

Psychosocial Characteristics of Adolescent Problem Gambling

Ramsay Dixon, BA (Hons)

Monash University

School of Psychological Sciences

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General Declaration

In accordance with Monash University Doctorate Regulation 17.2 Doctor of Philosophy and Research Master's regulations the following declarations are made:

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes 3 original papers submitted for publication in peer reviewed journals. The core theme of the thesis is the psychosocial characteristics associated with adolescent problem gambling. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the candidate, working within the School of Psychological Sciences under the supervision of Associate Professor Nicki Dowling, Associate Professor Penelope Hasking and Professor Murat Yücel.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.

In the case of chapters 3, 4, and 5, my contribution to the work involved the following:

Thesis chapter	Publication title	Publication status*	Nature and extent of candidate's contribution
Chapter 3	Psychosocial Characteristics Associated with Adolescent Problem Gambling: A Systematic Review	Submitted	80% Formulation of research questions Development and running of search strategy Principally responsible for selection of included articles, including screening, full-text review and selection for inclusion Preparation of manuscript for publication
Chapter 4	Risk and Protective Factors Associated With Adolescent Problem Gambling	Submitted	75% Formulation of research questions Preparation of secondary data file for analyses Data analysis Preparation of manuscript for publication
Chapter 5	The Relationship Between	Submitted	70%

	Gambling Attitudes, Involvement, and Problems in Adolescence: Examining the Moderating Role of Coping Strategies and Parenting Styles		Formulation of research questions Preparation of secondary data file for analyses Data analysis Preparation of manuscript for publication
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I have renumbered and reformatted sections of submitted papers in order to generate a consistent presentation within the thesis.

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Date: 10/9/2014

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Presentations

Dixon, R.W., Dowling, N.A., & Hasking, P. (2009, October). *A systematic review of the psychosocial correlates of problem gambling in individuals aged 12 to 18 years*. Paper presented at the inaugural Emerging and New Researchers in Gambling conference, Melbourne, VIC.

Dixon, R.W., Dowling, N.A., & Hasking, P. (2009, November). *An examination of the psychosocial correlates of adolescent problem gambling*. Poster session presented at Monash University, Melbourne, VIC.

Dixon, R.W., Dowling, N.A., & Jackson, A.C.J. (2008, November). *The impact of problem gambling on the family: The role of gender and gambling behaviour characteristics*. Paper presented at a professional development seminar for Gambler's Help staff, Melbourne, VIC.

Dixon, R.W., Dowling, N.A., & Jackson, A.C.J. (2008, December). *The impact of problem gambling on the family: The role of gender and gambling behaviour characteristics*. Paper presented at the annual National Association for Gambling Studies conference, Adelaide, SA.

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Abstract

Problem gambling among adolescents has emerged as a significant area of research interest. Youth gambling problems are associated with a range of interpersonal, familial, economic, psychological and legal problems. However, because not all adolescents who gamble will develop gambling problems, the research literature has begun to emphasise potential factors that may increase or ameliorate the risk of developing such difficulties. Those characteristics associated with higher levels of severity, earlier onset and longer duration of symptoms are described as risk factors, while those which serve to reduce the severity of problems or lessen the influence of risk factors are referred to as protective factors. Although a stronger focus on these characteristics has emerged, there is still much to be learned about factors that may be associated with adolescent problem gambling behaviour. In particular, given their potential as targets for intervention, potentially malleable psychosocial factors represent an important area of research.

Presented as a thesis by publication, the first chapter of this thesis provides a narrative review of problem gambling among adolescents. The use of a biopsychosocial model as a framework within which to identify and organise relevant variables is presented, and this framework is used throughout the thesis. The second chapter provides a rationale and aims for the current thesis. Chapter 3 consists of a systematic review of the extant literature in relation to the psychosocial characteristics associated with problem gambling in high school students, while Chapter 4 contains an original empirical study of the psychosocial characteristics of problem gambling among a sample of high school students. The study in Chapter 5 further explores the relationships between attitudes to gambling,

gambling involvement, coping strategies, parenting styles, and gambling problems in this sample. Finally, Chapter 6 provides a general discussion of the key findings contained within this thesis, and makes comment on their broader clinical and research implications.

For the study presented in Chapter 3, a comprehensive search of the extant literature in relation to the psychosocial characteristics associated with adolescent problem gambling in high school students was performed. Strict inclusion criteria were applied, resulting in 19 studies being examined. Reflecting the diversity of the field, from these 19 studies, 46 individual psychosocial characteristics were identified. For the purposes of drawing conclusions, only the 11 characteristics for which a minimum of two studies existed were described further.

