy to read) (Beatty et al., 2008).

Additionally, two programs utilized methods to involve, working with multiple stakeholders and developing alternative parent ideas based on stakeholder input (Ennett et al., 2001; Perry et al., 2002). Formative research was conducted with parents representing the target audience of the Family Matters program (Bauman et al., 2001). Informal discussion with parents led to the development of a pilot test which was administered to the parents. Program materials and procedures were refined based on parent feedback (Bauman et al., 2001). Throughout this process advice was solicited from a variety of experts such as a clinical psychologist, researchers in the field of adolescent alcohol use and developers of prior family based prevention programs (Ennett et al., 2001). No programs reported use of methods to collaborate or empower stakeholders during program design.

Level of theory utilization

Of the programs identified eight (61%) reported the use of a behavior change theory. Of those that specified a theoretical framework, three used one theory (Beatty et
al., 2008; Skeer et al., 2016; Pilgrim et al., 1998), three used two theories (Perry et al., 2002; Williams et al., 2001; Kosterman et al., 2001) and two used three or more theories (Adolfsen et al., 2017; Ennett et al., 2001). The most frequently identified theories were social cognitive theory (Perry et al., 2002; Adolfsen et al., 2017; Kosterman et al., 2001; Beatty et al., 2008; Konin et al., 2011) social learning theory (Adolfsen et al., 2017; Kosterman et al., 2001; Ennett et al., 2001) and ecological frameworks (Perry et al., 2002; Williams et al., 2001; Skeer et al., 2016). In terms of theory utilization level, three programs applied theory (Skeer et al., 2016; Williams et al., 2001; Pilgrim et al., 1998). For example, The Substance Use Prevention Promoted by Eating family meals Regularly (SUPPER) program was developed using eco-developmental theory as a guiding framework. Key theoretical constructs, namely family bonding and social interactions were clearly identified in study reporting (Skeer et al., 2016). Five programs tested theory (Perry et al., 2002; Adolfsen et al., 2017; Kosterman et al., 2001; Ennett et al., 2001; Beatty et al., 2008). For example, Beatty et al. (2008) report that the Self-help home ATOD Communication program incorporated key elements of SCT (e.g. improving parents’ self-efficacy to discuss alcohol related topics with their adolescent). The study used and measured several key theoretical constructs in both program implementation and evaluation (e.g. self-efficacy, knowledge and outcome expectations) (Beatty et al., 2008). No programs built theory.

4.4.3. Quality assessment

A quality assessment of the identified programs was conducted using the EPHPP tool (see Table 6). Of the 13 identified programs, ten were assessed as weak in the global rating, three were assessed as moderate and none were assessed as strong. Selection bias was likely in many studies. Only one third of the programs reported representative sampling methods (Perry et al., 2002; Koning et al., 2011; Tael-Oeren et al., 2019; Beatty et al., 2008). However, as one of these programs reported low participation levels, only two programs were assessed as strong in regards to selection bias. Only three of the included studies described how randomisation sequences were generated (Koutakis et al., 2008; Koning et al., 2011; Tael-Oeren et al., 2019) and therefore these were assessed as strong. In terms of confounders, the majority of programs (n = 10, 77%) reported either no baseline differences between groups or studies controlled for at least 80% of relevant confounders resulting in a strong rating. The rest of the programs did not report potential confounders or account for them in analysis and were therefore assessed as weak.
(Adolfsen et al., 2017; Koutakis et al., 2008; Ennett et al., 2001). In all programs, blinding for both assessors and participants was not reported. In terms of data collection methods, almost half (n = 6, 46%) (Pettersson et al., 2011; Williams et al., 2001; Koning et al., 2011; Adolfsen et al., 2017; Park et al., 2000; Brown et al., 2014) of the included studies provided evidence of the validity and reliability of the reported outcomes measures and were therefore assessed as strong. The remaining programs were assessed as either moderate (n = 3) (Koutakis et al., 2008; Beatty et al., 2008; Pilgrim et al., 1998) for reporting validity only or weak (n = 4) (Perry et al., 2002; Tael-Oeren et al., 2019; Skeer et al., 2016; Ennett et al., 2001) as they did not report validity. Regarding the retention rates of parents, only two programs were assessed as strong with more than 80% of parents completing the program.
Table 6. Quality assessment of included programs

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Author</th>
<th>A. Selection bias (Q1)</th>
<th>A. Selection bias (Q2)</th>
<th>A. SCO RE</th>
<th>B. Study design</th>
<th>B. SCOR E</th>
<th>C. Confounders (Q1)</th>
<th>C. Confounders (Q2)</th>
<th>C. SCOR E</th>
<th>D. Blinding (Q1)</th>
<th>D. Blinding (Q2)</th>
<th>D. SCOR E</th>
<th>E. Data collection methods (Q1)</th>
<th>E. Data collection methods (Q2)</th>
<th>E. SCOR E</th>
<th>F. Withdrawals and drop-outs (Q1)</th>
<th>F. Withdrawals and drop-outs (Q2)</th>
<th>F. SCOR E</th>
<th>Global rating</th>
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<tr>
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<td>Strong and Clear</td>
<td>Pettersen et al (2011)</td>
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<tr>
<td>Project Northland</td>
<td>Perry et al (2002); Toomey et al (1996)</td>
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<tr>
<td>Russian-American Partners for Prevention (Project Northland adapted for Russia)</td>
<td>Williams et al (2001)</td>
<td>2</td>
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<tr>
<td>Prevention of Alcohol Use in Students</td>
<td>Koning et al (2011); Glatz &amp; Koning (2016)</td>
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<td>The Unge and Rus (Youth and Alcohol) Program</td>
<td>Adolfsen et al (2017)</td>
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<tr>
<td>Preparing for the Drug Free Years</td>
<td>Park et al (2000); Kosterman et al (2001)</td>
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<td>Taél-oeren et al (2019)</td>
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* = weak, ** = moderate, *** = strong
4.5. Discussion

The aims of this systematic review were threefold. First, this study aimed to examine the efficacy of parent alcohol programs on parent outcome measures. Second, this study sought to assess the level of stakeholder engagement in the design of parent alcohol programs, and finally this study aimed to assess the extent of theory utilization in program design. The discussion will address each main contribution in turn.

4.5.1. Efficacy of parent alcohol programs

Each of the identified programs focused on influencing specific parenting factors associated with preventing or reducing alcohol use among adolescents including; parents’ restrictive attitudes, parent-child communication, alcohol-specific rule setting and parental monitoring. These forms of parental involvement have been described in previous studies as important protective factors for risky drinking behaviors in adolescents (Mynttinen et al., 2017; Kuntsche and Kuntsche, 2016).

Parental attitudes towards underage drinking changed as a result of program participation with seven of the nine programs evaluating attitudes demonstrating significant positive results. Parents restrictive attitudes towards underage drinking acts as one of the strongest protective factor for risky drinking behaviours in adolescents (Lam et al., 2017). A change in parental attitudes is an important step towards ultimately influencing parenting specific behaviors as influencing attitudes increases the likelihood of changing behavioral intentions (Fishbein, 2008). Furthermore, significant program effects were reported in four of the five programs measuring parent-child communication. Frequent and open alcohol specific communication between parents and adolescents can reduce adolescents’ alcohol usage, while also increasing their perceptions of the negative consequences associated with alcohol use (Miller-Day and Kam, 2010).

The results showed that parent alcohol programs are effective in increasing parents’ restrictive rules concerning underage drinking. Adolescents whose parents enforce strict alcohol specific rules are less likely to engage in risky drinking behaviors (Schwinn and Schinke, 2014; Mattick et al., 2017). Furthermore, the enforcement of strict rules can still exert a protective effect from early adolescence until early adulthood (Mares et al., 2012). Concerningly, in each of the studies assessing parental monitoring practices no program effects
were observed. Operating as one of the strongest protective factors for adolescent alcohol use (Dever et al., 2012; Moore et al., 2010; Yap et al., 2017), parental monitoring has been found to minimize underage alcohol use (McCann et al., 2016; Kelly et al., 2017) improve adolescents’ self-efficacy to refuse alcohol (Mynttinen et al., 2017) and improve family closeness (Moore et al., 2010).

In line with previous systematic reviews, this study provides evidence to support the efficacy of parent alcohol programs in preventing or reducing adolescent alcohol consumption (Yap et al., 2017; Newton et al., 2017; Bo et al., 2018) by focusing on parent specific outcome measures. However, improvements in study quality would extend confidence in reported findings. Extensive literature lends support to the notion that parenting specific behaviors play an important role in influencing and predicting adolescents’ drinking behaviors (Kuntsche and Kuntsche, 2016; Mynttinen et al., 2017; McCann et al., 2016). The results highlight emerging evidence that parent alcohol programs can achieve dual aims, providing a protective effect on adolescents in addition to changing parenting practices and attitudes. Further investigation is needed before definitive conclusions can be drawn giving heterogeneity in outcome variables and the lack of strong quality studies.

4.5.2. Limited stakeholder engagement in program design

Representation and involvement of a broad range of stakeholders in the design stage of the identified parent alcohol programs was limited. The results of this study support an earlier review which identified that programs aiming to minimize harm from alcohol lacked stakeholder engagement, with a restricted focus on the people whose behavior needed to change (e.g. problem alcohol drinkers) (Buyucek et al., 2016). While the importance of collaborating with key stakeholders during program design has been evidenced (Brett et al., 2014; Laverack and Labonte, 2000; Gitlin et al., 2015), this review highlights a lack of stakeholder consideration and inclusion during program design stages. Involving stakeholders during program design not only creates a sense of ownership among participants, through increased participation and empowerment (Kaur and Lodhia, 2017) but may enhance effectiveness through greater acceptance and adoption of the program (Gitlin et al., 2015).

Over half of the identified parent alcohol programs reported methods used to inform participants, involving limited one way communications. This limited stakeholders, giving them no voice or power to influence decisions on the programs to be implemented.
Collaborations with stakeholders allow program developers to tap in to the unique perspectives and insights held by various stakeholders (McCarron et al., 2019) whose interests are varied. Discrepancies between expert and user views exist in the context of parent alcohol programs (Hurley et al., 2018), suggesting expert designed programs may be failing to meet the unique needs of parents. Future program efforts should seek to include multiple stakeholder perspectives beyond the end user group to identify and acknowledge multiple views and resolve possible conflicts and discrepancies. For example, to assess needs and guide program development Project Northland developers consulted experts, conducted focus groups with parents and interviewed community leaders including mayors, police chiefs, school principals and local council members (Perry et al., 1993). This allowed program developers to gain a comprehensive understanding of community expectations and views on adolescent alcohol consumption.

Stakeholder empowerment can improve innovation (Späth and Scolobig, 2017) reducing resistance towards desired change (Verhulst and Boks, 2014). Therefore, program design processes need to evolve in order to achieve higher levels of empowerment and advance the sustainable development of programs. Thus, it is suggested that researchers consider novel methods that allow stakeholders to actively contribute during the design process as opposed to being passive participants. For example, empowering stakeholders through active collaborations such as co-design methods that provide stakeholder with the tools and a voice to design behaviour change programs of value to them (Hurley et al., 2018).

4.5.3. Limited theory use in parental programs

Theories are used in the development of programs to effect better outcome change (Michie and Prestwich, 2010), through influencing constructs that are known to cause specific behavior (Hardeman et al., 2005). Reporting of theory use in current parent alcohol programs is lacking with only eight (61%) of the 13 programs explicitly mentioning and utilizing theory. These findings are consistent with other reviews that indicate a lack of theory use in behavior change programs (Truong and Dang, 2017; Luca and Suggs, 2013). Theories are commonly used for audience research and segmentation (Ibrahim et al., 2017), program development (Hunter et al., 2015), message formation, promotion (Hunter et al., 2015) and evaluation (Rundle-Thiele et al., 2015; Truong, 2014). During the formative research phase theories may be useful to assist in setting explicit aims and objectives, segmenting target audiences (French
and Gordon, 2015), identifying messages that resonate with the target audience and identifying important barriers and benefits to focus on (Bloom and Gundlach, 2001).

Social cognitive theory is one promising theory for use in parent alcohol programs. Bandura (2004) highlights the importance of SCT in behaviour change programs, emphasizing the usefulness of the theory’s constructs in influencing behaviour change. From this theoretical perspective behaviour in influenced environmental and personal factors as well as behaviour (Bandura, 1998). As one of the most commonly used theory’s in health behaviour research (Painter et al., 2008), it has been suggested that alcohol education programs may benefit from the application of SCT (Sharma, 2005). For example, the Self-help ATOD Communication program was developed based on SCT and successfully improved parent-child communication regarding alcohol and other drugs (Beatty et al., 2008). Program materials focused on key constructs of the theory such as improving parent self-efficacy to communicate to the adolescents about alcohol and increasing their knowledge of the risks associated with underage drinking (Beatty et al., 2008). However, while SCT provides health promotion researchers with one possible theoretical lens through which to examine parent alcohol program, the current findings highlight the need for more thorough application, testing and reporting of theories in behavior change programs.

4.5.4. Methodological quality of included studies

Using the EPHPP quality assessment tool the methodological quality of the included programs were assessed. Ten programs were rated as weak and three as moderate. None were rated as strong. Overall the methodological quality of the included programs was low and conclusions should be interpreted with caution. Notable, methodological problems included selection biases and lack of assessor blinding. Only two programs selected participants representative of the population and achieved greater than 80% initial participation. In the included studies selection biases arose around practical issues related to the recruitment of parents. Parent were largely self-referred through convenience sampling methods such as mailouts or approaching parents at school pick up zones (Skeer et al., 2016; Brown et al., 2014), and control groups often consisted of parents who elected not to participate in program delivery (Pettersson et al., 2011; Pilgrim et al., 1998). These findings highlight the need for increased resources dedicated to the evaluation of parent alcohol programs that permit for large scale systematic recruitment procedures.
Finally, in the current review no programs reported blinding of participants or assessors. Prior criticism has pointed to the lack of external evaluations in school based alcohol prevention programs (Pape, 2009). While double blinding may not be feasible in parent based alcohol programs due to the nature of the trials, more external evaluations of parent alcohol programs are needed. Parent based alcohol program evaluations are largely evaluated by program developers who may have a vested interest in program success, thereby influencing the interpretation and reporting of results (Pape, 2009).

To enhance empirical evidence, future research should aim to address these issues and improve the methodological quality of parent alcohol programs. Due to the inconsistent evaluation methods and outcomes measures it was not possible to directly compare programs and make meaningful comparison of program components. Therefore, to move beyond a narrative description of programs and provide evidence towards the effectiveness of program components, more systematic reporting and evaluations of parents programs are needed. In doing so, researchers and practitioners will be provided with a more comprehensive picture of what does and does not make a program successful.

4.6. Limitations and future research directions

The present review has several key limitations. Firstly, the study is limited by the search parameters utilized. For example, the included studies were limited to peer review journal articles, which may bias results reported. Grey literature may contribute important information and future studies may benefit from examining these sources. Second, due to the heterogeneity in the outcomes assessed, study populations, and reporting of results a meta-analysis was not possible, and a qualitative description of study outcomes was provided. Few studies included effect sizes and odds ratios, limiting our ability to compare effectiveness for parental groups. Moving forward consistent use of outcome measures is recommended. In time this would deliver consistent measures permitting meta-analytic studies to be undertaken to further enhance our understanding of program effectiveness from a parental perspective. In addition, the outcome measures relied on parent self-report data. However, self-report has been shown to be a reliable and valid method and is widely accepted in alcohol and drug prevention studies (Del Boca and Darkes, 2003). Furthermore, only 11 of 39 studies received a good quality ranking and four studies had a poor quality ranking.
Workshops appear as the most common form of program delivery however often require inconvenient time commitments from parents. With the proliferation in smartphones and the creation of the ‘app economy’ (Sutton and Fraser, 2013), online and mobile based components offer an exciting opportunity for parent alcohol programs. However, only one parent alcohol program utilized online delivery methods. Smartphone applications can be utilized to deliver personalized and tailored programs to parents at a time that suits them most and with reduced time and resource requirements for program facilitators. Given well documented issues with participation and retention rates of parent in alcohol program (Petrie et al., 2007), the design and delivery of mobile based parent programs offers a potential area for future research. Next, to operationalize the move towards empowering stakeholders, a clear understanding of how stakeholders can be actively engaged during program design is needed. Future research should seek to provide frameworks and tools for facilitating stakeholder engagement during program design including stakeholder identification, recruitment and empowerment. Finally, the Buyucek et al. (2016) review considered stakeholder involvement in each stage of the social marketing process (i.e. formative research, implementation and evaluation) and this represents an opportunity to extend work undertaken in this review.

4.7. Conclusion

This systematic review examined parent programs aiming to prevent and reduce adolescent alcohol use and found that parent alcohol programs can be effective in positively influencing parenting specific behaviours associated with underage drinking. However, given the mixed evidence base, study quality concerns and limited use of parent specific outcome measures, further evaluations are needed to extend the evidence base. Specifically, this review highlighted a lack of stakeholder engagement during program design and underutilization and reporting of behaviour change theories. Stakeholder insights are rarely sought or considered during program design. Involving multiple stakeholders during the design stage of programs can help to uncover additional insights to design more effective and sustainable programs. In addition, the inclusion of theory in program design and evaluation will further extend understanding of the mechanisms leading to change. This research has contributed to a better understanding of parent alcohol programs and may be of interest to public health professional and alcohol education program designers.
Abbreviations

EPHPP: Effective Public Health Practice Project (Quality assessment tool)

PAS: Prevention of Alcohol use in Students

PDFY: Preparing for the Drug Free Years

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

SCT: Social cognitive theory

SUPPER: The Substance Use Prevention Promoted by Eating family meals Regularly
4.8. References


Truong, V. D., & Dang, N. V. (2017), "Reviewing research evidence for social marketing: systematic literature reviews" Formative Research in Social Marketing (pp. 183-250), Singapore: Springer.


Chapter 5: Blurred Minds Parent Program: Marketing to start teenage conversations.

STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper. The bibliographic details for the co-authored book chapter submitted for publication, including all authors, are:


My contribution to the paper involved:

• The research design, collection and analysis of data;
• Categorisation of the data into a usable format
• Writing drafts, finalising edits and submitting the manuscript.

(Signed) ___________________________ (Date) 20.08.2020

Erin Hurley

(Countersigned) ___________________________ (Date) 20.08.2020

Supervisor: Dr Timo Dietrich
5.1. Abstract

**Purpose:** While alcohol programs for parents have been identified as an important method to influence adolescent drinking behaviours, few programs have been designed with parents. This paper evaluates a co-designed social marketing pilot program that aimed to change parents’ self-efficacy, attitudes and adolescent monitoring practices.

**Design/methodology/approach:** The pilot program was implemented alongside an existing large-scale social marketing alcohol program targeting adolescents. Repeated measures demonstrated significant effects for all outcome variables, with moderate to large effect sizes.

**Findings:** Parents reported increased confidence in their ability to communicate with their adolescent about alcohol. Furthermore, parents reported significantly less permissive attitudes regarding underage drinking and felt significantly more capable of monitoring their adolescent following program participation.

**Originality/value:** This study provides evidence to suggest that co-design offers a feasible approach to design and implement effective social marketing programs that can positively influence alcohol specific parenting behaviours. Process evaluation highlights further improvements that can be implemented to further increase the acceptance of programs within schools, including flexibility with program delivery and the necessity to build relationships with school faculty members. This study offers a process that can be implemented design and implement effective user centred programs.

**Keywords:** Co-design, Parents, Social Marketing, Evaluation, Alcohol, Program

**Paper type:** Research paper
5.2. Introduction

Parents play a key role in preventing and reducing alcohol related risks in adolescents. Literature demonstrates a strong link between parenting specific behaviours and adolescent alcohol attitudes, expectations and drinking behaviours (Mynttinen et al., 2017; Yap et al., 2017). Parent alcohol programs which aim to influence specific parenting behaviours are an important strategy in reducing risks associated with underage drinking (Newton et al., 2017). Examination of the evidence base indicates alcohol programs targeting parents have previously demonstrated mixed effects (Hurley et al., 2019). Alcohol related programs have been found to be largely expert-driven, taking a top-down approach in which the target audience provide little, if any, contribution to program design (Dietrich et al., 2016b; Hurley et al., 2019). These findings demonstrate the need for further investigation to ascertain whether effective user-oriented programs can be developed. With its consumer orientated philosophy to program design (Andreasen, 2002) social marketing may offer an innovative approach that can be implemented to design and deliver an engaging and effective parent program.

Recognised worldwide as a credible behaviour change discipline (Rundle-Thiele, 2015), social marketing has successfully been applied to a range of behaviour change contexts including alcohol consumption (Rundle-Thiele et al., 2015b), global conservation (Green et al., 2019), physical activity (Kubacki et al., 2017), nutrition (Rangelov and Suggs, 2015) and many more. With a strong emphasis on delivery of behavioural change, social marketing focuses on developing solutions to social problems through the application of established marketing tools and techniques (Lefebvre, 2013). Consistent with its parent marketing discipline, social marketing was founded on the premise of centring programs on the needs of the target audience (Lefebvre and Flora, 1988). By working bottom up with audience needs, wants and perceptions programs are designed for people (Andreasen, 2002). Andreasen (2002) suggests that rather than treating the target audience as subjects, they should be involved in research, however novel techniques such as co-design lacked mention at the time (Kubacki and Rundle-Thiele, 2016). During the formative research stage an audience orientated approach is achieved and insights that inform program development are attained (Carins et al., 2016). Application of co-design gives users a voice in program design (Hurley et al., 2018).

A largely expert driven, top down approach in which the target audience provide little, if any, contribution to program design typifies alcohol programs (Dietrich et al., 2016a). Expert
dominated approaches fail to recognise that the target audience are experts of their own worlds who can contribute to program design (Sanders and Stappers, 2008; Hurley et al., 2018). As a consequence, programs that are designed for and not with the target audience often result in solutions that do not engage, which severely limits program effectiveness (Buyucek et al., 2016). Current social marketing programs have a narrow methodological focus with focus groups and surveys dominating formative research methods (Carins et al., 2016; Kubacki et al., 2015). While focus groups and surveys may be beneficial for uncovering participants’ perspectives and opinions on current prospective ideas (Kubacki and Rundle-Thiele, 2016), they might not sufficiently capture insights on latent user needs and preferences (Witell et al., 2011). Additionally, these formative methods do not provide the freedom for program users to initiate program design concepts or to introduce novel ideas. Active user involvement during program design has been reported and novel ideas have been introduced by target audiences participating in co-design (Dietrich et al., 2016a; David et al., 2019). Furthermore, Witell et al. (2011), found that active forms of user involvement such as co-design practices, led to new market offerings that were more innovative and profitable than those derived through traditional market research techniques (Witell et al., 2011). Following this initial promising audience focussed research method, it is proposed that co-design may serve as one successful approach to gaining audience insights to inform the design of effective programs.

This paper advances knowledge in two ways. First, this study aims to showcase how co-design insights can be transformed into workable design solutions by mapping co-design insights to program design and outcomes. Co-design insights inform design innovations (David et al., 2019), however the application of key insights to developed programs is often overlooked. New approaches are needed that effectively combine two important ends of the design spectrum namely, tapping users as a unique source of knowledge and experience and converting these insights into useful concepts with relevant experts. Second, through a repeated measure design this study evaluates a pilot program that was co-designed with program users. While a considerable evidence base exists espousing the importance of centring program development on users (Steen et al., 2011; Witell et al., 2011), few studies examine the effectiveness of co-designed programs (David et al., 2019).
5.3. Literature Review

Shifting consumer roles and recent practices in research and design increasingly emphasise the importance of actively engaging end users during the development of new market offerings (Ostrom et al., 2015). Participatory design empowers end users to take on a more active role in the design process (Sanders and Stappers, 2008). The approach acknowledges that those who are affected by a design should ultimately have a say in the design process (Ehn, 2008) and is in stark contrast to traditional market research where researchers ‘listen in’ to explore new combinations of customer needs (Poetz and Schreier, 2012). Through participatory design, end users are invited into idea generation and concept development stages and in doing so they are given the opportunity to directly contribute to the outcome of the design (Goodyear-Smith et al., 2015). From a design theory perspective participatory design represents the basis for the concept of co-design (Sanders and Stappers, 2008).

Co-design refers to the collective creativity of designers and participants during the design process (Sanders and Stappers, 2008). During the co-design process, expert’s (i.e., researchers and/or designers) facilitate and participants are given a ‘voice’ sharing their insights and experiences while generating and developing program ideas (Dietrich et al., 2017). To date, the role of co-design has been widely discussed and differences between user generated ideas and expert driven ideas have been observed (Dietrich et al., 2016a, Rundle-Thiele et al., 2019b). Active user involvement through co-design can have important benefits for the innovating organisation (Steen, Manschot & De Koning, 2011). Specifically, user generated ideas are generally found to be more creative and useful than those developed by experts (Magnusson et al., 2003; Poetz and Schreier, 2012; Witell et al., 2011). Active forms of user involvement, such as co-design may be more effective than traditional market research techniques (e.g. focus groups and interviews) (Witell et al., 2011), while identifying and capturing key elements that are valued ultimately affecting the user experience (Trischler et al., 2018b).

Essential for the active and creative user contribution is the application of appropriate co-design tools (Ind & Coates, 2013). Co-design tools enable facilitators to sensitise participants to the topic (Dietrich et al., 2017), provide meaningful ways to integrate insights from existing literature (Villalba et al., 2019), and help to uncover participants latent needs (Sanders and Dandavate, 1999) and new ideas (Rundle-Thiele et al., 2019b). In addition,
specific processes and procedures for implementing a co-design approach are required to effectively plan and conduct sessions as well as evaluate generated ideas (Dietrich et al., 2017). Co-design can be approached in a variety of ways with numerous approaches being explored by researchers over the years (Mattelmäki and Visser, 2011). For example, Dietrich et al. (2017) outlined a sequential six-step process that researchers and practitioners can apply to facilitate co-design sessions. This framework was later refined by Trischler et al. (2019) to reflect a collaborative and iterative process allowing for multiple iterations and close stakeholder consultation following the initial co-design stage.

These insights across numerous studies suggest that co-design might help to increase the likelihood of program success through greater user participation, satisfaction and an improved program experience. While several studies detail findings from user testing on early stage prototypes (Lipson-Smith et al., 2019; Birrell et al., 2018), they fail to evaluate final design outcomes. In fact, Eyles et al. (2016) conducted a systematic literature review of studies utilising co-design methods during the design of mobile health programs and found that none of the identified studies evaluated program effectiveness. To fill this gap, David et al. (2019) developed a social marketing program based on extensive formative research including co-design workshops, interviews, surveys and a systematic literature review. The program was implemented in the community and outcome evaluations demonstrated program effectiveness (David et al., 2019). Unfortunately, the co-design insights formed part of a large-scale formative research process whereby a multitude of insights were gathered via a variety of methods, thus making it difficult to directly assess the effectiveness of co-design (David et al., 2019). Following from the examination of the literature it is apparent that evidence of co-designs effectiveness is lacking which is surprising given the potential benefits of co-design. Furthermore, detailed reporting which demonstrates how co-design insights are developed into program design is limited (Trischler et al., 2019). To address these gaps, this study extends understanding showcasing how co-design insights can be used to build social marketing programs in addition to examining whether a co-designed program is in fact effective. Next, this paper discusses how co-design insights where used to build the pilot social marketing program before the method and result section highlight the testing of the program.

**Program Build**

The pilot parent alcohol social marketing program was developed to be implemented alongside an existing social marketing program named Blurred Minds, which targets
adolescents aged 14-16 years. Blurred Minds is a five-module social marketing program that has been designed following the eight social marketing benchmark criteria (The National Social Marketing Centre, 2010). The Blurred Minds social marketing program was delivered in 2017 via a comprehensive stratified randomised controlled trial in more than a dozen schools. The program delivered positive change for adolescent participants across a number of outcome variables which led to an increase in knowledge, more negative attitudes towards excessive drinking while maintaining low intentions to drink excessively (Dietrich et al., 2019). The newly co-designed pilot parent alcohol social marketing program was designed as a standalone program for parents to complement the existing Blurred Minds program. The specific components of the program are detailed next.

*Program components*

Parent (user) generated ideas for the pilot program are described in detail in Hurley et al. (2018). Analysis of parent-designed ideas led to the identification of three overarching strategies for program design, namely a) usability means flexibility, b) meaningful content, c) time is money (Hurley et al., 2018) and d) community connectedness (see Table 7).

**Table 7. Co-design insights mapped to program design**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Key co-design insights</th>
<th>Program features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability means flexibility</td>
<td>Online and postal are good supporting components but require prior knowledge and advice.</td>
<td>Online materials and text message conversation starters delivered as supporting components. Face to face session includes an overview of supporting components available. Core program component requires parents to attend face to face session with facilitator.</td>
</tr>
<tr>
<td></td>
<td>Face to face session with facilitator is important to engage parents with program and allow for questions and feedback.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interactive learning methods over static power point presentation.</td>
<td></td>
</tr>
<tr>
<td>Meaningful content</td>
<td>Provide up to date knowledge on adolescents and alcohol.</td>
<td>Myth busters activity: Evidence based facts on adolescents and alcohol presented to parents. Advising and guiding your teen activity: Parents provided with</td>
</tr>
</tbody>
</table>
| **Provide prompts to encourage parent-child communication.** | **practical tips on how to monitor their adolescents.**
**Text message conversation starters: Follow up text messages sent to parents which provide a conversation cue to promote parent-child communication.** |
|---|---|
| **Time is money** | **Multiple face to face sessions are a deterrent for parents.**
**Under 1 hour is an ideal time frame.**
**Parents favour the addition of components that can be completed in their own time.** | **Program requires parents to attend only one face to face session with facilitator.**
**Face to face session runs for 45 minutes.**
**Infographics made available to parents online.**
**An option for parents to sign up for a series of follow up text messages delivering communication cues.** |
| **Community connectedness** | **Opportunities for parents to get to know other parents in the community are valuable.**
**Allow for interaction between parents for support and feedback.** | **Face to face session delivered within schools allowing parents to attend program session with parents in the same school community.**
**Program activity “advising and guiding your teen” designed to encourage communication and collaboration, providing an opportunity for parents to share strategies and tips related to monitoring practices.**
**Closed Facebook Group ‘Blurred Minds for Parents’ created for parents to join.** |

During co-design sessions parents mentioned being time poor while still wanting face-to-face interaction with experts. As a result, the Blurred Minds pilot program targeting parents was designed as a one off 45-minute session delivered face-to-face by the research team and supported by follow up text messages. In addition, the co-design outcomes generated by parents highlighted alcohol specific knowledge acquisition, parental monitoring and parent-child communication as meaningful topics to cover in program delivery. Leveraging of these generated insights, the pilot program was organised around three core objectives which included; 1) provide best practice monitoring advice and guidance to assist parents, 2) raise awareness about the roles that parents play in adolescent alcohol use, and 3) increase parent-
child communication. Additionally, during co-design parents highlighted the importance of communication and collaboration with other parents in order to gain insights and knowledge. Therefore, the parent program was developed to be relevant, interactive and engaging. The session was designed to allow parents to participate in group discussion in an informal and relaxed atmosphere while giving them time to reflect on their specific circumstances. The program featured an ice breaker activity, myth buster session, advising and guiding your teen session as well as an overview of the supporting materials which are presented next.

Ice breaker activity

The purpose of the ice breaker activity was to introduce parents to the topic of underage drinking and the role parents play while creating an informal and relaxed atmosphere. Following a brief overview of the session’s activities, parents were presented with a short video clip which used humour to portray a key message about parents and their influence on their adolescent’s alcohol initiation and subsequent drinking. Following the ice breaker activity, parents were introduced to the ‘myth busters’ activity.

Myth busters

The myth buster activity aimed to build knowledge and confidence on the topic of parents and their influence in adolescent drinking. Understanding current issues that are relevant to adolescents was a specific benefit that parents described as valuable during co-design (Hurley et al., 2018). Using Kahoot (an online quiz platform), parents were presented with multiple choice questions which they could individually answer using their mobile devices. Parent answers appeared in a de-identified manner as a poll on the screen (See Figure 5). The questions were based on evidence-based facts (Kaynak et al., 2014; Berends et al., 2016) that were interesting and relevant to parents.
The aim of the use of the online quiz format was to ensure that parents could think about the question on their own and answer each question anonymously without fear of judgement. Next, a guided discussion with parents was facilitated by the lead researcher. For example, parents were asked; “Can you teach ‘responsible drinking’ through controlled exposure to alcohol?” With little to no research that supports the notion of teaching ‘responsible drinking’ parents were presented with two or more facts which state that parents who supply alcohol; 1) undermine important messages about the unacceptability of underage drinking as teens who perceive that their parents disapprove are less likely to drink (Berends et al., 2016), and 2) are likely to accelerate their adolescents drinking as parental provision of alcohol is associated with increased alcohol use by adolescents (Kaynak et al., 2014). Next followed the ‘advising and guiding your teen’ activity.

Advising and guiding your teen

Advising and guiding your teen aimed to provide parents with practical examples on how they could effectively monitor their adolescent. During the co-design sessions parents deemed content on monitoring as highly relevant and noted that practical tips specifically for parents to implement in their household were of value (Hurley et al., 2018). In groups, parents were allowed time to discuss what monitoring strategies did or did not work in their household. Specifically, they were asked to consider behaviour expectations, how they keep in touch with their adolescent and how rules and consequences are implemented, communicated and
enforced in their household. Following the small group discussions, parents had the opportunity to share their effective strategies with the larger group and additional best practice examples were provided by the facilitator. Next, the supporting components of the program were presented to the parents.

**Supporting components**

Parents were offered the opportunity to sign up for weekly SMS conversation starters with the aim to promote parent-child communication post program completion. During co-design sessions parents highlighted the importance of utilising multiple platforms (i.e. face to face, online, and text messages) to add versatility and continuity of the program and therefore provide a more holistic form of program delivery (Hurley et al., 2018). The conversation starters consisted of one message a week for eight weeks. Each message presented a conversation cue to promote communication with their adolescent (see Figure 6). Each point discussed was selected in line with both the materials addressed in the parent program and the materials presented to the adolescent during the Blurred Minds student program. For example; “The pressure for your teen to drink may be intense and sometimes simply saying ‘no thanks’ is not enough. Has your teen heard of a good excuse to avoid alcohol? Help them come up with an answer they feel comfortable with when people ask them why they are not getting drunk. E.g. I’m driving, I have a big day tomorrow, my parents are waiting up for me, I’d rather dance.”

**Figure 6. Conversation starter text message**

![Conversation starter text message](image)
In addition, the Blurred Minds website featured a webpage dedicated for the parents. On this page parents could find a series of infographics which were related to the content that was delivered during the session. The four infographics included were; 1) an overview of the facts presented during the myth busters activity, 2) a checklist for monitoring social media, 3) practical examples to monitor adolescents, and 4) conversation tips which detailed practical tips on how and when to start the conversation with their adolescent (see Figure 7).