Grouped using a biopsychosocial model, the review presented in Chapter 3 found evidence for a number of characteristics across various domains. Specifically, associations were found between problem gambling and: impulsivity and general risk propensity (temperament/personality domain); ineffective coping (cognitive domain); family problems (family environment domain), symptoms of ADHD, substance use, and delinquency (externalising problems domain), and emotional problems and anxiety (internalising problems domain). It was concluded that measurement issues and a lack of replication have an impact on the ability to determine the strength and direction of relationships between problem gambling and associated psychosocial characteristics. Implications of the findings for practice and research are also discussed.

The study described in Chapter 4 is based on secondary data analysis from a larger study investigating the familial transmission of gambling problems. Participants ($N = 612$, 240 males, 371 females, 1 unreported) recruited from 17 secondary schools across Victoria, Australia, completed a self-report questionnaire assessing a number of relevant variables.

Using a biopsychosocial conceptual model, the aim of the study was to examine the extent to which a number of previously identified demographic and psychosocial characteristics were predictive of gambling problems. In addition, the study sought to explore whether female gender acted as a protective factor by moderating associations between putative risk factors and gambling problems. Results from the study partially supported the hypothesised relationships between a number of risk factors and problem gambling. When controlling for the influence of other variables, perceived paternal problem gambling, perceived paternal problem drinking, the number of gambling friends, gambling attitudes and life stressors all emerged as unique predictors. Of note, female gender moderated the relationship between paternal problem drinking and problem gambling, such that this variable was significantly predictive of gambling problems only for females. The implications of these findings for intervention and treatment are discussed, and the importance of utilising multivariate approaches that can take into account the mutual influence of various biopsychosocial factors is emphasised.

The final study, which is presented in Chapter 5, is based on the same data set as that described in Chapter 4, however employed a more sophisticated multivariate statistical technique to further examine the links between gambling attitudes, gambling involvement, coping strategies, parenting styles, and gambling problems. The aim of the study was to simultaneously explore predictors of problem gambling, while examining the extent to which coping skills and parenting styles may moderate the expected association between gambling involvement and gambling problems. Data from the 612 high school participants were analysed using a zero-inflated Poisson (ZIP) regression model, controlling for gender. Results provided mixed support for the hypotheses, with gambling involvement and inconsistent discipline both predicting gambling problems, and gambling attitudes

predicting gambling involvement. In addition, significant interaction terms were found for gambling involvement by problem focussed coping, reference to others and inconsistent discipline. Finally, a significant indirect effect on gambling problems from gambling attitudes through gambling involvement was found, suggesting involvement fully mediated the relationship between gambling attitudes and gambling problems. In contrast, no relationships were found for the prediction of the inflated portion of the model, suggesting that the study variables were only related to the level of gambling problems, and not the probability of having gambling problems.

The sixth chapter of the thesis provides a synopsis and general discussion of the key findings from Chapters 3, 4, and 5. The clinical and research implications are presented, and the strengths and limitations of the current thesis are discussed. Finally, recommendations for future research are provided.

Preface

Gambling is a prevalent activity among young people, with large scale prevalence studies generally finding past year participation rates of over 60%, (e.g., Welte, Barnes, Tidwell, & Hoffman, 2008; see review by Volberg et al., 2010), with some literature reporting participation rates of over 80% (National Research Council, 1999; Volberg et al., 2010). Rates of problem gambling among adolescents are also high relative to adult populations, with some evidence that rates of problem gambling among youth represent two to four times those of adults (Gupta & Derevensky, 2000; Haroon & Derevensky, 2002; Jacobs, 2000; Shaffer & Hall, 1996; Volberg et al., 2010; Wardle et al., 2010). Despite the high rates of participation and elevated rates of gambling problems, not all youth who gamble will develop gambling problems. Given this, the identification of factors that may increase or ameliorate the risk of youth problem gambling have been argued to be an important focus for research (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004).

In this context, a substantial amount of literature attempting to shed light on these characteristics has emerged. While this has led to an increase understanding of the relationships between gambling problems and various factors, it is argued in this thesis that conclusions in regard to some of these findings are limited by measurement issues and a lack of replication. It is suggested that to better understand problem gambling behaviour among high school students, more research using multivariate statistical techniques is needed.