Figure 7. Online infographics for parents

5.4. Method

5.4.1. Recruitment and participants

The co-designed parent alcohol social marketing program was piloted in four Australian schools. Schools in which the adolescent Blurred Minds program was being implemented were approached to offer the pilot parent program. Out of the eleven schools that were approached, five were willing to organise the parent program and invite parents to attend. However, in one of the schools no parents attended the session due to a scheduling conflict - another community event was held on the same evening. To assist in recruiting parents, each school was sent a brief overview of the program as well as promotion messages for their social networks and email newsletters. In total 65 parents participated in the parent program (see Table 8).
Table 8. Program delivery overview

<table>
<thead>
<tr>
<th>School</th>
<th>Location</th>
<th>Delivery date</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Toowoomba</td>
<td>August 2017</td>
<td>8</td>
</tr>
<tr>
<td>B</td>
<td>Brisbane</td>
<td>August 2017</td>
<td>33</td>
</tr>
<tr>
<td>C</td>
<td>Mount Isa</td>
<td>August 2017</td>
<td>13</td>
</tr>
<tr>
<td>D</td>
<td>Toowoomba</td>
<td>October 2017</td>
<td>11</td>
</tr>
</tbody>
</table>

5.4.2. Measures

A repeated measure research design was used for outcome evaluation (see Table 9 for outcome evaluation items) and two process evaluation items were included in the post survey to gain parent feedback on the pilot program to inform program improvement. Parents confidence to communicate with their adolescent about alcohol was measured using 7-point scales adapted and adjusted for the context following Bandura (2006) self-efficacy measures. Parents permissive attitudes towards adolescent alcohol use was measured using scales derived from the Community Readiness Survey, which was designed to measure attitudes towards substance use (Beebe et al., 2001). This scale has been used in a previous study evaluating the efficacy of a parent based alcohol education program (see Brown et al., 2014). Parental monitoring was measured using two selected items from the Bandura (2006) parental self-efficacy 5-point scale to understand parents efficacy in monitoring their adolescent and their efficacy to exercise control over their adolescents drinking behaviour. The scale has previously been used to gain a better understanding of parents influence in their adolescent’s activities (Bandura et al., 2001, Caprara et al., 2003).

Reliability tests for constructs were performed using Cronbach’s alpha. All measures exceeded the threshold of 0.70 demonstrating acceptable reliability (Hair et al., 2006). In addition, two open ended questions were included to measure satisfaction with the pilot program by asking how the program was perceived and how it could be improved moving forward. Socio-demographic (i.e., gender, yearly income and employment status) data was also collected. Finally, data on parents drinking behaviour was collected.

Table 9. Constructs, item wording and response anchors for survey measures

112
<table>
<thead>
<tr>
<th>Constructs and item wording</th>
<th>Response anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-efficacy ( (a=0.90) )</strong></td>
<td>(-3) Not at all confident – (3) completely confident</td>
</tr>
<tr>
<td>How confident do you feel about talking to your teen about alcohol?</td>
<td>(3) completely confident</td>
</tr>
<tr>
<td>I believe I have the ability to talking to my teen about alcohol</td>
<td></td>
</tr>
<tr>
<td>How confident are you that you could talk to your teen about alcohol?</td>
<td></td>
</tr>
<tr>
<td><strong>Attitudes ( (a=0.80) )</strong></td>
<td>(1) Strongly disagree – (4) strongly agree</td>
</tr>
<tr>
<td>In my opinion it is acceptable for teenagers under the age of 18 to drink alcohol at parties if they don’t get drunk</td>
<td>(4) strongly agree</td>
</tr>
<tr>
<td>In my opinion it is acceptable for teenagers under the age of 18 to drink as long as they don’t drive afterward</td>
<td></td>
</tr>
<tr>
<td>In my opinion it’s okay for parents to offer their children under the age of 18 alcoholic drinks in their own home</td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring ( (a=0.70) )</strong></td>
<td>(1) Nothing – (5) a great deal</td>
</tr>
<tr>
<td>How much can you do to keep track of what your adolescents are doing when they are outside the home?</td>
<td>(5) a great deal</td>
</tr>
<tr>
<td>How much can you do to prevent your adolescent from becoming involved in drugs or alcohol?</td>
<td></td>
</tr>
<tr>
<td><strong>Program satisfaction</strong></td>
<td>(1) Very dissatisfied – (5) very satisfied</td>
</tr>
<tr>
<td>Overall, how satisfied were you with today’s Blurred Minds Parent Session?</td>
<td>(5) very satisfied</td>
</tr>
</tbody>
</table>

5.4.3. Data analysis

Parents filled out a survey prior to their participation in the program and immediately post completion of the face to face component of program delivery. All responses were entered in SPSS and a unique identifier code was used to match parent data across the two collection points. Data was analysed using paired sample t-tests. Cohen’s d was used to determine the effect sizes of any significant results (Cohen, 1988). Cohen (1988) criteria for effect size are as follows; 0.2 small, 0.5 medium, and 0.8 large.

5.5. Results

5.5.1. Demographic and sample characteristics

The overall sample \(N = 65\) was 68% female with 43% of parents reporting they worked full time. Sixty five percent of parents reported they consumed on average one or two standard drinks containing alcohol on a typical day when they were drinking. Only 3.4% of parents reported consuming five to nine drinks in one sitting. No parents reported drinking 10 or more alcoholic drinks in one sitting or consuming six or more alcoholic drinks daily (see Table 10). Overall parents were very satisfied (49.2%) or satisfied (49.2%) with the program. Only 1.6% of parents were neither satisfied nor dissatisfied with the program. Aspects of the
program that parents favoured were the short time frame, group discussions involving interactions with other parents, learning practical tips and strategies, and the presentation of evidence based facts.

Table 10. Summary of parents drinking behaviours

<table>
<thead>
<tr>
<th>Drinking behaviour</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of alcohol consumption</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>12.9</td>
</tr>
<tr>
<td>Monthly or less</td>
<td>22.6</td>
</tr>
<tr>
<td>2 to 4 times a month</td>
<td>32.3</td>
</tr>
<tr>
<td>2 to 3 times a week</td>
<td>21</td>
</tr>
<tr>
<td>4 or more times a week</td>
<td>11.3</td>
</tr>
<tr>
<td>Standards drinks in one sitting</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>13.3</td>
</tr>
<tr>
<td>1 or 2</td>
<td>65</td>
</tr>
<tr>
<td>3 or 4</td>
<td>18.3</td>
</tr>
<tr>
<td>5 or 6</td>
<td>1.7</td>
</tr>
<tr>
<td>7, 8 or 9</td>
<td>1.7</td>
</tr>
<tr>
<td>10+</td>
<td>0</td>
</tr>
<tr>
<td>Frequency of heavy drinking (6 or more drinks in one sitting)</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>50</td>
</tr>
<tr>
<td>Less than monthly</td>
<td>40.3</td>
</tr>
<tr>
<td>Monthly</td>
<td>8.1</td>
</tr>
<tr>
<td>Weekly</td>
<td>1.6</td>
</tr>
<tr>
<td>Daily or almost daily</td>
<td>0</td>
</tr>
</tbody>
</table>

5.5.2. Changes in parents’ confidence, attitudes and monitoring

A significant increase in parents confidence to communicate with their adolescent was observed pre (M = 2.6, SD = 0.5) and post (M = 2.9, SD = 0.3) program t(26) = -2.726, p < 0.01, d = 0.73. A significant decrease in parents permissive attitudes towards underage drinking was observed pre (M = 1.9, SD = 0.7) and post (M = 1.5, SD = 0.6) program t(26) = 4.087, p < 0.001, d = 0.61. Finally, a significant increase was also seen in parents ability to monitor their adolescent pre (M = 3.7, SD = 0.7) and post (M = 4.1, SD = 0.5) program t(34) = -4.73, p < 0.001, d = 0.66.

While positive effects were observed for parents participating in this program, room for improvement is noted with only four out of eleven approached schools adopting the pilot program and a total of 65 parents participating. The research team noted several factors that contributed to the lack of program acceptance and implementation from schools approached.
Notably, time and scheduling limitations inhibited the acceptance of programs within schools. Due to scheduling limitations, the research team only offered to deliver the program in schools on the evening the adolescent program was delivered. This lack of flexibility with delivery date options resulted in scheduling conflicts within some schools which ultimately meant they declined to participate in the program. Similarly, as some schools were approached to deliver the program at the end of a school semester, school staff did not consider it an optimal time for engaging with parents and therefore declined to participate.

5.6. Discussion

While co-design methods are becoming increasingly popular, detailed reporting of how user insights are transformed into final design solutions is often overlooked (Trischler et al., 2019). Additionally, due to a lack of studies detailing evaluation outcomes, there is limited reporting on the effectiveness of co-designed programs (Eyles et al., 2016). To address these gaps the purpose of this research was to demonstrate how key co-design insights were built into program design and to report on program outcomes for the co-designed program. In doing so the paper contributes with further evidence on the effectiveness of employing co-design to inform program design. The application of a co-design method provided rich audience driven insights that were translated into workable design solutions. A co-design method offers the potential to design and implement more effective and engaging programs that are grounded in the target audience’s real world experiences.

The parent alcohol program was designed incorporating key insights generated by parents participating in previous co-design sessions (Hurley et al., 2018). This study aimed to demonstrate how insights from co-design sessions were used to design a pilot alcohol social marketing program that targeted parents. Numerous studies explore the processes for and benefits of applying a co-design approach (Ward et al., 2018; Trischler et al., 2019), however as previous research suggests there is a need for more work demonstrating how co-design insights are developed into program design (Trischler et al., 2019). To address this key gap in understanding this study showcases how insights generated during co-design sessions were utilised and incorporated into program design. Specifically, parent preferences regarding program duration, content and delivery format were included. Hence, the program was designed to be delivered within a workshop setting in a short time frame, provide parents with opportunities to collaborate and interact with other each other and focus on content associated
with parental communication and monitoring practices. Several studies highlight concerns regarding the meaningful contributions of user ideas, suggesting that user generated design outcomes lack feasibility for implementation (Poetz and Schreier, 2012; Magnusson et al., 2003). The current study demonstrates that parents successfully generated co-design insights that were converted into viable program concepts, thus increasing the extent to which the program is user centred. Importantly, program evaluation demonstrated effectiveness of the final co-designed program.

The literature review highlighted how existing parent alcohol programs showcase mixed effects (Adolfsen et al., 2017; Brown et al., 2014) and are typically characterised by low parental participation rates (Tael-Oeren et al., 2019). The pilot parent program showed significant positive program effects on all three constructs. In addition, according to Cohen (1988) the effect size for each construct suggested a “moderate” to “large” practical significance. Post program, parents were more confident in their ability to communicate to their adolescents about alcohol. Frequent and open alcohol specific communication between parents and adolescents can reduce adolescents’ alcohol usage, while also increasing their perceptions of the negative consequences associated with alcohol use (Miller-Day and Kam, 2010). In addition, post program parents had less permissive attitudes regarding underage drinking. A change in parental attitudes is an important step towards ultimately influencing parenting specific behaviours as influencing attitudes has shown to increase the likelihood of changing behaviour intentions and ultimately behaviour (Fishbein, 2008). Finally, parents felt significantly more capable of monitoring their adolescent. Operating as one of the strongest protective factors for adolescent alcohol use (Mynttinen et al., 2017), parental monitoring has been found to both minimise (McCann et al., 2016) and prevent adolescent alcohol use (Mynttinen et al., 2017). Preliminary findings demonstrate that a social marketing program that was co-designed by parents can deliver positive outcomes for parents, which in turn may further assist to support adolescents. This is a first study to examine parents and alcohol from a social marketing perspective and demonstrates promising results.

5.7. Implications

In the present research a co-designed social marketing pilot program was evaluated to gain an understanding as to co-designs effectiveness. The focus thereby was on integrating co-
First, this study extends understanding by showcasing how insights derived through a co-design process can be developed into feasible program design concepts to produce more audience orientated programs that ultimately influence outcome change. While some studies raise concerns as to the feasibility of user generated ideas (Poetz and Schreier, 2012; Magnusson et al., 2003), the current study suggests that given the right procedures a co-design process that involves the creative collaboration between parents can produce feasible ideas that are successfully translated into program design concepts and deliver desired outcome change.

Second, this study provides a method for successfully developing more audience orientated programs. Co-design allows for user insights to be derived through close collaborations with the target audience during the span of the design process (Sanders and Stappers, 2008a). The benefits of co-design are evident in the literature (Steen et al., 2011; Ward et al., 2018), however the implementation and evaluation of co-designed programs is lacking. The current program co-designed by parent represents a radical shift from the existing expert driven programs that largely make up the alcohol education space (Dietrich et al., 2016b). Through co-design, the complexities of the parent’s individual circumstances are taken into account, in a process that focuses on designing programs from participants everyday reality as opposed to traditional expert driven approaches (Ward et al., 2018). This study demonstrates that a program designed from audience generated insights can in fact lead to a positive change in program participants.

Next, this study shows how social marketing can be used for alcohol education program design. Existing parent based alcohol programs demonstrate mixed effects (Adolfsen et al., 2017; Brown et al., 2014) and are largely developed in the prevention science space (Koutakis et al., 2008; Adolfsen et al., 2017). Social marketing is a credible behaviour change discipline that has demonstrated success in various contexts including alcohol education (Kubacki et al., 2015), food choice behaviour (Schwantes, 2018), and physical activity (Kadir et al., 2019). An audience focus is an essential feature of social marketing and sways from traditional, expert driven or top down approaches (French and Blair-Stevens, 2005) which typify current alcohol programs (Dietrich et al., 2016b; Hurley et al., 2019). Through the integration of co-design this
study demonstrates how social marketing techniques can be applied in the context of alcohol education to positively influence alcohol specific parenting factors.

Finally, for practitioners this study provides insights into how program acceptance and implementation can be improved in order to maximise program exposure. Reflecting on the challenges identified during program recruitment and implementation it becomes clear that strong networks are needed in order to successfully achieve the investment needed to facilitate program delivery within schools. When implementing a program within a school setting it is dependent upon the commitment of a faculty member to invest time and effort into organising program aspects such as venue arrangements and parent recruitment. In schools where the program was implemented the research team liaised with a dedicated staff member who was enthusiastic to be a part of the project. Building relationships with school staff may therefore help to increase acceptance of the program. Finally, it is important to ensure flexibility with program delivery and carefully consider optimal delivery dates in close consultation with key stakeholders to avoid potential scheduling conflicts.

5.8. Conclusions, limitations and future research

This study demonstrates how insights from co-design sessions informed the build of a pilot program targeting parents. Several limitations prevent generalizability beyond the current study. First, outcomes in the present study are limited to self-report data and as such are subject to response bias. Furthermore, it is recognized that due to self-selection bias the parents who chose to attend may not be representative of the target population. Programs which reach only those already equipped with the desired skills are not enough to see the desired social change. Second, this study is limited by a lack of theory integration. In social marketing and other behavioural change fields, theories are used in the development of programs to effect better outcome change (Michie and Prestwich, 2010), through influencing constructs that are known to cause specific behaviour (Hardeman et al., 2005) and behavioural change (Rundle-Thiele et al., 2019a). Thus, future research is needed to design and evaluate social marketing programs which incorporate theory during the co-design process. Third, due to difficulties in recruiting parents, the study is limited to a small sample size. Consequently, future research should aim to increase parent attendance by offering the program outside of school settings. Finally, as the program was co-designed with parents only, other important stakeholders (e.g. teachers, addiction experts, industry professionals) were not considered. Co-design teams representing
a mix of users and experts can produce outcomes higher in novelty and greater in user benefits than those produced by user only co-design teams (Trischler et al., 2018a). As such, future research should aim to capture knowledge and insights from a range of stakeholders in order to further assist in improving the outcomes observed through co-design.
5.9. References


Birrell, Deen, Champion, Newton, Stapinski, Kay-Lambkin, Teesson and Chapman. (2018), "A mobile app to provide evidence-based information about crystal methamphetamine (ice) to the community (Cracks in the Ice): Co-Design and beta testing." *JMIR mHealth and uHealth*, Vol. 6 No. 12, e11107.


Chapter 6: Integrating theory in co-design: An abductive approach

STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper. The bibliographic details of the co-authored paper submitted for revise and resubmit, including all authors, are:


My contribution to the paper involved:

- The research design, collection and analysis of data;
- Categorisation of data into a usable format
- Writing drafts, finalizing edits, submitting final manuscript, and responding to reviewers comments

(Signed) ___________________________ (Date) 20.08.2020

Erin Hurley

(Countersigned) ___________________________ (Date) 20.08.2020

Supervisor: Dr Timo Dietrich
6.1. Abstract

Co-design empowers people, giving them a voice in social marketing program design, however approaches have mostly excluded expert knowledge. An abductive approach to co-design allows for inclusion of expert knowledge, providing theoretical guidance while simultaneously investigating user views and ideas extending understanding beyond known effective approaches. We use the seven-step co-design framework and outline how an abductive inference can be applied to co-design. Social Cognitive Theory constructs were integrated into the seven-step co-design process. The abductive approach to co-design was tested in two co-design sessions involving 40 participants. Findings demonstrate that theory can be successfully integrated into the seven-step co-design process through utilisation of theory-mapped activity cards. This paper provides guidance on how theory can be incorporated into ideation and insight generation. Limitations and future research recommendations are provided.

Keywords: co-design, abductive reasoning, insights, formative research, social marketing
6.2. Introduction

Social marketing, which is about to turn 50 years old (Kotler and Zaltman, 1971), has gained prominence as an effective approach demonstrating marketing application to benefit people and planet. Social marketers have co-designed solutions with communities that have led to lasting changes benefitting endangered animal populations such as koalas (David et al., 2019). Across three co-design sessions that followed the 6 step co-design process (Dietrich et al., 2016) 41 dog owners were tasked to design a program that would appeal to them and people like them. Dog owners wanted a non-koala focussed program that showed them what to do and the program had to be fun (Rundle-Thiele et al., 2019). Leave It, a social marketing program, was piloted in 2017 featuring a community event celebrating man’s best friend (DogFest) supported by a marketing communication campaign to raise awareness for a $150, 4 week training program which had koala aversion (the ability to avoid a koala) embedded into the program along with other dog abilities such as sit and stay. The pilot study was extended to a city wide roll-out over the next 3 years. By re-imaging approaches with dog owners and ensuring the program was designed for their needs, the Leave It program has delivered a 40% reduction in koala deaths resulting from dog interactions since the program was first introduced in the Redland City Council area in 2017.

With a focus on collaboration and co-creation, user driven innovation is a catalyst for behaviour change (Trischler et al., 2019). From a participatory design perspective, co-design is a method that facilitates user involvement during program design in order to develop more user orientated design solutions (Voorberg et al., 2015). Co-design empowers those who are not traditionally part of the design team (e.g. end users, program beneficiaries), giving them a voice to share their unique insights and experiences to discover new approaches that can be applied to ensure that changes can occur (Sanders and Stappers, 2008). However, exclusive inductive or ‘bottom up’ approaches may be limiting program effects by excluding or limiting expert knowledge. Expert knowledge in the form of theory use may offer the potential to further extend co-design successes and thus improve program outcomes through the identification and examination of key variables that are known to have the greatest impact on influencing behaviour change.

Baker and Saren (2016) describe theory as offering “explanations of the physical and social worlds around us that can reveal deeper understandings of how and why things happen”
Thus, theory offers an organised way to think about a topic by outlining a set of propositions that explain or predict a behaviour occurring in the future (Baker and Saren, 2016). For example, social cognitive theory, which is one of the most commonly reported theories in social marketing (Luca and Suggs, 2013; Truong, 2014), contends that individual behaviour changes through observing others within social interactions and through lived experiences resulting from surrounding environments (Bandura, 2005). In social marketing and other behavioural change fields, theories are often used in the development of programs to effect better outcome change, through influencing constructs that are known to cause specific behaviour (Hardeman et al., 2005). Thus, social marketers strive for the development of programs that are grounded in both user insights and are set within behavioural theory. In studies such as Leave It, theory application was not clearly evident in the co-design process, indicating an inductive process was applied in this study. The co-design workshops reported in Rundle-Thiele et al. (2019) commenced with a review of ten existing campaigns that aimed to decrease dog and koala interactions. Campaign elements were not clearly linked to theory, nor was theory mentioned in reporting of these initiatives.

Deductive or ‘top down’ approaches place the focus on expert knowledge (e.g. theoretical frameworks) when developing programs (Dubois and Gadde, 2002). Deductive approaches that exclude users in processes limit the ability to design programs that people prefer (Müller and Thoring, 2012) and run the risk of expert bias (Holmgren et al., 2018). The Rundle-Thiele et al. study (2019, p10) noted “insights gained in the current study highlight incongruence between experts who believe people need to be educated, informed and provided with scientific evidence to act, which contrasts with community perspectives generated through co-design.” However, failing to include theory may limit program success (Willmott et al., 2019, Green et al., 2019) and, therefore, approaches that leverage the relative strengths of inductive and deductive approaches may offer the greatest potential.

Abductive approaches merge inductive and deductive approaches (i.e. expert and user views). The application of an abductive approach has received limited attention in co-design and social marketing research. Similar to deduction, abduction requires a theoretical lens, encouraging the identification and investigation of new ideas that fall outside of the initial theoretical framework (Meyer and Lunnay, 2013). Therefore, an abductive approach permits the inclusion of theory in user centred design. However, guidance on how to integrate expert evidence into user centred design processes without overshadowing individual voices or
disempowering people is lacking. While both inductive and deductive approaches are commonly referenced in social science literature (Bryman, 2012), the value of an abductive approach has received comparably less attention.

Given the importance and benefits of applying a customer orientated approach to social marketing (Slattery et al., 2020), integrating theory into an existing co-design process may extend co-design success, allowing for the build of more theoretically robust programs which in turn are more effective. A method outlining how a theory based program can be co-designed utilising an abductive approach is needed. Thus, this study aims to understand how theory, in this case Social Cognitive Theory (Bandura, 2005), can be incorporated into the fuzzy front and back end of an existing co-design process (see Trischler et al., 2019). This paper aims to provide guidance on how theory can help with ideation, user insight evaluation and subsequent program design.

6.3. Literature Review
6.3.1. Empowering participants through co-design

Uncovering novel and innovative ideas that break the bounds of existing knowledge (e.g. radical shifts in program design solutions) is needed for change to occur (Brown and Wyatt, 2010). One approach stimulating innovation and creative solutions is design thinking (Lefebvre, 2012). Design thinking is an approach that brings diverse disciplinary expertise together to solve problems. Design thinkers are challenged to create empathy maps to understand the user experience, followed by a process that draws on diverse areas of professional expertise with a key aim to generate innovative solutions that are grounded in user needs and experiences (Brown and Wyatt, 2010). Brown and Katz (2011) describe three iterative stages to the design thinking process that includes; inspiration (identifying an opportunity or problem); ideation (process of generating and testing creative ideas); and implementation (implementing the designed artefact in market). During the ideation phase rather than acquiring an often superficial understanding which can occur when conventional research methods are applied, design thinkers are tasked with gaining rich insights focused on understanding user experiences (Lefebvre, 2012). A key limitation of the design thinking approach is that user voices may be shouted out by experts involved in the process if empathy fails to be achieved.
In contrast to expert driven approaches, user centred approaches are evident. Originating from the field of participatory design (Ehn, 2008) co-design refers to the collective creativity of users and beneficiaries of programs (Hurley et al., 2018). In line with the notion of participatory design, co-design recognises that those who are affected by the design should be the driving influence during the design process (Ehn, 2008). Users are recognised as valuable sources of knowledge, that can work together to design programs, products or services (Dietrich et al., 2016). Thereby, co-design empowers participants’ to contribute as active and equal contributors to design ideas (Trischler et al., 2019). Unlike design thinking, where experts are involved across all stages, co-design ensures users generate ideas and from there feasibility, testing and implementation then become the responsibility of experts who need to challenge prevailing systems and structures to drive the changes needed from idea to action.

To facilitate and support creative engagement and contributions from participants, appropriate processes and tools must be utilised. Trischler et al. (2019) proposed a seven step iterative process for facilitating co-design which includes; 1) resourcing whereby relevant input (e.g. academic literature) is sourced for the co-design session, 2) planning whereby each of the subsequent stages are planned for and coordinated by the research team, 3) recruiting whereby suitable users are identified and recruited to the co-design sessions, 4) sensitising whereby participants are familiarised with the underlying topic, 5) facilitation of the co-design session, including ideation and insight generation, 6) reflecting involving analysing and reflecting on co-design insights, and 7) building for change, whereby viable solutions are conceptualised in consultation with key stakeholders.

To date co-design has proved successful in many contexts (Mehmet et al., 2020; Domegan et al., 2019) and differences between user generated ideas and expert generated ideas have been observed (Hurley et al., 2018; Dietrich et al., 2016). Benefits of co-design have been observed for researchers, users and society at large (Slattery et al., 2020). Co-design fosters the establishment of community links that enable researchers easier access to participants, including improved accessibility to vulnerable user groups, and greater response rates (Brett et al., 2010). In addition, active user involvement through co-design empowers users through increased knowledge, skills and confidence (Slattery et al., 2020). Benefits of co-design can also extend to wider society, strengthening community engagement (Clarke et al., 2017) and democratising public services (Voorberg et al., 2015). However, co-design approaches may be limited by their lack of theory integration, given that theory application may extend program
outcomes by focusing on constructs known to cause specific behaviour (Baker and Saren., 2016).

Given the importance and benefits of applying a customer orientated approach to program design, and to support academics and practitioners in applying behavioural change theories in program design (Firestone et al., 2017) this research aims to understand how theory can be applied within a co-design process. One method for integrating theory with user insights is an abductive approach, which is discussed next.

6.3.2. An abductive approach to program design

Arising from the works of Charles Sanders Peirce (Peirce, 1980), all types of logical reasoning can be classified into three distinctly unique categories including abductive, deductive, and inductive reasoning. Each type of reasoning is responsible for distinctly different ways of producing design knowledge. Deductive reasoning or “top down” approaches apply pre-existing and tested solutions to similar problems (i.e. evidence based program that relies on existing theories and frameworks) (Mason et al., 2018). Deductive approaches feature extensive testing with established patterns verified over time and across settings delivering confidence. Theories, evolving from deductive approaches, deliver propositions that explain current behaviour or behavioural changes (Baker and Saren, 2016). However, the low levels of variance explained and inability of widely established theories to hold over time and across contexts suggest the research community has yet to achieve a theory that can be handed to practitioners to confidently apply knowing they will achieve their desired outcome. In the pursuit of understanding, inductive or “bottom-up” approaches are applied and conclusions are drawn from available data to formulate design solutions (i.e. user generated programs). However, these user orientated processes may lack theoretical relevance and an ability to be applied across contexts or time.

Inductive and abductive inferences are similar in that they do not provide deductively derived guaranteed truths. However, each are uniquely distinct as induction uses evidence to support conclusions (that do not have the certainty of deductive conclusions), while abduction offers speculative but plausible explanations to explain some surprising phenomena (Folger and Stein, 2017). Some authors frame abductive reasoning as ‘induction plus an explanation’ (Lipton, 2004, Harman, 1965). That is, abduction attempts to provide meaningful explanations or “educated guesses” to explain surprising phenomena, offering more solid evidence than
inductively derived conclusions (Green et al., 2007). Therefore, an abductive approach may have the potential to yield more than an inductive approach given that both theoretical concepts and the empirical world may be captured (Dubois and Gadde, 2002), improving the quality of outputs.

Of the three types of reasoning, abduction is the best suited to uncover novel insights (Kolko, 2010), playing an important role in assisting social researchers to make new discoveries (Reichertz, 2004), which can support theory building processes. Abductive reasoning involves the conceptualization and reimagination of existing knowledge to envision and explain a new concept (Roozenburg, 1993). While receiving less attention than its more popular inductive and deductive counterparts (Nenonen et al., 2017), the value of abduction is recognised in marketing (see Table 1). For example, Mehmet and Simmons (2019) applied an abductive approach to examine community sentiment to gain insights to inform NSW shark policy. While an emphasis was placed on understanding community views (a bottom up approach), data were constantly examined and re-examined in relation to the literature. This process allowed for a more nuanced and accurate understanding of community viewpoints to emerge through the social listening method applied and ensured meaning to user data was assigned drawing on past research (Mehmet et al., 2018). Selected studies that have applied abductive approaches in various marketing fields are outlined in Table 1.
**Table 11. The value of abduction in the context of Marketing**

<table>
<thead>
<tr>
<th>Author</th>
<th>Context</th>
<th>Method</th>
<th>Value of abduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aarikka-Stenroos &amp; Jaakkola</td>
<td><em>Service marketing</em>: An abductive approach to understand the collaborative process of value co-creation.</td>
<td>Interview data were analysed and examined in relation to existing theoretical knowledge.</td>
<td>Broadened the existing understanding of collaborative value co-creation processes.</td>
</tr>
<tr>
<td>Davey &amp; Grönroos</td>
<td><em>Transformative service research</em>: An abductive hermeneutic approach to health service literacy.</td>
<td>Iterative abductive hermeneutic approach to analyse textual data linking it with existing theory.</td>
<td>Insights from interview data were deepened by analysing and linking data to pre-existing knowledge and literature.</td>
</tr>
<tr>
<td>Dubois &amp; Gadde</td>
<td><em>Industrial marketing</em>: An abductive systematic combing approach to case research</td>
<td>Suggests an approach based on ‘systematic combing;’ grounded in an ‘abductive logic’</td>
<td>Offers a framework for theory building (i.e. refinement of existing theories, rather than building new ones). Through a cross fertilisation process new combinations were developed through a mixture of existing theory and new data. The process generated a broader understanding of the consumer and the context in which they behave.</td>
</tr>
<tr>
<td>Carins et al. (2014)</td>
<td><em>Social marketing</em>: Abductive reasoning approach to understanding Defence Force eating behaviour</td>
<td>Iterative and reflective abductive process (inductively generating themes from qualitative data; deductively searching data to support theory).</td>
<td>Abduction played a pivotal role in making sense of social media comments. Examining social media comments in the context of existing literature resulted in more nuanced and accurate thematic analysis and coding, providing deeper and richer insights from key groups of interest.</td>
</tr>
<tr>
<td>Mehmet &amp; Simmons (2019)</td>
<td><em>Social marketing</em>: Assigning meaning to social media commentary through an abductive approach.</td>
<td>An abductive process was used to analyse social media comments in relation to existing literature to develop codes and themes.</td>
<td></td>
</tr>
</tbody>
</table>

Taken together, abductive approaches reported within marketing typically pair consumer viewpoints with theoretical understanding at the data analysis stage. Application of an abductive approach at the research design stage is a gap in reported literature. Abduction’s innovative and creative nature makes it synonymous with co-design (Steen, 2013) which aims to introduce new ideas and envision new approaches that can be applied to overcome
intractable problems (Dorst, 2011). While abduction has been recognised as the foundation for design thinking where discipline expert involvement is a condition of the process (Serrat, 2017; Lefebvre and Kotler, 2011), less emphasis has been placed on abductive co-design processes, which centres users at the heart of the design process, ensuring they are not mere recipients of designed outcomes emanating from expert driven design processes. Design thinking relies on application of a hierarchical structure where a design expert leads an innovation process, supported by a diverse range of disciplinary expertise informed by user insights. Alternatively, co-design places ideation firmly upon users. Program solutions arising from user centred design processes, such as co-design, could potentially be limited to knowledge held by users. Thus co-design may benefit from a more balanced approach to program design that embeds theory into the co-design process ensuring that all theoretical constructs are available for consideration at the resourcing stage (Step 1 in the 7 step co-design process – See Trischler et al., 2019).

While consideration of expert approaches is evident, the level of detail needed to ensure a theory is comprehensively mapped is missing. For example, O’Brien et al. (2016) details a systematic, sequential approach to integrating expert knowledge (evidence from systematic reviews, insights from relevant experts) into co-design sessions with key stakeholders in the design of a health intervention. During the Resourcing stage, evidence from expert knowledge was summarised by the research team to produce “evidence statements” (e.g. providing explicit social roles produces most benefits), which were then presented to participants’ during co-design sessions to inform the aims and content of the sessions (O’Brien et al., 2016). Co-design participants were asked to brainstorm new program ideas which were informed and inspired by the evidence statements (O’Brien et al., 2016). Alternatively, Villalba et al. (2019) and Dietrich et al. (2017) designed activity cards to communicate past approaches known to deliver positive outcomes that were identified from literature reviews. Activity cards were used in co-design sessions to sensitise participants and trigger discussions. However, while studies have integrated some expert knowledge into the co-design process explicit links between theoretical constructs and program component ideas are not apparent. By mapping program components to a theoretical construct the role of theory in program design can be more clearly illuminated.

A systematic literature review of parent alcohol programs identified Social Cognitive Theory (SCT) as the most commonly applied theory within the context of alcohol education programs targeting parents (Hurley et al., 2019). In a process known as “reciprocal determinism”, SCT focuses on how both individuals and the environment interact and influence
each other to result in behaviour change (Bandura, 2004). The core constructs of SCT are intended to predict behavior (Bandura, 1998) and aid to understand the process by which individuals create habituation (i.e. maintain the changed behaviour) to effect long-lasting change (Kwasnicka et al. 2016). SCT provides a basis to guide program development (Bandura, 2004), and is a promising theory used in behavioural programs. Given SCT’s popularity in health promotion (Bandura, 2004) and more specifically alcohol education (Hurley et al., 2019; Sharma 2005) and in recognition of its ability to offer an holistic approach to program development SCT was selected to be applied during the co-design process.

SCT provides understanding of the mechanisms that influences and maintain health behaviours (Glanz et al., 2008). Individual determinants of behaviour include knowledge of health risks and benefits, observational learning and self-regulation (Glanz et al., 2008). Knowledge of health risks and benefits create a precondition for change, an essential element for influencing behaviour (Bandura, 2004). Observational learning exposes individuals to others modelling the desired behaviour (Bandura, 2004), and is an established method for influencing behaviour (Glanz et al., 2008). Self-regulation encompasses certain skills that individuals must learn in order to exercise self-influence over behaviour (Bandura, 1991). Self-regulation is achieved through; (1) the identification and adoption of proximal and distal goals; (2) feedback received on the quality of performance and areas for improvement; and (3) finding social support in people who encourage their efforts (Glanz et al., 2008). Finally, environmental determinants of behaviour include the provision of enabling factors to support behaviour, known as ‘environmental facilitators’ (Bandura, 1998).

It has been suggested that the theory-practice gap is widening (Nenonen et al., 2017). While arguments are commonly made as to whether or not this gap can be bridged, solutions as to ‘how’ this is achieved remain underexplored (Nenonen et al., 2017). This study responds by offering a detailed description of one possible solution to bridge the theory-practice gap. Examining co-design through an abduction lens allows us to explore whether clear links between theory and practice can be effectively incorporated into user centred design processes to inform the design of behaviour change programs. An abductive reasoning approach may provide a novel approach permitting clear links between theoretical constructs and program components to be established through clear reporting. Thus the purpose of this study is to understand how theory, specifically Social Cognitive Theory, can be incorporated into an existing co-design process to design a social marketing program. The following research
questions guided this study: RQ1: *What is the role of theory in an abductive co-design process?*
RQ2: *Which Social Cognitive Theory constructs are included in a co-designed program by potential program users?*

Specifically, the study outlines an abductive co-design process highlighting how Social Cognitive Theory constructs were mapped to program components in the Resourcing stage. This study aims to propose a co-design process that will provide practitioners and researchers with the necessary tools required to integrate theory with practice.

**6.4. Method**

**6.4.1. Recruitment and participants**

A purposive sampling method was used to recruit participants for this study. Thereby, participants were recruited through an established relationship with the owner of a local restaurant. A Facebook post was placed on the business Facebook page, advertising the co-design sessions. Anyone with at least one adolescent in high school was eligible to register. The use of Facebook to recruit participants has attracted research attention (Forgasz et al., 2018) and is recognised as a cost-effective approach to recruit different demographic and psychographic groups (Gilligan et al., 2014). The restaurants Facebook page has over 10,000 followers allowing the research team access to a large number of potential participants with minimal time and resources spent. As an incentive for assisting in recruiting participants, the owner was given $AUD 50 per participant. Food and drinks were provided to participants during the co-design session along with a $25 voucher for completing the co-design session. A total of 40 participants were recruited to participate in two co-design sessions. The average age of participants was 45 and 89% of participants were female (see Table 12).