Chapter 1 provides a narrative review of the literature regarding the psychosocial characteristics associated with problem gambling in youth. This chapter includes sections on the definition of gambling problems in youth, their prevalence, an overview of relevant theoretical perspectives, and a brief summary of findings in respect to a range of characteristics associated with adolescent gambling problems. It is argued that the use of a biopsychosocial conceptual model is of utility in helping to organize findings and structure research in a coherent manner, and

that the identification of potentially modifiable psychosocial characteristics represents an important potential target for intervention. In addition, the review includes a summary of the limitations of the literature and suggestions for future research.

In Chapter 2, the rationale and aims of the current thesis are articulated in the context of the narrative review. In Chapter 3, a systematic review, which has been submitted to the *Journal of Youth and Adolescence* is presented. Chapter 4 contains the first of the two original empirical studies included within this thesis. The first of these examines the extent to which a number of relevant characteristics are uniquely predictive of risk for problem gambling in high school students, and also tests whether female gender acts a protective factor by moderating the links between putative risk factors and problem gambling. This study has been submitted to the *Journal of Gambling Studies*. The final study, presented in Chapter 5, has been submitted as a brief report to the *Journal of Research on Adolescence*. This study simultaneously explores the effects of a number of characteristics on problem gambling in a high school population, with an emphasis on the potential moderating effects of coping strategies and parenting styles on the relationship between gambling involvement and problem gambling. The role of attitudes towards gambling is also considered. The thesis concludes with Chapter 6, which offers a general discussion of the key findings, along with an evaluation of the limitations and strengths of the thesis, the clinical implications of the findings, and suggestions for future research based on the three studies contained within the thesis whilst taking into account the broader state of the research.

Chapter 1

Literature Review

Background

The substantial and rapid increase in the gambling industry worldwide has been accompanied by a concomitant increase in the number of people for whom gambling is a problem (Eadington, 2003; Marshall & Baker, 2002; Petry, 2005). Although ostensibly an activity legally restricted to adults in most jurisdictions, gambling participation and problematic gambling behaviour are not confined to those of legal age. In fact, gambling participation rates among youth are high, with one review reporting a median lifetime prevalence of 85% (National Research Council, 1999). Adolescents have also been found more likely to experiment with gambling than with alcohol, cigarettes, or drugs (Gupta & Derevensky, 1998). While not nearly as high as rates of participation, rates of gambling problems among youth have consistently been found to be higher than those among adults, estimated to be approximately 14% to 22% (Gupta & Derevensky, 2000; Shaffer & Hall, 1996) compared to an adult rate of 2.3% (Williams, Volberg, & Stevens, 2012). It should be noted that adolescence can be defined as the developmental period involving the transition to adult-like biological, psychological and social maturity from childhood (Rosenfeld & Nicodemus, 2003; Steinberg & Morris, 2001). Although there are some differing definitions in regard to the age range spanned by this period, the current thesis uses the term adolescence to refer generally to the period between ages 12 to 18; however, some extant literature reported on has included participants with ages outside this somewhat arbitrary range.

Numerous international research findings and reviews of this evidence indicate that adolescent problem gambling is associated with a range of interpersonal, familial, economic, psychological and legal problems (e.g., Blinn-Pike, Worthy, & Jonkman, 2010; Ellenbogen, Gupta, & Derevensky, 2007; Jacobs, 2000). Given the comparatively high rates and wide-

ranging negative sequelae, adolescent problem gambling has subsequently emerged as a significant area of research (Ariyabuddhiphongs, 2012; Chalmers & Willoughby, 2006; Messerlian, Derevensky, & Gupta, 2005; Valentine, 2008; Shead, Derevensky, & Gupta, 2010).

However, because not all adolescents who gamble will develop gambling problems, it has been argued that research literature should focus on potential factors that may increase or ameliorate the risk of developing such difficulties, rather than on the broad-based prevalence studies that characterised earlier investigations (Shaffer et al., 2004). Although a stronger focus on the correlates of problem gambling emerged in the subsequent research, there is still much to be learned about factors that may play a role in adolescent problem gambling behaviour.

The definition of gambling and gambling problems

There are several definitions of gambling, most of which are similar in their description. In Australia, gambling has been defined as “...an entertainment based on staking money on uncertain events driven by chance, with the potential to win more than staked, but with the ultimate certainty that gamblers as a group will lose over time” (Productivity Commission, 2010, p. 1.2). Others have included stakes other than money, such as objects of sentimental value (e.g., Ladouceur, Boudreault, & Jacques, 1999). Given that adolescents typically have less expendable income or access to money than adults, the inclusion of stakes other than money seems reasonable to include as part of the description of adolescent gambling behaviour.