**Table 12. Participant overview**

<table>
<thead>
<tr>
<th>Session 1</th>
<th></th>
<th>Session 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>Age</td>
<td>Participant</td>
<td>Age</td>
</tr>
<tr>
<td>Theresa</td>
<td>53</td>
<td>Rhonda</td>
<td>45</td>
</tr>
<tr>
<td>Trudi</td>
<td>43</td>
<td>Willemyn</td>
<td>39</td>
</tr>
<tr>
<td>Anita</td>
<td>42</td>
<td>Jose</td>
<td>40</td>
</tr>
<tr>
<td>Georgia</td>
<td>48</td>
<td>Steven</td>
<td>54</td>
</tr>
<tr>
<td>Jennifer</td>
<td>49</td>
<td>Vicky</td>
<td>45</td>
</tr>
<tr>
<td>Peta</td>
<td>41</td>
<td>Mark</td>
<td>46</td>
</tr>
<tr>
<td>Fiona</td>
<td>44</td>
<td>Kath</td>
<td>46</td>
</tr>
<tr>
<td>Victoria</td>
<td>38</td>
<td>Louise</td>
<td>55</td>
</tr>
</tbody>
</table>
Participants were invited to join a co-design session with the aim of designing a parent based alcohol program. Underage drinking is an issue of concern in Australia (Australian Institute of Health and Welfare, 2017) and as key influencers in the adolescent lives, parent based program have been identified as important to reduce underage drinking (Newton et al., 2017).

6.4.2. Approach – Application of the seven-step co-design framework

This study applied Trischler et al.’s (2019) seven step co-design process (see Table 13).

Table 13. Application of seven-step co-design framework.

<table>
<thead>
<tr>
<th>Process stage</th>
<th>Application to an abductive co-design approach</th>
</tr>
</thead>
</table>
| 1. Resourcing | - Relevant input sourced from peer reviewed literature.  
- Previous parent alcohol programs identified and assessed.  
- Program components extracted  
- Social Cognitive Theory construct definitions sourced for expert judging  
- Expert judging process utilised to match program components with Social Cognitive Theory constructs via a consensus process  
- Theory-mapped activity cards created for all program components offering clear links to Social Cognitive Theory constructs (see Figure 1). |
| 2. Planning   | - Regular meetings held with the research team to coordinate the planning of the co-design sessions. |
3. Recruitment - Suitable participants identified and recruited through existing relationship with local restaurant owner.

4. Sensitization - Sensitisation process implemented during facilitation stage

5. Facilitation

   The co-design session was split into four stages:
   
   **Introduction**: Participants were introduced to the topic and the purpose of the co-design session.
   
   **Sensitisation**: Participants provided with theory-mapped activity cards and ‘most/least liked’ template. Participants’ asked to read through each card individually and then record and provide reasons for their three most liked and three least liked activities on the template provided.
   
   **Ideation**: Participants provided with ‘make tools’ and asked to design their ideal parent alcohol program. Participants encouraged to improve and/or develop ideas based on the provided theory-mapped activity cards, and/or generate completely new ideas.
   
   **Pitch presentation**: Each group presented their design ideas to the larger group.

6. Reflecting

   Qualitative data analysed using five-phase cycle Yin (2015) to identify and code overarching themes.

   Critical evaluation and interpretation of design ideas and co-design themes against SCT constructs in consultation with other design experts.

7. Building for change

   Integrating and bridging SCT and user insights to design a social marketing program.

Specifically, the co-design activity cards (i.e. cards detailing existing program activities) to be used during the sensitisation and facilitation stages of the co-design sessions were theoretically mapped using key Social Cognitive Theory (SCT) constructs (Bandura, 1998).

### 6.4.3. Expert judging

To ensure that each activity offered to users during the co-design session accurately represented the selected SCT construct, expert judging was utilised (Hardesty and Bearden, 2004). The expert panel was sent to 27 experts in the Marketing Department at a large Australian University. The judging panel were asked to match a list of 30 unique activities to six identified constructs of SCT. The key constructs of SCT included in the expert panel were the following: (1) knowledge of health risks and benefits; (2) observational learning; (3) health goal setting; (4) feedback; (5) social support: and (6) environmental facilitators. Each activity was judged as to whether it was representative of any of the identified SCT constructs. Eight out of the 27 experts (26%) returned completed expert panels. The literature suggests that the response rate is acceptable (Criscione-Schreiber et al., 2015) with good results obtainable.
through small panels of homogenous experts in a field of study (Akins et al., 2005). An activity was deemed representative of a SCT construct if an 85% agreement rate was achieved among the judges (Saxe and Weitz, 1982). In total, 22 activities were aligned to SCT constructs. Of these, two activities were selected to represent each of the six SCT constructs to create a total of 12 theory-mapped activity cards (see Figure 8)

Figure 8. Theory-mapped activity cards.

6.4.4. Data collection and analysis

Data was collected in two ways. First, qualitative data was collected from the ‘most/least liked’ templates provided to parents during the sensitisation stage. Second, the pitch presentations delivered at the end of the co-design session were recorded and photographs taken of each design idea. Thematic analysis was used to identify and analyse patterns of meaning in the qualitative data gathered from the ‘most/least liked’ templates. Specifically, data were analysed by following the five-phase cycle recommended by Yin (2015). This involved an open coding process, whereby codes were assigned to the transcribed data with a focus on identifying key aspects that parents placed value on in parent alcohol programs (e.g. content, format, features). In an iterative process, codes were critically re-examined to identify themes that further refined and focused the data. In addition, a total of 12 program ideas were generated by participants as a result of the two co-design sessions and were analysed in terms of their application of the theoretically mapped activities. A cross rater process was used whereby, two independent researches assessed user generated ideas in relation to key SCT
constructs to ensure reliability, with a high-level of agreement (95%) reached. For any discrepancies, a third independent researcher acting as an arbitrator was consulted. Specifically, each idea was assessed in terms of 1) its direct use of the theory based activities, 2) adaptive reuse of the theory based activities, and 3) generation of novel ideas that fell outside of the theoretically mapped activities presented.

6.5. Findings

The application of theoretically mapped co-design activity cards to an existing co-design process was critically examined to understand the role and relevance of theory in co-design. First, the results of the expert panel are presented. Second, the utilisation of theory-mapped activity cards during the sensitisation and facilitation stages are examined. Finally, user insights are evaluated against the SCT framework to inform subsequent program design.

6.5.1. Expert panel results

An expert panel process was utilised to map SCT constructs to existing parent alcohol activities. Findings highlight the top two activities for each of the six SCT constructs (i.e. at least an 85%+ agreement rate) (see Table 14). The activities with the highest agreement rate amongst the expert panel were selected and presented to participants through the use of theoretically mapped activity cards during the co-design sessions.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Activity description</th>
<th>Consensus rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observational</strong></td>
<td>Learning by observing the desired behaviour performed by others.</td>
<td><strong>Interactive sessions:</strong> Interactive sessions showing characters engaging in risk and protective behaviours and reaping the consequences and benefits of these behaviours. <strong>Skills demonstration:</strong> Series of workshops that involve skills demonstrations, role play and homework tasks which require parents to implement the practical strategies they learnt during the previous workshop.</td>
<td>100%</td>
</tr>
<tr>
<td><strong>learning</strong></td>
<td>- Use of role play to trial and improve skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>- Creation of social support.</td>
<td><strong>Peer to peer support:</strong> A peer-to-peer program where parents are paired with a parent coach</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Support</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
who has had similar experiences and can offer compassion, guidance and support.

**Contact list:** Parents are provided the opportunity to swap contact details with each other.

**Goal Setting** - Adopting goals and evaluating one’s performance in relation to those goal.

**Parent-child contract:** Parents form a contract between themselves and their adolescent that outlines their agreed upon attitudes.

**Parental drinking assessment:** Using an online tool parents are able to assess their own drinking and set new goals to help them reduce their risk.

**Feedback** - Information about the quality of performance and how it can be improved.

**Feedback on communication style:** Following discussion parents receive feedback from other parents and facilitator on their communication styles.

**Take home strategies and feedback:** During workshops parents relay how they went about practically implementing the learnt strategies to gain feedback from facilitators.

**Knowledge** - Knowledge about health risks and benefits.

**Online quiz:** Impart research based information to help parents promote healthy adolescent development using a quiz.

**Webinar series:** Webinar series that provides practical information for parents about the prevention of early substance use among young people.

**Environment** - Delivery of enabling factors to support the behaviour (e.g. environmental change).

**Clean out alcohol cabinet:** Parents are encouraged to clean out their alcohol cabinet at home, or ensure all alcohol is locked away out of sight.

**Monitoring app:** Parents are encouraged to install a mobile app which enables them to monitor their adolescent's whereabouts.
6.5.2. Sensitisation

In line with the abduction approach, during the sensitisation stage, participants were provided with the 12 theory-mapped activity cards detailing previous parent alcohol program activities theoretically mapped to key SCT constructs (2 cards per construct – see Table 3 and Figure 1 for card examples). Participants were given time to read and reflect upon each card. Next, participants were provided with a template asking them to identify and provide reasons for their three most liked and least liked activities (see Table 15). This sensitisation activity is important as it familiarises participants with the underlying topic while beginning the process of idea generation (Hurley et al., 2018). Thereby, providing theoretically mapped activity cards influences participants to begin interpreting and considering the activities alongside their own needs and wants. Sensitising participants using theory-mapped activity cards allows them to call upon prior knowledge of theoretically based constructs which otherwise would not be present in the interpretations, adaptations and creative outputs during the co-design session.

<table>
<thead>
<tr>
<th>Most liked activities</th>
<th>SCT Construct</th>
<th>Activity</th>
<th>Example quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Knowledge</td>
<td>Online quiz</td>
<td>“I love a good quiz. I find them engaging and competitive.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Parents need to learn how alcohol affects the teenage brain. Students learn this at school but parents’ do not know the latest research.”</td>
<td></td>
</tr>
<tr>
<td>2 Goal setting</td>
<td>Parent-child contract</td>
<td>“Encourages open communication with parents and child.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“his is a great way to lay on the table what parents expectations are and what the childs expectations are. Then everyone knows where they stand.”</td>
<td></td>
</tr>
<tr>
<td>3 Knowledge</td>
<td>Webinar series</td>
<td>“Easily accessible, time to suit person, good amount of information easily.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Practical information shared online that can be recorded and re-accessed anytime.”</td>
<td></td>
</tr>
</tbody>
</table>

| Least liked activities | Environment | Cleaning out alcohol cabinet | “Children need to understand the effects of alcohol, not hide it away.” |
|                       |             |                             | “If your child wants to drink they will source it whether or not you have it at home. I feel it is unhealthy to remove and gives them the wrong impression.” |
2 Environment Monitoring app
“I don’t think monitoring shows the children you trust them to make the right choices.”
“Kids know how to work around this tech. doesn’t build trust in the relationship. Doesn’t support practical ways to support or reduce bad behaviours or have a discussion.”

3 Knowledge Webinar series
“I’m great at registering for webinars, not so good at coming back.”
“Less interactive and more likely I would find it difficult to get through as I would be less accountable to a group of people.”

6.5.3. Facilitation

Following the card sorting activity, participants were randomly allocated into groups of three to four and the remaining design tools were distributed (butcher paper, pens, post-it notes, colored markers, sticky tape, scissors). The facilitators encouraged participants to improve and/or develop ideas based on the provided activity cards and/or the generation of completely new activities to design their ideal parent alcohol program. In doing so participants were provided with the freedom to introduce program ideas beyond the initial theoretical framework which had been used to sensitise them and prepare them for the ideation phase.

6.5.4. Reflecting

On average, four (33%) of the theory-mapped activity cards were directly utilised in the final design ideas generated by participant groups. In addition, 11 of the 12 design ideas (92%) adapted SCT mapped program components to better align with their user needs. Given participants use of activity cards to articulate final design outcomes, the inclusion of theoretically mapped activities offers the potential to yield more theoretically derived outcomes than traditional co-design approaches. Finally and importantly, while program design was guided by SCT, the process still allowed for many novel insights to emerge, featuring nine (75%) of the final design concepts introducing novel program design ideas.

Analysing the collected data from the co-design sessions led to the identification of five key themes including a preference towards three Social Cognitive Theory constructs, namely 1) social support, 2) goal setting and, 3) knowledge of health risks and benefits and two additional converging themes, namely 4) communication and, 5) flexibility, which are discussed hereafter.
Social support

Social support, a key Social Cognitive Theory construct, was a key theme for parents. Eleven (92%) of the final design ideas implemented at least one element of social support, indicating that parents wanted other people to encourage their efforts. Specifically, participants noted that program components that included collaborations and interactions with other parents would be beneficial in not only fostering the creation of peer to peer support systems but allowing for idea sharing and feedback amongst participants.

“To have somebody who has already experienced what you’re going through and to help give ideas on new ways to try and help your relationship with your child.”

(Female participant, Session 1)

In addition, while parents recognised the need for content tailored specifically to parents, they also expressed the desire to include their teenagers in some program strategies, such as in an online quiz or dedicated parent/teen workshop session.

“I actually like the idea of doing something with our teens involved. Let’s share ideas, thoughts, experiences of our past and work together” (Female participant, Session 2)

Goal setting

The next prominent theme was the SCT construct goal setting, including the identification and communication of family expectations. In total, eight (67%) of the final design ideas implemented a program component focused on parents setting alcohol specific family goals. While participants suggested novel ideas such as a peer to peer contract for parents to agree on parameters, and a family assessment quiz for families to track and rate their own progress, the ‘family contract’ provided on the theory-mapped activities was the most favoured. Participants felt that a family contract would set clear rules and guidance on what is acceptable behaviour and provide accountability once expectations were set.

“A contract is a great way to lay on the table what parents’ expectations are and what the child’s expectations are. Then everyone knows where they stand.” (Female participant, Session 1)
In addition, participants favoured the implementation of goals as they can be personalised, taking into account the individual needs and values of the teenager, dynamic of the family household and parent-child relationships.

“Can cater it to the particular personality of the child and what would benefit them individually” (Female participant, Session 1)

Knowledge of health risks and benefits

Participants felt that evidence based knowledge (e.g. alcohol and the teenage brain) and practical tips (e.g. how to have conversations with teens) were valuable content. For example, participants indicated that the evidence base has changed since they received alcohol education in school and as such they felt they are not aware of the latest research on alcohol and the developing teenage brain.

“Parents need to learn how alcohol affects the teenage brain. Students learn this at school, but parents do not know this as it is new research.” (Female participant, Session 2)

“There is a lot of information we can access when seeking parental guidance, but it usually/typically lacks the practical implementation of strategies.” (Female participant, Session 1)

The final two themes were not aligned to SCT constructs and these related to program delivery preferences.

Communication

Participants valued program components that fostered positive parent-child communication, such as discussing concerns, the harms associated with underage drinking and family expectations. In addition, practical tips on how to communicate, when to communicate and what topics to discuss were considered important.

“Opportunity to openly discuss concerns, impact of drinking, what is acceptable and unacceptable. Starts a direct line of communication.” (Female participant, Session 2)

Flexibility
As parents are time poor, online was considered a convenient platform as it would allow parents to access the information at times that suited them, from their own home and in times when they actually needed it. However, online components were considered as essential supporting components for face to face sessions.

“I like something that is easily accessible, can do in my own time - a way of learning new information.” (Female participant, Session 2)

6.5.5. Building for change

Co-design sessions were theory informed via 12 activity cards mapped to six SCT constructs delivering an abductive approach to co-design. Participants indicated a clear preference towards three SCT constructs (i.e. goal setting, social support and knowledge). These SCT themes are ‘parent focused’ demonstrating how three SCT constructs, namely social support, goal setting and knowledge were considered as valuable mechanisms within a program seeking to improve parent child communications to reduce adolescent alcohol drinking. While some SCT constructs were identified as core program mechanisms by co-design participants, other SCT constructs were not considered to be essential elements for program design (i.e. observational learning, feedback and environmental facilitators). Alternatively, participants identified two additional themes (i.e. communication and flexibility) which are mechanisms that are ‘program features’. Program features are elements related to program build and delivery aims. When considered together, the ‘program feature’ themes converge on the SCT themes to provide a clear starting point for program build (see Figure 9).
Figure 9. Key program features and mechanisms identified in co-design

The development of these themes in consideration with SCT led to the creation of four key program activities and a series of online resources which are detailed in Table 16.

Table 16. Contribution of theory and user insights in program design.

<table>
<thead>
<tr>
<th>Element of program design</th>
<th>Relevant Social Cognitive Theory construct</th>
<th>Relevant co-design theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myth busters Quiz</td>
<td>Knowledge of health risks and benefits</td>
<td>Knowledge of health risks and benefits</td>
</tr>
<tr>
<td>Knowledge of 1) the risks associated with underage drinking, and 2) parents influence in underage drinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consider the conversation</td>
<td>Observational learning</td>
<td>Communication</td>
</tr>
<tr>
<td>Video clip of parent-teen conversation regarding alcohol</td>
<td>Feedback</td>
<td>Communication</td>
</tr>
<tr>
<td>Conversation scenarios</td>
<td>Goal setting</td>
<td>Social support</td>
</tr>
<tr>
<td>The family agreement</td>
<td>‘Family agreement’ template</td>
<td>Goal setting</td>
</tr>
<tr>
<td>‘Family agreement’ template</td>
<td>Group discussion surrounding house rules</td>
<td>Social support</td>
</tr>
<tr>
<td>SMS Conversation starters</td>
<td>(Environmental facilitators</td>
<td>Communication</td>
</tr>
<tr>
<td>Weekly conversation cues sent via mobile phone</td>
<td>Flexibility</td>
<td>Flexibility</td>
</tr>
<tr>
<td>Program website - The teenage brain and alcohol</td>
<td>Knowledge of health risks and benefits</td>
<td>Knowledge of health risks and benefits</td>
</tr>
<tr>
<td>- Consider the conversation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Element of program design | Relevant Social Cognitive Theory construct | Relevant co-design theme
---|---|---
- Family expectations | Goal setting | Goal setting
- Family agreement template | Social support | Social support
- Frequently asked questions | Communication | Flexibility
- Evidence based facts | | |
- Help line contact numbers | | |
- Alcohol trivia game | | |

6.6. Discussion

We introduced abduction as a novel method of reasoning and applied it to the seven-step co-design process (Trischler et al., 2019). The aim of this study was to understand how theory may be incorporated into an existing co-design process in order to provide guidance on how theory can help with program design. Each of the contributions are discussed in turn.

Theory’s role in the fuzzy front end co-design process

This study provides guidance on how theory can be integrated into co-design sessions with users following an abductive approach. The findings demonstrate that theory can be successfully integrated into co-design through the use of theory-mapped activity cards. The integration of theory-mapped activity cards resulted in a co-design process that differed from earlier applications of co-design (Trischler et al., 2019) (see Table 17).

<table>
<thead>
<tr>
<th>Co-design stage</th>
<th>Theory-mapped co-design</th>
<th>Traditional co-design</th>
</tr>
</thead>
</table>
| Resourcing | - Literature review conducted to identify previous parent alcohol programs  
- Expert panel process to map SCT constructs to existing parent alcohol activities  
- 85%+ expert agreement for theory mapped constructs utilised in the co-design process.  
- Two theoretically mapped cards per key SCT constructs. | - Literature review conducted to identify previous parent alcohol programs.  
- Activity cards clustered based on alcohol specific parenting behaviours |
| Sensitisation | - SCT-based activity cards used.  
- Participants begin to interpret their own needs and wants within a theoretical framework (in a process they are unaware of). | Parenting behaviour based activity cards.  
- Participants equipped with no knowledge of existing behaviour change theories. |
<table>
<thead>
<tr>
<th>Co-design stage</th>
<th>Theory-mapped co-design</th>
<th>Traditional co-design</th>
</tr>
</thead>
</table>
| Facilitation   | - Focus on SCT activities.  
- Able to call upon knowledge of SCT obtained during sensitisation stage.  
- Iteration between SCT and prior knowledge to arrive at final design ideas. | - Focus on alcohol specific parenting behaviours without theory guidance.  
- Final design ideas grounded in user insights. |
| Reflecting and building for change | - Abductive analysis.  
- Cross rating process to assess user insights in relation to SCT constructs. | - Inductive analysis.  
- User insight driven. |
| Building for change | - Final design grounded in SCT and user insights.  
- Program evaluation criteria guided by SCT constructs. | - Final design grounded in user insights  
- Program evaluation criteria guided by user insights. |

Specifically, during the fuzzy front end of the co-design process, utilisation of an expert panel allows for the creation of theory-mapped activity cards. Attempts have been made to integrate prior expert knowledge into co-design sessions through the use of activity cards (for example see Dietrich et al., 2017; Villalba et al., 2019), however these have not previously been mapped to specific theoretical constructs. Clearly mapping prior knowledge and insights to behaviour change theory provides theoretical guidance that can then clearly inform subsequent program design.

The sensitisation phase of co-design is important in building a trusting environment, consequently improving participants’ reflections and insights (Dietrich et al., 2016). Sensitising participants’ using theory-mapped activity cards allowed participants’ minds to be prepped with theoretical knowledge to build from. Therefore, and unlike the traditional co-design approaches, participants were able to unconsciously gain a level of appreciation for the theoretical base prior to program development, without any explicit instruction on the theory. Abduction requires participants to consider new ideas and envision new design solutions through the critical examination of their current knowledge against new data (Reichertz, 2004). Workshop discussions were framed within the theoretical framework, enabling participants to relate theoretical constructs to their real life experiences. During the facilitation stage participants’ made assumptions about what they believed a program should look like based on their existing knowledge and prior experience while also interpreting their existing knowledge against the new theoretically mapped information they were provided. The utilisation of the
theory-mapped activity cards allowed participants to expand their repertoire, thus improving their capacity to examine different perspectives in order to unleash new ideas and insights (Kolko, 2010). This process led to the adaptive reuse of the theory-mapped activity cards while also providing innovative ideas permitting a stronger reliance on theory than the traditional approach to co-design.

Bridging user insights and theory

Next, during the fuzzy back end of the co-design process, abduction allowed for a more nuanced understanding of co-design ideas than an inductive approach to analysis. Co-design insights were reflected upon in conjunction with the research teams existing knowledge of SCT. That is, user insights were critically examined against SCT constructs to identify any theoretical links. Therefore, program design was grounded in both user insights and SCT. Clear preferences for key SCT constructs emerged through the co-design process with parents identifying the importance of social support, goal-setting and knowledge as key mechanisms for inclusion in a program. SCT constructs that were neglected included observational learning, feedback and environmental facilitators. In addition, parents identified program delivery preferences; key insights that are often lacking from behaviour change theories which focus on predictors and influencers of behaviour (Bandura, 2004). Through clear mapping and subsequent program testing the social marketing theory base can be challenged and new theories can emerge (Belk et al., 2019).

The user generated insights provided a strong starting point for program build, identifying SCT constructs favoured by parents, as well as program build considerations (i.e. delivering program components that are accessible to parents at any time). During this stage it was important to make sure the program feature themes converging on the SCT themes were clearly aligned to a SCT construct, ensuring a balanced approach to the preferred constructs (e.g. online formats to deliver goal setting tools or foster social support through online communities). Theoretically grounded insights on user behaviour and user generated program feature insights allows us to not only measure program success in relation to achieving desired change in parents (i.e. parent specific outcomes measures), but offers performance indicators to evaluate program implementation.

Enriching the co-design process through abductive inference
Finally, this study provides a process to design practically useful and theoretically guided behaviour change programs. There is a need for the development of actionable strategies which guide researchers and practitioners to integrate theory in new program development (Levit and Cismaru, 2020). New approaches are needed that effectively combine two important ends of the design spectrum namely, tapping users as a unique source of knowledge and experience and converting these insights into feasible and useful concepts. Particularly the latter must come from a team of experts (e.g. designers, researchers, and marketers). Nenonen et al. (2017) suggest that abductive methodologies may improve the quality of research outputs through the generation of concepts that are more accessible and understandable in practice than those that arise from theory. Our approach adds to the growing body of literature, providing an explicit and replicable description of how to apply an abductive approach to program co-design, using an example of the development of a parent alcohol program. An abductive co-design method is a promising approach that can identify clear program strategies that are grounded in both user insights and theoretical constructs to improve program efficacy and usability.

6.7. Limitations and future research directions

This study must be viewed in light of limitations. We have demonstrated that an abductive approach to co-design can be applied to the development of a parent alcohol program aiming to influence alcohol specific parenting behaviours. There is opportunity for this approach to be further developed and explored in other contexts. This in turn would allow for the refinement of the abductive co-design process and build evidence surrounding its acceptability.

In addition, while SCT has been shown to be effective in alcohol prevention efforts (Tebb et al., 2016), it does bring with it some limitations. SCT is broad and seeks to provide explanations for a multitude of human phenomena (Bandura, 1998), thus, it is difficult to operate in its entirety. In addition, with the focus largely on individual and environmental factors which are known to influence health behaviours, SCT is less focussed on emotional factors and unconscious thought processes. Future research may seek to explore the application and usefulness of alternative behaviour change theories to the abductive co-design approach.
Next, this work involved co-design sessions with parents only. In the future, the theory-mapped cards could be used with other key stakeholders or a combination of key stakeholders (e.g. school teachers, health care professionals). Involving key stakeholders in co-design activities is important for gaining support and acceptance for program implementation (Trischler et al., 2019). Thereby, the inclusion of school teachers and principals during co-design may aid to improve the uptake and adoption of program strategies within school communities.

Next, to further assist researchers in implementing an abductive approach and to allow for replicability, more detailed reporting on methodologies used to transform user generated insights into viable program ideas are needed. Finally, the efficacy of implementing an abductive approach to co-design needs to be tested. These insights can be used to inform the design of a pilot program to evaluate effectiveness.

6.8. Conclusion

This study advances understanding of the role and relevance of theory use in co-design research. Researchers and practitioners are provided with practical guidance on how theory can be incorporated into co-design sessions with users following an abductive approach. Given the importance and benefits of applying a customer orientated approach to program design, integrating theory into an existing co-design process may further extend program effectiveness. This study delivers an approach that can embed theory into the fuzzy front end of co-design, a process that ensures users are placed at the heart of program design. User centred approaches are needed to challenge thinking, overcoming bias and blinkered viewpoints. It is only when users are placed at the heart of all actions that new paths forward can emerge and this is marketing’s strength in the social change landscape.
6.9. References


Chapter 7: Discussion and conclusion

7.1. Introduction

This thesis featured three studies which were presented in Chapters 4, 5 and 6. The discussion section begins by briefly revisiting the research purpose and design. Next, a general discussion of the results in relation to each of the proposed research questions of the thesis is presented. Importantly, the overall contributions of the thesis including theoretical and practical contributions for social marketing and parent alcohol prevention efforts are presented. Finally, the limitations of the research and opportunities for future research are discussed.

7.2. Restating the research purpose and design

The core proposition of this research is that co-design insights may be extended through the integration of behavioural theory utilising an abductive methodology. The purpose of this research was to examine the usefulness of theory when combined with an audience orientated approach to understand if this blended approach can be successfully applied to gain insights to inform program design. Adopting a pragmatic research paradigm, this thesis contains three studies to address the research questions (see Table 1). One evidence review, a program evaluation, and a co-design study are included in this research program. Study 1 began with a systematic literature review ($N = 17$ studies) to identify existing parent alcohol program solutions with a focus on understanding outcomes experienced by parents, stakeholder engagement during program design and level of theory application. Next, Study 2 demonstrated the effectiveness of co-design as an approach to social marketing program design in the context of parent alcohol programs. Namely, an outcome evaluation was undertaken to examine the effectiveness of a pilot program ($N = 65$) that was built following an earlier co-design process (Hurley et al., 2018a). Considering the importance of user insights and theory application in social marketing program design, the final study examined how theory could be integrated in a traditional co-design process in order to extend co-design insights ($N = 40$) drawing on existing theoretical frameworks, in this case, Social Cognitive Theory. The following section discusses the key findings of each of the three studies presented in this PhD program of research.
### Table 1: Summary of gaps, objectives, research questions, proposed methods, and research contributions

<table>
<thead>
<tr>
<th>Study</th>
<th>Research gaps</th>
<th>Objectives</th>
<th>Research questions</th>
<th>Methods</th>
<th>Contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formative study 1</td>
<td>Lack of existing reviews of parent alcohol programs that examine efficacy on parent reported outcomes measures. Limited understanding of level of stakeholder engagement during parent alcohol program design. Limited understanding of level of theory application and reporting in parent alcohol programs.</td>
<td>To evaluate existing parent alcohol programs with a focus on outcomes experienced by parents, stakeholder engagement during program design and theory application.</td>
<td>RQ1: What outcomes do parents experience following participation in parent alcohol programs? RQ2: What is the level of stakeholder engagement in the design process of parent alcohol programs? RQ3: What is the level of theory application in parent alcohol programs?</td>
<td><em>Data collection:</em> Systematic literature search following PRISMA guidelines (Moher et al., 2009) <em>Analysis:</em> Narrative review</td>
<td>Provided mixed evidence as to the efficacy of parent alcohol programs, and highlighted the need for more theory application and stakeholder engagement during program development.</td>
</tr>
<tr>
<td>Pilot program study 2</td>
<td>Limited evidence of parent alcohol social marketing programs. Lack of evidence examining the effectiveness of co-designed programs.</td>
<td>To test the effectiveness of a co-designed social marketing program on alcohol specific parenting factors.</td>
<td>RQ4: Does a pilot co-designed social marketing program improve alcohol specific parenting factors?</td>
<td><em>Data collection:</em> Pre- and post-survey (n=65) <em>Analysis:</em> SPSS - Descriptive and inferential statistics</td>
<td>Implemented and evaluated a traditional co-design approach verifying its usability in designing and implementing more user oriented social marketing programs that positively influence</td>
</tr>
<tr>
<td>Study</td>
<td>Research gaps</td>
<td>Objectives</td>
<td>Research questions</td>
<td>Methods</td>
<td>Contributions</td>
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<tr>
<td>Formative study 3</td>
<td>Limited application of theory in the development of social marketing programs.</td>
<td>To examine the application and usefulness of theory in a seven-step co-design process following an abductive approach.</td>
<td>RQ5: Can theory be applied within the seven-step co-design process?</td>
<td>Data collection: Co-design sessions (n=40) following seven-step co-design process (Trischler et al., 2019) Analysis: Abductive thematic analysis</td>
<td>Outlined a method to integrate behavioural theory and user insights in a co-design process following an abductive approach.</td>
</tr>
</tbody>
</table>

alcohol specific parenting behaviours.
7.3. Addressing the research questions

7.3.1. Extending understanding of current parent alcohol practice

Study 1 of this research systematically reviewed parent alcohol programs to identify, describe and evaluate the efficacy of alcohol education programs targeted to parents. To achieve this, three research questions were proposed, namely: RQ1: What outcomes do parents experience following participation in parent alcohol programs? RQ2: What is the level of stakeholder engagement in the design process of parent alcohol programs? RQ3: What is the level of theory application in parent alcohol programs?

As reported in Study 1 (Hurley et al., 2019), the systematic literature review provided evidence to support the efficacy of parent alcohol programs. Previous research has highlighted the efficacy of parent alcohol program in preventing and minimising adolescent alcohol consumption (Newton et al., 2017; Bo et al., 2018). Study 1 extended the evidence base with findings highlighting the potential for parent alcohol programs to positively influence alcohol specific parenting behaviours and attitudes.

Room for improvement was noted with mixed program effects observed and evidence suggesting that alcohol programs targeting parents fail to consult parents regarding their educational needs and program delivery preferences. In total, 61% of programs reported limited or no stakeholder engagement during program design, thus neglecting to gain valuable stakeholder insights gained through more collaborative efforts. Finally, consistent with other reviews (Truong and Dang, 2017; Willmott et al., 2019) reporting of theory use was lacking, with only eight (61%) of the 13 programs explicitly mentioning and utilising theory. In addition, when theory was used, reporting was weak. In summary, the review highlighted a lack of stakeholder engagement during program design and underutilisation and reporting of behaviour change theories. Given the dominance of expert driven approaches to parent alcohol programs, Study 2 presented social marketing as an approach that could potentially be used to deliver more parent centred alcohol programs.

7.3.2. Examining the effectiveness of co-design in social marketing

Study 2 of this thesis empirically validated the use of co-design during the social marketing program design process, which was previously lacking in the context of engaging parents with alcohol programs. This study evaluated a co-designed social marketing pilot
A parent alcohol program was developed based on previous co-design research (Hurley et al., 2018a), and trialled in four Australian high schools. Insights from co-design workshops informed the program design in terms of the duration of the program, content included and method of delivery. The program consisted of one 45-minute session for parents, which was delivered in person by the research team. The sessions were developed to be interactive and engaging, allowing parents to participate in group discussions in an informal atmosphere. A total of 65 parents participated in the trial and a repeated measures assessment of the pilot program was undertaken (pre and post program evaluation).

As reported in Study 2 (Hurley et al., in press) findings demonstrate that a social marketing program designed by parents can deliver positive outcomes. Significant program effects were observed for all outcome variables. Although the findings of this study can be treated as preliminary, the findings show promise, offering empirical data demonstrating that a co-designed parent program can change alcohol specific parenting factors. In summary, this study demonstrated the utility of co-design as an approach to designing social marketing programs in the context of parent alcohol education. A key limitation of the approach was a lack of theory integration. Application of behavioural theory is widely accepted as an integral component in the social marketing planning process (French and Blair-Stevens, 2006), representing opportunities for further research. In response, Study 3 presented an examination of an abductive approach to co-design that involved the integration of user insights and behavioural theory during program design.

7.3.3. Examining the usefulness of theory in co-design

Responding to calls for improvements in theory use and reporting in social marketing program, and to support social marketers to apply behavioural change theories in program design (Firestone et al., 2017), Study 3 examined the application of theory within a co-design process for a social marketing program. The following research question guided this study: **RQ5: Can theory be applied within the seven-step co-design process?**
Study 3 illustrated a seven-step abductive co-design process for developing a parent alcohol program. Taking an abductive approach, the co-design tools used during the facilitation of the co-design session were informed by key Social Cognitive Theory (SCT) constructs. To ensure that each activity accurately represented the selected SCT construct, expert judging was utilised. The key constructs of Social Cognitive Theory included in the expert panel were the following: (1) knowledge of health risks and benefits; (2) health goal setting; (3) feedback; (4) observational learning; (5) social support; and (6) environmental facilitators (Bandura, 1998). Seven out of the 27 experts (26%) returned completed tasks. Following a seven-step co-design process (Trischler et al., 2019), two co-design sessions were held with a total of 40 participants.

Findings from Study 3 (Hurley et al., revise and resubmit) demonstrated that theory can be successfully integrated into the seven-step co-design process through the use of theory-mapped activity cards. Specifically, during the fuzzy front end of the co-design process, utilisation of an expert panel allowed for the creation of theory-mapped activity cards. Sensitising participants using the theory-mapped activity cards allowed participants to expand their repertoire, thus expanding their capacity to examine different perspectives in order to unleash new ideas and insights. Evidence highlights a lack of detailed reporting to demonstrate how co-design activities are implemented (Slattery et al., 2020), and how co-design insights are transformed into viable program solutions (Eyles et al., 2016; Trischler et al., 2019). A process is illustrated through illumination of strategies that can be implemented within parent alcohol programs, practically demonstrating how user insights are critically examined alongside SCT constructs, permitting transformation into viable program strategies.

In summary, Study 3 detailed how expert knowledge and user insights can be effectively integrated to engage end users. The inclusion of an abductive co-design approach broadens the social marketing toolkit, providing fresh opportunities to expand application of key social marketing principles during the formative research process. The following section details each of the theoretical and practical contributions of the research in turn.