Several conceptualisations of what constitutes harmful gambling behaviour exist (Abbott, 2001; National Gambling Impact Study Commission, 1999; Productivity Commission, 1999). According to the most recent version of the Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) (*DSM-5*: American Psychiatric Association [APA], 2013), individuals who display recurrent and maladaptive gambling behaviour, and who display four or more of the

nine listed criteria (e.g., preoccupation with gambling; lying to conceal extent of gambling involvement) are diagnosed as having Gambling Disorder (APA, 2013; see Figure 1, p.12). This differs from the previous version of the *DSM*, where the term ‘Pathological Gambling’ was used for those meeting diagnostic criteria. In addition, a criterion relating to committing illegal acts to finance gambling has been removed in the current version, and the number of criteria that needs to be met to attract a diagnosis has reduced from five to four. Of interest, the diagnosis has been moved from the ‘Impulse-Control Disorders Not Elsewhere Classified’ section, into the Addiction and Related Disorders, where it is the only behaviourally-related addiction included (APA, 2013). The current version of the International Classification of Diseases (ICD; World Health Organisation [WHO], 1994), still uses the term ‘pathological gambling’ to refer to frequent, repeated episodes of gambling that dominate the patient's life to the detriment of social, occupational, material, and family values and commitments. It should be noted there are no separate criteria for adolescent gambling in either of these formal diagnostic systems.

Because many people experience significant and serious adverse effects as a consequence of their gambling behaviour without meeting the diagnostic criteria for gambling disorder or pathological gambling, it has been suggested that, rather than a discrete psychiatric diagnosis, problematic gambling behaviour exists on a continuum ranging from short-term moderate problems at one end, to chronic and severe behaviour at the other (Abbott, 2001; Fisher, 1999; Productivity Commission, 1999, 2010). Australia has adopted this conceptualisation, in which the term ‘problem gambling’ is used to refer to the entire spectrum of negative gambling impacts, including but not limited to the most serious (i.e., ‘disordered’) gambling behaviour. Such behaviour has been characterised as that which leads to difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or

for the community (Neal, Delfabbro, & O’Neil, 2005). This conceptualisation appears to be reflected in the new *DSM-5* diagnostic classification, in which the severity descriptor increases in line with the number of symptoms met.

- A. Persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period:
1. Needs to gamble with increasing amounts of money in order to achieve the desired excitement.
 2. Is restless or irritable when attempting to cut down or stop gambling.
 3. Has made repeated unsuccessful efforts to control, cut back, or stop gambling.
 4. Is often preoccupied with gambling (e.g., having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble).
 5. Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed).
 6. After losing money gambling, often returns another day to get even (“chasing” one’s losses).
 7. Lies to conceal the extent of involvement with gambling.
 8. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling.
 9. Relies on others to provide money to relieve desperate financial situations caused by gambling.
- B. The gambling behavior is not better explained by a manic episode.
- Specify if:*
- Episodic:** Meeting diagnostic criteria at more than one time point, with symptoms subsiding between periods of gambling disorder for at least several months.
- Persistent:** Experiencing continuous symptoms, to meet diagnostic criteria for multiple years.
- Specify if:*
- In early remission:** After full criteria for gambling disorder were previously met, none of the criteria for gambling disorder have been met for at least 3 months but for less than 12 months.
- In sustained remission:** After full criteria for gambling disorder were previously met, none of the criteria for gambling disorder have been met during a period of 12 months or longer.
- Specify current severity:*
- Mild:** 4–5 criteria met.
- Moderate:** 6–7 criteria met.
- Severe:** 8–9 criteria met.

Figure 1. *DSM-5* Diagnostic Criteria for Gambling Disorder (APA, 2013, section 312.31).

Prevalence of gambling and gambling problems among adolescents

Despite legal restrictions, the reported participation rates of adolescent gambling are high. For instance, a study conducted in Melbourne, Australia, found that of 769 high school students aged 15-18 years, almost 90% had gambled at least once (Moore & Ohtsuka, 2001). More generally, prevalence studies have found high rates of gambling participation among adolescents, with one review finding lifetime rates of between 76% and 91%, and past year rates of 65% to 75% across the United Kingdom and North America (Valentine, 2008). Other large scale prevalence studies have also found past year participation rates of over 60% (e.g., Welte, Barnes, Tidwell, & Hoffman, 2008; Wardle et al., 2010). Although some years old, an earlier review of prevalence studies by the National Research Council (1999) found the median lifetime prevalence rate of gambling participation among youth to be 85%, with a median past year rate of 73%. This parallels the rate of 70% for Australian adults reported by the Productivity Commission (2010). Rossen (2001) reported that regular gambling involvement ranges from 1% to 35%. Overall, these findings suggest that gambling behaviour is not an uncommon or unusual activity among adolescents.

Given the frequency of participation among adolescents, rates of gambling problems have also been the subject of numerous research endeavours (for a review, see Volberg, Gupta, Griffiths, Ólason, & Delfabbro, 2010). Although there are some more recent conflicting findings (e.g., Forrest & McHale, 2012) suggesting that the rates of problem gambling among adolescents are decreasing, it has been previously reported that these rates appear to be increasing as gambling opportunities also increase (Jacobs, 2000; Messerlian, Derevensky, & Gupta, 2005). It should be noted that comparison of prevalence rates across studies is made somewhat difficult by the utilization of different measures of the same construct by different authors.

In 1996, Shaffer and Hall published a large meta-analytic study of the prevalence of gambling problems among North America adolescents across 11 studies including more than 7700 participants aged 13 to 20 years. Although they identified conceptual and methodological inconsistencies across the studies in terms of measurement instruments and nomenclature, their preliminary analyses indicated that the estimates could be pooled and compared. These findings are summarised in Table 1, with the addition of a combined problem gambling category based on the continuum framework (Neal et al., 2005).

Table 1

Findings From a Large Meta-Analytic Study of the Prevalence of Gambling Problems Among Adolescents Aged 13-20 Years.

	95% Confidence Limits	
	Lower Limit (%)	Upper Limit (%)
Non-problem (Level 1)	77.9	83.0
At-risk/In-Transition (Level 2)	9.9	14.2
Serious problem/Pathological	4.4	7.4
Problem (combined Level 2 and 3)	14.3	21.6

Adapted from Shaffer and Hall (1996), p. 204

As can be seen from Table 1, Shaffer and Hall (1996) categorised youth gamblers into non-problem (level 1), at-risk or in-transition (level 2), or serious problem or pathological (level 3) based on the parallel conceptual schemes they identified despite inconsistent methods across the various studies. The results indicated that approximately 10% to 14% of adolescents were at-risk gamblers, and 4.5% to 7.5% were pathological gamblers. When combining the two

problem categories (i.e., levels 2 and 3), the pooled estimate reveals that approximately 14% to 22% would fall into the problem gambling category.

These figures can be contrasted with adult rates, although some caution is required as the measurement of problem gambling is different for adults as compared to adolescents due to the measures used. For instance, the Productivity Commission (2010) estimated the rate of adult ‘severe problem gambling’ (i.e., level 3) to be between 0.4 and 1% and the ‘moderate risk’ rate (i.e. level 2) to be between 1.4 and 2.1%. They estimated problem gambling to occur at a rate of 2.4% in adults. More recently, a global prevalence study methodologically designed to compute standard prevalence estimates found the average past year rate of adult problem gambling to be 2.3% (Williams et al., 2012).

Even using the lower estimates from Table 1, prevalence findings in relation to adults suggest that rates of at-risk, disordered gambling, and problem gambling are much higher among young people than adults. It should be noted however that this comparison relies on different jurisdictions, and that measurement differences exist. However, based on North American adult rates, the pathological rate found by Shaffer and Hall (1996) has been reported to represent two to four times the prevalence rates found in the adult population (Gupta & Derevensky, 2000; Shaffer & Hall, 1996). One important limitation to these adolescent prevalence rate findings is the time that has elapsed since their publication. This is of particular importance, as youth gambling activity may be influenced by a number of factors that can change over time, including improved access (e.g., through the introduction of new ways to gamble such as on the internet and smartphones), and socio-cultural shifts in attitudes towards participation (Volberg et al., 2010).