7.4. Contributions to theory and practice

The contributions of this study are sevenfold. First, this study delivers a process that demonstrates how theoretical constructs can be mapped to program strategies tested in co-design. Next, the thesis demonstrates how theoretically informed co-design outputs emerge
when participants are sensitised with theory-mapped co-design activity cards. In turn, the third contribution of the thesis provides improved clarity for the fuzzy back end of co-design. The provision of a practical example showcased how co-design outputs are transformed into user generated insights which, when considered alongside theory, contributes to program design. Next, the thesis provides evidence of the effectiveness of co-design as an approach to social marketing program design. The fifth contribution provides social marketing researchers and practitioners with a process to improve application of social marketing benchmark principles during formative research. The sixth contribution removes some of the mystery surrounding abduction as a methodological approach, by providing a clear case of how abduction can be applied during the research design stage. Finally, this thesis contributes with several key implications for the development of parent alcohol programs. Each contribution to theory and practice is now discussed in turn.

7.4.1. A theory mapping process for co-design

This thesis delivers a process that demonstrates how theoretical constructs can be mapped to program strategies tested in co-design. Willmott et al. (2019) found that explicitly linking theoretical constructs to program strategies improved program outcomes. However, in behavioural science clear links between theory and program techniques are lacking (Prestwich et al., 2014), inhibiting understanding of how theories are used to inform program build (Willmott et al., 2019). This thesis outlines a process to identify which program strategies target specific theoretical constructs. The process improves transparency in program design, facilitating program replication, and increases understanding of the mechanisms in theoretical terms. Together, with evaluation aligned to theory constructs, an understanding of the capacity for programs and their element parts to achieve behaviour change can emerge through testing. Moving forward programs that are clearly mapped and evaluated theoretically will build understanding of what works, when, and where.

Specifically, during the fuzzy front end of the co-design process, utilisation of an expert panel allows for the creation of theory-mapped activity cards. The importance of expert knowledge has been recognised in co-design, with research previously focusing on integrating expert insights through expert interviews (Rundle-Thiele et al., 2019b) and systematic literature reviews (Mehmet et al., 2020). However, behavioural theory, a key social marketing principle, has not previously been incorporated into program design. The expert panel approach utilised in Study 3 provides confidence that identified strategies are mapped to a theoretical construct,
given more than 85% consensus had to be achieved for any theoretically mapped strategy to be used as an activity card. By assuring all constructs are represented in strategies for user consideration, theory utilisation in the fuzzy front end of co-design is assured. Thus, clearly mapping theory to program activities provides theoretical guidance to inform subsequent program design. In addition, mapping theory to program activities allows for the accurate representation of the various constructs to be tested during co-design. Thus, important theoretical constructs for user consideration are not neglected. Finally, inclusion of key theory constructs permits the utility of ideas outlined in theories to be examined for their potential to serve as agents of behaviour change from a program user standpoint. Where constructs are overlooked in user designed programs their potential to engage people to willingly change their behaviour can be challenged.

While studies may describe programs as theory-based, the rationale for this is often unclear (Michie and Prestwich, 2010), inhibiting understanding of how and when theory was applied. Michie and Prestwich (2010) developed the Theory Coding Scheme as a method to assess theory application in program design, implementation and evaluation (Michie and Prestwich, 2010). However, while effective in coding programs based on their level of theory application, the TCS fails to show how clear links between theory and program strategies can be reported in program design. This research fills that gap by outlining a clear process to explicitly link theoretical constructs to program strategies and to assess the extent to which theoretically mapped strategies can serve as catalysts of change.

Finally, sensitisation is an integral step in the co-design process (Dietrich et al., 2016a). The use of activity cards as co-design tools is not new; exposing participants to previous program components via activity cards is a widely adopted approach (Peters et al., 2020). This research extends evidence of the utility and application of co-design activity cards by demonstrating how activity cards can be mapped to behavioural theory. The findings support further development of co-design activity cards as sensitisation materials.

7.4.2. Emergence of theory in co-design outputs

Study 3 of this thesis showed that theoretically informed co-design outputs may emerge when theory is embedded into the co-design process. Findings indicate that when sensitised with theoretically mapped activity cards, co-design participants are able to interpret their own needs within a theoretical framework, thus extending the theoretical relevance of co-design
outputs. A clear understanding of what theoretical constructs emerge in co-design outputs delivered by parents provides an opportunity to test and advance behavioural theory. Social marketing literature promotes the importance of conducting theory driven research and practice (French and Blair-Stevens, 2005), however that theoretical progress within the discipline remains limited (Belk and Sobh, 2019; Rundle-Thiele et al., 2019a). As Lewin (1951) once said, “there is nothing more practical than a good theory” (p. 169). To date, however, the innovative evolution of good theories of behaviour change has been slow (Rundle-Thiele et al., 2019a). In order advance the field we need to move beyond merely applying extant theories to developing theories. Understanding which theoretical concepts emerge in program design can ensure that these theoretical constructs are measured pre and post intervention to allow for theory testing. Through repeated tests conducted over time, we can develop new theories explaining how parental behaviour has changed as a result of theoretically mapped strategies applied within programs.

It has been suggested that the theory-practice gap is widening (Nenonen et al., 2017). While arguments are commonly made as to whether or not this gap can be bridged, solutions to ‘how’ this might be achieved is an underexplored area of research (Nenonen et al., 2017). An abductive co-design process helps to close this gap through the creation of theoretically inspired user orientated solutions. To create novel or innovative ideas some existing foundation of knowledge to build from (Beghetto, 2019) is needed. Unconsciously prepping participants’ minds with SCT (through theory-mapped activity cards) can successfully extend the theoretical outputs emerging in user generated insights.

7.4.3. The fuzzy back end of co-design

This thesis delivers a clear example of how user generated insights are translated into final program design techniques and strategies. Research indicates a lack of evidence as to how co-design insights are transformed into viable program solutions (Eyles et al., 2016; Trischler et al., 2019). While co-design insights aid in improving understanding of participants’ desires and values, they are not in themselves actionable and ready to implement in program techniques and strategies. The seven-step co-design process (Trischler et al., 2019) describes the fuzzy back end of co-design as a process of reflecting on user insights in order to build actionable program strategies. Building on the co-design process proposed by Trischler et al. (2019), Study 3 extends understanding of the fuzzy back end of co-design by showcasing a practical example of how the process is achieved.
Specifically, in Study 3 the process of insight generation and program creation was illustrated through the development of a parent alcohol program to prevent underage drinking. The study showcased how co-design insights, which emerged through thematic analysis of data generated during co-design workshops, and when considered alongside theory, contributed to the final program design. Demonstrating this process through the development of a parent alcohol program aids in improved transparency and understanding of the fuzzy back end of co-design.

7.4.4. Evidence on the effectiveness of applying a co-design approach

Study 2 of this thesis delivered a test of co-design’s effectiveness, extending evidence of the utility of the approach. Discussions of co-design are largely conceptual and qualitative in nature (Dudau et al., 2019; Voorberg et al., 2015) with researchers highlighting the need to increase empirical examinations of the approach (Dudau et al., 2019). This thesis contributes to co-design literature by demonstrating the effectiveness of a program co-designed with parents to reach adolescents about alcohol. Outcome change for parents was achieved across the three variables measured when the co-designed program was delivered.

Insights from co-design added value to the parent program by uncovering and incorporating information and ideas as expressed and valued by the parents themselves. Approaches which employ bottom-up techniques have been found to generate ideas that differ from top-down or expert driven approaches (Rundle-Thiele et al., 2019b; Hurley et al., 2018a), and successfully change desired behaviours (David et al., 2019). Previous work has used co-design to engage community members in the development of a social marketing program aimed at reducing dog and koala interactions (David et al., 2019). Co-design insights informed the development of ‘Leave it’, a wildlife conservation program that was successful in engaging the dog owning community and positively changing desired behaviours (David et al., 2019). The current research extends evidence from the Leave it program, delivering a second evaluation for the usefulness of basing programs on user designed ideas to effect positive change.

Importantly, the thesis demonstrates that empowering non experts by providing them with a platform to contribute to the development of change can achieve positive outcomes. This finding is important given concerns with the feasibility of user generated design ideas (Poetz and Schreier, 2012; Magnusson et al., 2003). Study 2 shows that given the right procedures,
co-design insights can be transformed into viable program design solutions that lead to positive change in program participants.

7.4.5. Improved application of social marketing principles in formative research

This thesis delivers a user centred formative research approach demonstrating how potential program users can drive program design. Specifically, Study 3 demonstrated how theory can be embedded into co-design, delivering a clear process for social marketing researchers and practitioners to follow ensuring that three key social marketing principles (i.e. customer orientation, insights and theory) are embedded in program design. Research indicates that change is more likely to occur when more of the social marketing principles are applied (Carins and Rundle-Thiele, 2014; Xia et al., 2016). Given the importance of applying key social marketing principles this research contributes by providing a clear example of how researchers and practitioners can successfully apply multiple social marketing principles to program design.

Despite the emphasis on applying theory in social marketing and the reported advantages, evidence as to its usefulness is mixed. Evaluating evidence is difficult due to a significant proportion of social marketing programs lacking theoretical guidance or delivering low levels of theory reporting (Truong, 2014; Luca and Suggs, 2013; David and Rundle-Thiele, 2018; Almestahiri et al., 2017). Hence, conclusions as to theories’ usefulness are premature since they fail to provide meaningful comparisons. Explicitly detailing how theory is used may extend discussions around the usefulness of theories to provide a more accurate picture of their application. This research offers an approach that enables clear reporting and application of theory during program co-design.

Finally, dominant methods employed in social marketing formative research are researcher driven (e.g. surveys, focus groups and interviews) (Kubacki and Rundle-Thiele, 2016). While these methods aim to uncover user insights, they are typically restricted to understanding what people think and feel, with researchers driving the line of questioning. Thus, approaches which place the user at the heart of discoveries may overcome bias and blinkered viewpoints. Co-design is a bottom-up approach that empowers users to develop solutions to design problems (Dietrich et al., 2016a; Mehmet et al., 2020). An abductive co-design approach permits theory to be incorporated into a user driven formative research approach, ensuring users are at the centre of the process and their voice is not shouted down
by experts in the design process. Theoretically, by ensuring customer orientation and theory are applied to generate insights, program success may be enhanced.

7.4.6. Guidance to applying an abductive approach

Study 3 contributes to clearer understanding of the abductive methodology from a design perspective. There are certain characteristics of abduction such as creativity and the interplay between theory and data that are widely affirmed (Dorst, 2011; Nenonen et al., 2017). However, there are various definitions of abduction and a lack of clarification about why particular research is abductive (Nenonen et al., 2017). This research provides an explicit and replicable example of how to apply an abductive methodology to program design.

Applying an abductive methodology to a co-design approach enables researchers to combine two important ends of the design spectrum, namely, user insights and theory, producing innovative and novel design ideas. Abduction runs the risk of being merely a buzz word if the concept remains too broad, with limited clarity and understanding of its value. By showing clearly how an abductive process can be utilised, in turn facilitating replication and comparability of findings, this thesis helps to demystify the concept of abduction for use in a social marketing context. Finally, previous research on abduction in the context of marketing typically pairs consumer viewpoints with theoretical understanding at the data analysis stage. This thesis contributes by proposing an abductive approach utilised during the research design stage.

7.4.7. Implications for parent alcohol education

This thesis recommends social marketing as a systematic approach to the development of parent alcohol programs. Study 1 identified the lack of end user insights as a key limitation to current parent programs success. Thus, valuable insights into what parents value in program strategies are often overlooked. Given discrepancies exist between parent and expert views in parent alcohol programs (Hurley et al., 2018a), approaches are needed that extend the focus beyond expert opinion. Social marketing principles of customer orientation and insight generation provide opportunities to enhance behaviour change efforts targeting parents to reduce adolescent drinking.

Secondly, a co-design methodology may offer a solution for designing and implementing programs more valued by parents. Limited attention has been paid to examining
parent perspectives through a co-design approach. Study 2 showed that parents can contribute valuable insights to inform the development of a parent alcohol program that successfully achieves change. This thesis suggests executing a co-design approach to developing a parent alcohol program to successfully influence parents. In summary, when developed and implemented, user driven programs can deliver key program outcomes, changing parents’ behaviours.

7.5. Limitations and future research

This thesis must be viewed in light of some limitations. Self-selection bias due to non-probability sampling methods means the characteristics of parents who chose to participate in the program may not strictly represent the entire target population. Parents who are most vulnerable and those who would benefit most from the program are not well represented (for example, baseline characteristics show that participating parents are not high-risk drinkers and they exhibit a high level of confidence in their ability to communicate with their teens). Increasing participation rates is crucial to program success and for change to occur we need to improve our ability to reach ‘at risk’ parents. Online delivery methods have been credited for their ability to remove barriers inhibiting attendance (e.g. time and location) (Newton et al., 2018) and may facilitate engagement of those who fear social pressures attending face-to-face sessions. With the population increasingly connected to the internet (Kuss et al., 2015), online methods provide an important opportunity for future alcohol prevention efforts.

Next, this thesis is limited by its focus on end user insights to the exclusion of other important stakeholders in program co-design. Although not explicitly stated as a social marketing principle, stakeholder engagement is considered an important factor (The National Social Marketing Centre, 2018). Involving multiple stakeholders in the co-design process may allow for contributions and insights to emerge from multiple perspectives and areas of expertise (for example, school teachers, alcohol prevention specialists and design experts). Trischler et al. (2019) found that involving key stakeholders in the co-design process was important for gaining implementation support. Thus, future research should seek to extend the focus beyond end user insights in the co-design of parent alcohol programs to include those who will support, promote, offer and endorse the program.
Next, while Study 3 highlighted the usefulness of an abductive co-design approach in the context of parent alcohol education, in order to develop and refine the approach future research should replicate the process in contexts that differ from the original study sample. In addition, Study 3 did not implement or evaluate the final co-designed program. To provide evidence for the efficacy of the approach a repeated measures assessment of the final developed program is needed. Further, to extend debates over the usefulness of applying theories in social marketing, future research should investigate whether an abductive co-designed program delivers superior outcomes to a traditionally co-designed program. Thus, to determine the efficacy of the two approaches they should be compared in formal process evaluations and randomised controlled trials.

Finally, while this research applied three key social marketing principles during program design (i.e. customer orientation, insights and theory), future research should seek to extend application of social marketing principles. Evidence espouses the importance of applying key social marketing principles, suggesting change is more likely to occur when more of the principles are used (Carins and Rundle-Thiele, 2014; Xia et al., 2016). For example, a segmentation process may be used to allocate participants into design teams based on pre-determined segment criteria (Dietrich et al., 2016a).

7.6. Conclusion
In conclusion, this thesis has sought to examine the efficacy of co-design as an approach to social marketing program design, and it has attempted to integrate theory into program co-design through an abductive approach. The implementation of theory in a user driven formative research process allowed for increased application of social marketing benchmark principles during the social marketing program design process. Examining co-design through an abductive lens allowed for the integration of behavioural theory alongside user insights, thus increasing the theoretical relevance of co-design outputs. As a result, an abductive co-design process was proposed, assisting social marketing researchers and practitioners to generate meaningful insights from co-design sessions to build more audience orientated and theoretically mapped social marketing programs.
Chapter 8: Reference list


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## Appendices

### Appendix 1. Search terms used to search for articles in eight databases

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<thead>
<tr>
<th>Database</th>
<th>Search terms used to search for articles</th>
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<td>PubMed</td>
<td>(((alcohol AND (intervention* OR Randomi?ed. Controlled Trial OR evaluation OR trial OR program*)) AND parent*) AND school*)</td>
</tr>
<tr>
<td>EBSCO</td>
<td>AB alcohol AND AB (intervention* OR Randomi?ed. Controlled Trial OR evaluation OR trial OR program*) AND AB parent* AND AB school* TI alcohol AND TI (intervention* OR Randomi?ed. Controlled Trial OR evaluation OR trial OR program*) AND TI parent* AND TI school* SU alcohol AND SU (intervention* OR Randomi?ed. Controlled Trial OR evaluation OR trial OR program*) AND SU parent* AND SU school*</td>
</tr>
<tr>
<td>Emerald</td>
<td>[Abstract: alcohol] AND [[Abstract: intervention*] OR [Abstract: Randomi?ed. Controlled Trial] OR [Abstract: evaluation] OR [Abstract: trial] OR [Abstract: program*]] AND [Abstract: parent*] AND [Abstract: school*] [Publication Title: alcohol] AND [[Publication Title: intervention*] OR [Publication Title: Randomi?ed. Controlled Trial] OR [Publication Title: evaluation] OR [Publication Title: trial] OR [Publication Title: program*] AND [Publication Title: parent*] AND [Publication Title: school*] [Keywords: alcohol] AND [[Keywords: intervention*] OR [Keywords: Randomi?ed. Controlled Trial] OR [Keywords: evaluation] OR [Keywords: trial] OR [Keywords: program*] AND [Keywords: parent*] AND [Keywords: school*]</td>
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<tr>
<td>ProQuest</td>
<td>ab(alcohol) AND ab(intervention* OR Randomi?ed. Controlled Trial OR evaluation OR trial OR program*) AND ab(parent*) AND ab(school*) ti(alcohol) AND ti(intervention* OR Randomi?ed. Controlled Trial OR evaluation OR trial OR program*) AND ti(parent*) AND ti(school*) mainsubject(alcohol) AND mainsubject(intervention* OR Randomi?ed. Controlled Trial OR evaluation OR trial OR program*) AND mainsubject(parent*) AND mainsubject(school*)</td>
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<td>Ovid</td>
<td>(alcohol and (intervention* or Randomi?ed. Controlled Trial or evaluation or trial or program*) and parent* and school*).ab (alcohol and (intervention* or Randomi?ed. Controlled Trial or evaluation or trial or program*) and parent* and school*).kf (alcohol and (intervention* or Randomi?ed. Controlled Trial or evaluation or trial or program*) and parent* and school*).ts</td>
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## Appendix 2. Studies included in the analysis of thirteen parent alcohol programs