Theories and conceptual models of problem gambling in adolescence

Several theories have been applied to explain adolescent problem gambling, covering a range of orientations (see Hardoon & Derevensky, 2002; Thrasher, Andrew, & Mahony, 2011 for reviews of these theoretical perspectives). Briefly, personality theories seek to explain problem gambling behavior on the basis of underlying personality constructs such as impulsivity, risk-taking propensity and sensation seeking, while cognitive theories emphasise the role of beliefs and erroneous thought processes in maintaining gambling in the face of negative consequences. Learning and behavioral theories suggest that reward sensitivity and reinforcement schedules are central to gambling behavior, while the general addictions model emphasizes the similarities between those with gambling problems and those with addictions to substances, with specific reference to an abnormal physiological resting state and early negative affective states which predispose an individual to engaging in addictive behavior. This behavior is thought to be acquired over time when attempting to cope with stress (Jacobs, 1986).

From a social learning perspective, gambling behavior is learnt, acquired and persevered with because it is reinforcing. The pathways theory (see Nower & Blaszczynski, 2004) describes three distinct pathways to gambling problems, the central elements of which have recently been found applicable to adolescents (Gupta, Nower, Derevensky, Blaszczynski, Faregh, & Temcheff, 2013). As described by Nower and Blaszczynski (2004), in the behaviorally conditioned pathway, youth are typically free from pre-morbid pathology, and gamble in order to gain income or socialise rather than as a result of impaired control. However, due to conditioning principles and cognitive distortions, they may develop gambling problems. The second pathway, emotionally-vulnerable, refers to youth who gamble to escape negative mood states or unpleasant social circumstances, and who frequently have co-morbid substance use issues. Thirdly, the anti-social impulsivist pathway refers to adolescents with significant early childhood

psychopathology who are typically impulsive, have a need for excitement and engage in a range of antisocial behaviours.

In social inoculation theory, emphasis is placed on resisting social pressures to engage in harmful behaviours, and addressing the associated psycho-social factors through skills training and information provision (Evans, 2003). Problem behavior theory (Jessor, 1987) posits that risky behaviours constitute a syndrome which share a common basis, and that the perceived environment, personality and behavior share a mutual influence on risk outcomes. As summarised by Evans (2003), the theory of reasoned action views gambling as the result of the formation of an intention to gamble, which is derived from individual attitudes and perception of social norms, while an extension to this theory, the theory of planned behavior, includes perceived control over the behavior and perceived ability to perform the activity as key influences in the likelihood of it occurring.

Despite the multitude of theories potentially relevant to adolescent problem gambling, none has emerged as a leading theoretical stance (Thrasher et al., 2011). This may be a reflection of the research in general, in that although much research into adolescent problem gambling and its associated characteristics exists, relatively little has been based on explicit theoretical rationales. For instance, a systematic review of the general adolescent gambling literature found that 84% of the included 103 quantitative studies reviewed did not make recourse to any theoretical underpinning (Blinn-Pike et al., 2010). Of those that did draw on a theoretical framework, most either utilized Jessor's (1987) problem behavior theory ($n = 7$) or Jacobs' (1986) general theory of addiction ($n = 5$) to inform potential explanatory mechanisms.

Overall, in the absence of a comprehensive and well-supported single theory of adolescent gambling problems, it appears that the complex interaction between multiple risk and protective factors across numerous individual, extra-individual, social and cultural domains may

be best viewed through a biopsychosocial model. Such models emphasise the shared influence of variables in accounting for differences in particular behaviours of interest. For example, Edwards and colleagues (1981) proposed a biopsychosocial model of drug use which was adapted by Casey and colleagues (2011) in relation to adolescent problem gambling (see Figure 2, p. 19). It contains a number of domains, under which proposed risk and protective factors are grouped (Casey et al., 2011; Edwards, 1981). These include demographic, biological, temperament and personality, family history, cognitive, family environment, extra-familial and stressor domains. In the model, these factors interact and exert an influence on gambling participation, which in turn leads to greater risk for developing gambling problems. In addition, and consistent with both the problem behaviour theory of Jessor (1987), and the general addictions theory of Jacobs (1986), internalising and externalising problems are grouped with gambling problems as shared outcomes of the influence of the risk and protective factors (Casey et al., 2011). Although this model has not yet been empirically tested in relation to problem gambling, it provides a useful conceptual framework within which to group the various characteristics associated with problem gambling. It also appears that such models can subsume a number of other theories; for instance, the general addictions model involves factors drawn from biological, environmental and stressor domains, while problem behaviour theory draws from biological, personality, and extra-familial familial domains which lead to a number of externalising problems.

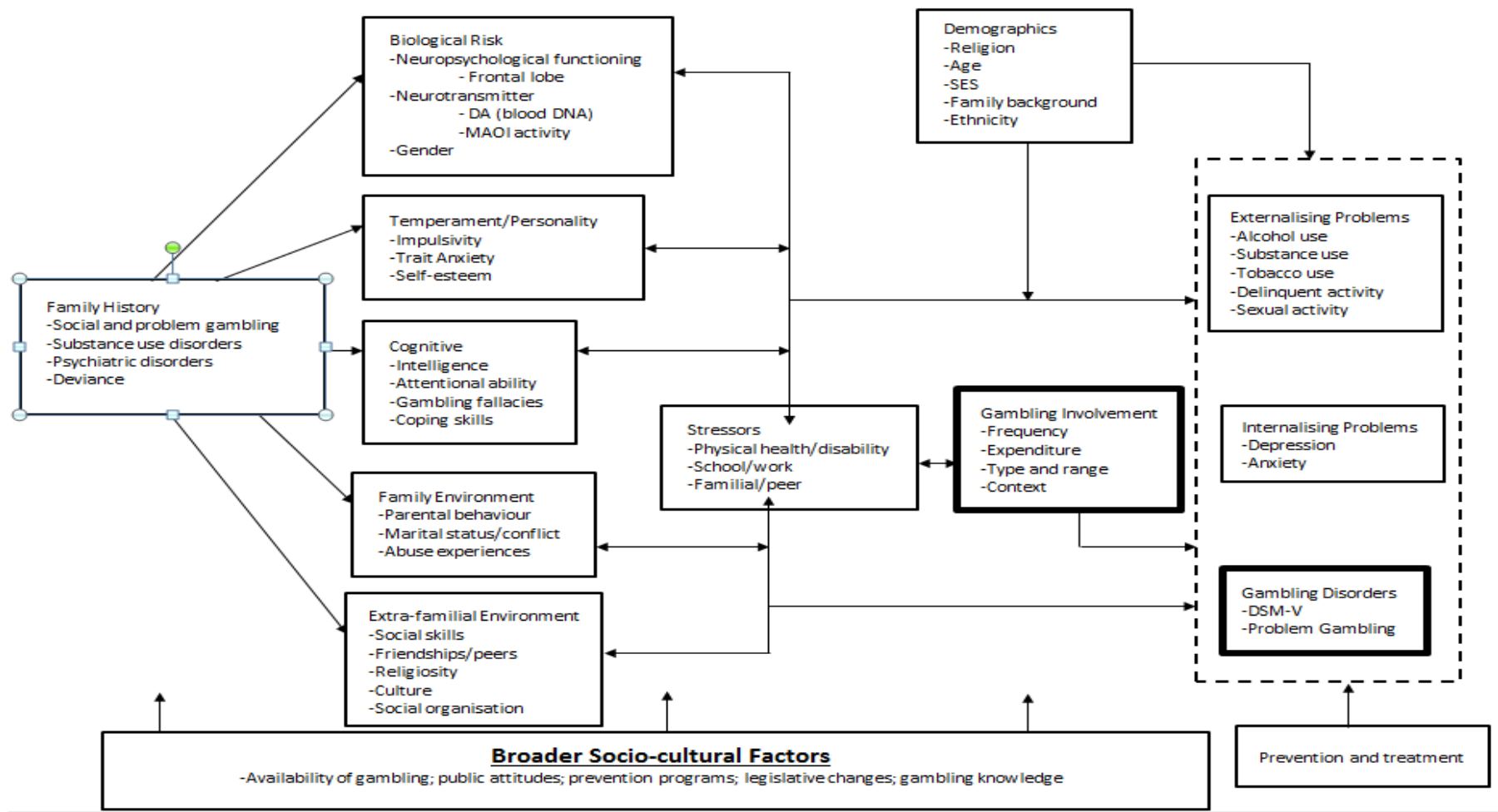


Figure 2. Biopsychosocial model for adolescent problem gambling, adapted from the substance abuse literature (reproduced from Casey et al., 2011, p.844).

Previous findings related to characteristics associated with an increased risk of adolescent problem gambling

Much early research into gambling behaviour among young people focussed on identifying the prevalence rates of participation and associated problems (Blinn-Pike, 2010; Shaffer et al., 2004). However, as the field has grown, emphasis has shifted onto identifying those factors which may increase or decrease the likelihood that an individual may develop gambling problems. This is of particular importance given the high discrepancy between participation rates and rates of problem gambling. As noted earlier, participation rates of up to 85% have been reported, with problem rates at around 14% to 22% (Shaffer & Hall, 1996).