<table>
<thead>
<tr>
<th>No.</th>
<th>Program</th>
<th>Articles included</th>
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<tbody>
<tr>
<td></td>
<td>Author(s)</td>
<td>Title</td>
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<tr>
<td>8</td>
<td>Tael-Oeren et al., 2019</td>
<td>n/a</td>
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<td>9</td>
<td>Skeer et al., 2016</td>
<td>n/a</td>
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<tr>
<td>11</td>
<td>Brown et al., 2014</td>
<td>Brown P. Increasing parental awareness and monitoring: the development and evaluation of a web-based program to empower parents to reduce underage alcohol use. Doctoral Thesis.</td>
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<tr>
<td>13</td>
<td>Pilgrim et al.,</td>
<td>n/a</td>
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## Appendix 3. Program summary

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<tr>
<th>Program</th>
<th>Trial</th>
<th>Substances</th>
<th>Sample</th>
<th>Level of stakeholder engagement</th>
<th>Behaviour change theory used (level of theory utilization)</th>
<th>Specific parenting focus of program</th>
<th>Intervention components directed at parents</th>
<th>Parent reported parenting-specific factors</th>
<th>Program effect on parent factors</th>
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</thead>
<tbody>
<tr>
<td>Orebro Prevention Program</td>
<td>Koutakis et al., 2008</td>
<td>Alcohol</td>
<td>Sweden Schools: 8 Parents: 339 intervention, 312 control Parental participation: Yr 7: 77% Yr 8: 72% Yr 9: 84%</td>
<td>Inform</td>
<td>Not reported (n/a)</td>
<td>Maintain and communicate strict attitudes against youth alcohol use</td>
<td>Intervention: Parent meetings: 5 x 30min face to face meetings with project worker (1 per semester) Postal Info: 3 x mailings per semester for 5 semesters Activity catalogues: Catalogue sent to parents via post. Control: Standard health education</td>
<td>Parental restrictive attitudes towards youth drinking</td>
<td>Parental restrictive attitudes (baseline to 36-months) INT &gt; CO***</td>
</tr>
<tr>
<td>Orebro Prevention Program</td>
<td>Bodin &amp; Strandberg, 2011</td>
<td>Alcohol</td>
<td>Sweden Schools: 20 intervention, 20 control Parents: 632 intervention, 682 control Parental participation: NR</td>
<td>Inform</td>
<td>Not reported (n/a)</td>
<td>Maintain and communicate strict attitudes against youth alcohol use</td>
<td>Intervention: 6 x 20min power point presentation administered by trained program presenters. Summary of each presentation mailed to parents. Control: Standard health education</td>
<td>Parental restrictive attitudes towards youth drinking</td>
<td>Parental restrictive attitudes (baseline to 12-months and 30-months) INT &gt; CO**</td>
</tr>
<tr>
<td>Strong and Clear</td>
<td>Petterson et al., 2011</td>
<td>Alcohol</td>
<td>Sweden Schools: 6 Parents: 229 intervention, 270 control Parental participation: 43% *participation defined as completing at least one program activity in both school yr 8 and 9</td>
<td>Inform</td>
<td>Not reported (n/a)</td>
<td>Maintain parents' restrictive attitudes to youth drinking</td>
<td>Intervention: Parent meetings: 1 x meeting with other parents per year for 3 years Family dialogue: 2 x booklets sent via the post in first year, 1 x booklet sent per year for remaining 2 years. Family meetings: 1 x meeting per year for 3 years Friend meetings: 1 x meeting per year for 3 years</td>
<td>Parents restrictive attitudes towards youth drinking, parents' behaviour regarding youth drinking</td>
<td>Parents restrictive attitudes towards underage drinking (baseline to 27-months) INT &gt; CO** (ES=0.32) Parents behaviour regarding youth drinking (baseline to 27-months) NS</td>
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<td>Project Northland</td>
<td>Perry et al., 2002</td>
<td>Alcohol, other drugs</td>
<td>USA Schools: 24 school districts</td>
<td>Involve</td>
<td>Ecological framework, social cognitive theory (tested)</td>
<td>Promote parent-child communication, improve knowledge and setting up family guidelines, improve parents monitoring and supervision skills</td>
<td>Intervention: Phase 1 (school year 6-8) Slick Tracy Family fun night: Student's posters and projects from the program displayed Amazing alternatives Home Program: booklets mailed to parents for parent and student to complete Print media campaign: local news. Phase 2 (school year 11-12) Northland Notes for Parents: 11 x parent postcards Sound OFF! Campaign: 3 x mailouts with discussion questions regarding teen drinking Print media campaign: Don't Provide! campaign and celebration posters.</td>
<td>Parent reported parenting-specific factors</td>
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<td></td>
<td>Toomey et al., 1996</td>
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<td>Parents: 1793 Parental participation: Yr 6: 90% Yr 7: 33% Yr 12: 20%</td>
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<td>Perry et al., 2002 Acceptability of underage drinking, permissive norms, opposition to alcohol control policies, limited parental monitoring Toomey et al., 1996 Alcohol related knowledge and attitudes, perceptions of alcohol related problems in the community, parent child communication (discussions about consequences if caught drinking, alcohol advertising, alcohol related situations, encouraging child and friends to gather at home), family rules against alcohol use, parental monitoring</td>
<td>Perry et al., 2002 Acceptability of underage drinking by guardians (at 24 months), NS Permissive norms (at 24-months) INT &gt; CO* Opposition to alcohol control policies (at 24 months), NS Limited parental monitoring (at 24-months), NS Toomey et al., 1996 Discussions about alcohol advertising**, alcohol related situations** and consequences if caught drinking*, encouraging child and friends to gather at home* (baseline to immediately post intervention) INT &gt; CO* All other outcomes NS</td>
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<td>Russian-American Partners for Prevention (Project Northland adaptation)</td>
<td>Williams et al., 2001</td>
<td>Alcohol</td>
<td>Russia Schools: 20 Parents: 544 intervention, 534 control Parental participation: NR</td>
<td>Consult</td>
<td>Ecological framework, social cognitive theory (applied)</td>
<td>Encourage parents to communicate and enforce strict rules about underage drinking</td>
<td>Intervention: 4 x take home booklets to complete with student, 1 x 1-hour family fun day poster fair Control: Receive curriculum upon completion of initial intervention</td>
<td>Parents perceptions of adolescent problem behaviours, adolescents' access to alcohol, other issues (not specified)</td>
<td>Likely to perceive that adolescents had easier access to alcohol in their communities (baseline to 6-months) INT &gt; CO* Parents perceptions of adolescent behaviours (baseline to 6-months) NS Other issues (not specified) (baseline to 6-months) NS</td>
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<td>Prevention of alcohol use in students (PAS Program)</td>
<td>Koning et al., 2011</td>
<td>Alcohol</td>
<td>Netherlands Schools: 19</td>
<td>Inform</td>
<td>Not reported (n/a)</td>
<td>Encourage restrictive parental rule-setting concerning their children’s alcohol consumption</td>
<td>Intervention: 1 x 20min presentation given by an expert (20mins) 1 x meeting with parents and mentor (trainee) prevention professionals to discuss rules and reach a consensus of rules Summary of 1 &amp; 2 sent to parent’s home, including those not present at parent intervention</td>
<td>Combined intervention: Both student and parent intervention</td>
<td>Koning et al., 2011 Restrictive rules (baseline to 10-months) INT &amp; PY INT &gt; CO** Strict attitudes (baseline to 10-months) INT &amp; PY INT &gt; CO** Glatz and Koning, 2016 Strict rule setting about alcohol (baseline to 34-months) INT &amp; PY INT &gt; CO** Parents confidence in their ability to prevent their adolescent drinking (baseline to 34-months) PY INT &gt; CO** Parents confidence in their ability to prevent their adolescent drinking (baseline to 34-months) INT &amp; Y INT NS</td>
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<tr>
<td>The Unger and Ross (Youth and Alcohol) program</td>
<td>Adolfsen et al., 2017</td>
<td>Alcohol, other drugs</td>
<td>Norway Schools: 24 intervention, 17 control Parents: 656 intervention, 510 control Parental participation: 1 parent meeting: 48%, 2 parent meetings: 31%, no parent meetings: 17%</td>
<td>Inform</td>
<td>Social learning theory, social cognitive theory, theory of planned behaviour (tested)</td>
<td>Change parents’ rules and attitudes towards adolescent alcohol use, improve parent-child alcohol specific communication, set clear limits for alcohol use</td>
<td>Intervention: 1 x 2-hour parent group meeting to discuss attitudes and practices related to adolescents’ alcohol use 1 x 2-hour parent and student group meeting to discuss rules and attitudes regarding alcohol. Control: Standard health education</td>
<td>Parents relationship to their adolescent, parent’s knowledge about their adolescent (monitoring), parent-child alcohol specific communication</td>
<td>Parents attitudes towards alcohol (baseline to 4, 6 and 28 months) NS Talk about the dangers of alcohol (baseline to 4, 6 and 28 months) NS Ease of talking about alcohol with adolescents (baseline to 4, 6 and 28 months) NS Parents’ relationship with their adolescents (baseline to 4, 6 and 28 months) NS Knowledge about adolescents leisure time (monitoring) (baseline to 4, 6 and 28 months) NS</td>
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<td>Preparing for the Drug Free Years (PDFY)</td>
<td>Park et al., 2000</td>
<td>Alcohol, other drugs</td>
<td>USA Schools: 11 intervention; 11 control Parents; 144 intervention; 151 control Parental participation: 94% (attended 3 or more sessions) 93% (attended at least 4 sessions) 61% (attended all 3 sessions)</td>
<td>Inform</td>
<td>The Social Developmental Model; integrates Social Cognitive Theory and Social Learning Theory (tested)</td>
<td>Improve parents' skills to explicitly establish family norms for behaviour, improve communication, improve monitoring and enforcement of family norms, manage and reduce family conflict</td>
<td>Intervention: 5 x 2-hour sessions (1 per week for 5 consecutive weeks) Control: Mailed four informational leaflets describing different aspects of adolescent development (e.g., physical and emotional changes, parent-child relationships, etc.), and no intervention otherwise. Received curriculum upon completion of the study</td>
<td>Park et al., 2000 Parents' norms against substance use, family management practices (the extent of parents rule setting, monitoring and punishment for misbehaviour), family conflict (family strategies for dealing with conflict and negative feelings)</td>
<td>Park et al., 2000 Parents' norms against substance use (baseline to 2 years) INT &gt; CO** Family management practices (baseline to 2 years) NS Family conflict (baseline to 2 years) NS Kosterman et al., 2001 Mother participants (baseline to 8 weeks) Rewards to child INT &gt; CO** Monitoring and reasoning NS Rules for substance use INT &gt; CO** Punishment inclination INT &gt; CO* Punishment consistency NS Alcohol restrictiveness INT &gt; CO* Conflict from child NS Involvement toward child INT &gt; CO* Involvement from child NS / Involvement together with child NS Father participants (baseline to 8 weeks) Rewards to child NS Monitoring and reasoning NS Rules for substance use INT &gt; CO* Punishment inclination NS / Punishment consistency NS Alcohol restrictiveness NS</td>
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<td>Effekt (formerly known as the Oerbro Prevention Program)</td>
<td>Tael-Oren et al., 2019</td>
<td>Alcohol</td>
<td>Estonia Schools: 34 intervention; 32 control Parents: 384 intervention; 406 control Parental participation: NR</td>
<td>Consult</td>
<td>Not reported (n/a)</td>
<td>Maintain and communicate strict attitudes against youth alcohol use</td>
<td>Intervention: 6 x meetings (2 per year) to increase parents’ knowledge and awareness of children-related alcohol topics and parenting skills 2 x newsletters per year</td>
<td>Parental attitudes towards adolescent alcohol use</td>
<td>Parents restrictive attitudes (baseline to 18 months) INT &gt; CO**</td>
</tr>
<tr>
<td>Substance Use Prevention Promoted by Eating family meals Regularly (SUPPER)</td>
<td>Skeer et al., 2016</td>
<td>Alcohol, marijuana, other drugs</td>
<td>USA Schools: 5 intervention; 33 control Parents: 29 intervention; 35 control Parental participation: NR</td>
<td>Inform</td>
<td>Eco-developmental theory (applied)</td>
<td>Increase the number of conversations parents have with their children about the harms associated with substance use, increase a consistent time that parents spend with their children through eating meals together</td>
<td>Intervention: 1 x parental handbook specific to the gender of the child Website: links to additional resources In-person session: 1 hour session with specialist where the main point of the handbook were reviewed Home based element: half hour follow up phone call with the specialist 2 x text messages per week for 13 weeks (reminders and tips that reinforced handbook information) 1 x fridge magnet with message reinforcing the importance of family meals</td>
<td>Communication about substances (alcohol, marijuana, other drugs), family meals (frequency and duration)</td>
<td>Communication about alcohol (baseline to 3 months) INT &gt; CO** (ES=1.13) Communication about alcohol (baseline to 6 months) INT &gt; CO* (ES=0.81) Communication about marijuana (baseline to 3 and 6 months) NS Communication about other drugs (baseline to 3 and 6 months) NS Frequency of family meals (baseline to 3 and 6 months) NS Duration of family meals (baseline to 3 and 6 months) NS</td>
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<tr>
<td>Family Matters</td>
<td>Ennett et al., 2001</td>
<td>Alcohol, tobacco</td>
<td>USA Parents: 549 intervention, 658 control Parental</td>
<td>Involve</td>
<td>Social learning theory, social control theory, family interaction</td>
<td>Promote healthy parent-child relationships, improve communication</td>
<td>Intervention: 4 x Booklets mailed to parents. Booklets provide information in question and answer</td>
<td>Parental supervision (whether the adolescent had curfews on weekend and school nights and the parent’s knowledge about</td>
<td>Rules about use (baseline to 3 months) INT &gt; CO** Discussions about nonfamily influences on</td>
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<td>Increasing Parental Awareness and Monitoring (IPAM)</td>
<td>Brown et al., 2014</td>
<td>Alcohol</td>
<td>USA Schools: n/a Parents: 33 intervention; 34 control Parental participation: NR</td>
<td>Information: Not reported (n/a)</td>
<td>Improve parental awareness and monitoring</td>
<td>Intervention: 1 x 20-30-minute web-based program comprising 3 modules (1. Audio visual interactive quiz; 2. Modelling of communication strategies using digital media; 3. Parent monitoring checklist)</td>
<td>Parental knowledge about underage alcohol use; parental monitoring, parent communication about alcohol, parental attitude about underage alcohol use</td>
<td>Parental knowledge about underage alcohol use (baseline to 4 weeks) INT &gt; CO** Parent communication about alcohol (baseline to 4 weeks) INT &gt; CO* Parental monitoring (baseline to 4 weeks) NS Parental attitude about underage alcohol use (baseline to 4 weeks) NS</td>
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<td>Self-help home ATOD communication intervention</td>
<td>Beatty et al., 2008</td>
<td>Alcohol, tobacco</td>
<td>Australia Schools: 14 intervention, 6 control Parents: 848 intervention, 353 control Parental participation: 93.6% of parents reported that they had read the intervention materials</td>
<td>Consult</td>
<td>Social Cognitive Theory (tested)</td>
<td>Improve parent-child communication</td>
<td>Intervention: 5 x communication sheets (1 every 3 weeks for 13 weeks) containing information and activities designed to encourage parents to talk with their adolescent about issues related to smoking cigarettes and drinking alcohol</td>
<td>Parents self-efficacy, parental knowledge, outcome expectancies, parent-child communication (frequency, recency, duration and nature of parent/child tobacco- and alcohol related communication)</td>
<td>Alcohol outcomes (baseline to 5 weeks) Ever talked out drinking alcohol INT &gt; CO** (OR=2.8) Communicated about alcohol in the last 1-2 months INT &gt; CO** (OR=3.1) Communicated about alcohol in the last 3-4 months INT &gt; CO* (OR=1.9) Communicated about alcohol in the last 4-3 months NS Duration of communication &lt;3mins INT&gt;CO** (OR=2.9) Duration of communication 5-10mins INT &gt; CO** (OR=2.8) Duration of communication &gt;10mins INT &gt; CO** (OR=3.1) Level of engagement (high vs. none) INT &gt; CO** (OR=2.3) Number of topics (3-4 vs. none) INT &gt; CO** (OR=2.2) Number of topics (1-2 vs. none) NS</td>
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<tr>
<td>Families in Action</td>
<td>Pilgrim et al., 1998</td>
<td>Alcohol, tobacco, other drugs</td>
<td>USA Schools: 4 Parents: 61 intervention 169 control Parental participation: 71% of parents</td>
<td>Inform</td>
<td>Social developmental model (applied)</td>
<td>Increase positive attachment to family, increase time spent enjoying family activities, increase involvement</td>
<td>Intervention: 6 x 2.5hour weekly sessions Social evening twice a year for graduates and families Quarterly newsletter reinforcing topics taught during sessions Control: no intervention</td>
<td>Family cohesion, shared family activities, school attachment, participation in school activities, experience with counsellors, curriculum knowledge, attitudes towards alcohol and tobacco use by minors</td>
<td>Short-term effects (baseline to 6 weeks) Family cohesion INT &gt; CO** Restrictive attitudes INT &gt; CO* Curriculum knowledge INT &gt; CO**</td>
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<td>attended at least 4 out of 6 sessions</td>
<td>with child’s school, increase willingness to talk to counsellor, increase restrictive attitudes</td>
<td>Short-term effects (baseline to 10 weeks) Family cohesion NS Restrictive attitudes INT &gt; CO* Curriculum knowledge INT &gt; CO** Long-term effects (baseline to 12 months) Participation in school activities INT &gt; CO** Involvement in family counselling INT &gt; CO** All other outcomes NS</td>
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* P < 0.05, ** P < 0.01

INT, parent intervention; CO, control group; PY INT, combined parent and youth intervention; Y INT, youth intervention; NS, no significant difference between intervention and control groups; NR, not reported