Although sometimes referred to as correlates, the term ‘characteristics’ is preferentially employed in this thesis due to the fact that although a particular variable may be more prevalent in those with gambling problems, it may not be a correlate in the true sense of the term (e.g., higher mean scores on a personality trait as opposed to a significant bivariate correlation). From a preventative prevention science framework, the term ‘risk factors’ refers to those characteristics associated with higher levels of problem severity (Coie et al., 1993). In contrast, protective factors may decrease dysfunction directly or interact with a risk factor to buffer its effects (Coie et al., 1993). While it has been argued the term protective factors should be reserved only for variables which directly interact with risk factors to reduce dysfunctional behaviour (see Dickson, Derevenksy, & Gupta, 2008), the term is frequently used more broadly within the gambling literature to refer to factors which lessen the likelihood or severity of problems, irrespective of the presence of an interaction with an identified risk factor. This broad approach is taken in the current thesis, where characteristics associated with gambling problems are referred to as risk factors, while those which are associated with less harm are termed protective factors. This approach is consistent with the majority of the literature, but it is acknowledged there is some debate over this issue.

While not the focus of the current thesis, demographic characteristics associated with adolescent problem gambling are briefly reviewed here. Although static, and therefore not amenable to change through intervention, such factors can play a role in prevention efforts by identifying those at risk before problems escalate. Most of the literature in this domain has explored gender and age. Although considered a biological risk factor in the model of Casey et al. (2011), gender is typically viewed as a demographic variable. The vast majority of findings indicate that gambling problems are more common among male adolescents than their female counterparts (e.g., Adlaf & Ialomiteanu, 2000; Chalmers & Willoughby, 2006; Jackson, Dowling, Thomas, Bond, & Patton, 2008; Jacobs, 2000; Derevensky, Pratt, Hardoon, & Gupta, 2007; Lesieur & Klein, 1987; Nower, Derevensky, & Gupta, 2004; Stinchfield, 2000; Welte et al., 2008). Findings in regard to age are less clear. While some studies have found that problem gambling increases with age (e.g., Dickson et al., 2003), others have found no differences (e.g., Adlaf & Ialomiteanu, 2000), or that gambling problems decrease as a function of age (Forrest & McHale, 2012). In addition, earlier age of onset has been found to be associated with an increased risk for the development of gambling problems (Gerdner & Svensson, 2003; Shead, Derevensky, & Gupta, 2010). There is also some evidence that adolescents from ethnic minority backgrounds are over-represented as problem gamblers (Delfabbro, Lahn, & Grabosky, 2005; Langhinrichsen-Rohling, Rhode, Seeley, & Rohling, 2004; Stinchfield 2000).

Numerous reviews and summarising articles that synthesise and collate findings in regard to the range of characteristics associated with adolescent problem gambling exist (e.g., Ariyabuddhiphongs, 2012; Blinn-Pike et al., 2010; Dickson et al., 2008; Gupta & Derevensky, 2000; Shead, Derevensky, & Gupta, 2010). However, in order to provide context for the current thesis, a number of findings specifically in regard to the psychosocial characteristics of adolescent problem gambling are presented in the next section, grouped by

domains from a biopsychosocial model: Family history; temperament and personality; cognitive factors; family environment; extra-familial environment; stressors; externalising problems, and; internalising problems (Casey et al., 2011).

Family history

The family history domain refers to factors present in the family of origin which may impact on gambling behaviour of a child (Casey et al., 2011). Although there are some exceptions (e.g., Chiu & Woo, 2012), a large number of studies have found support for the notion that gambling behaviour and problem gambling among family members is associated with a greater frequency of adolescent gambling problems (e.g., Delfabbro et al., 2005; Govoni, Rupcich, & Frisch, 1996; Magoon & Ingersoll, 2006; McComb & Sabiston, 2010). There is also evidence that this relationship may be more pronounced in relation to paternal gambling problems than maternal gambling problems. For instance, one study found that paternal problem gambling scores contributed significantly more to offspring problem gambling scores than maternal problem gambling scores (Oei & Raylu, 2004), while another reported that although the gambling frequency and problems of both parents were associated with adolescent gambling frequency, only severity of paternal gambling problems was related to adolescent gambling problems (Vachon, Vitaro, Wanner, & Tremblay, 2004). Moreover, a meta-analysis of 19 family and twin studies on gambling and problem gambling revealed that paternal gambling raised the risk for the development of gambling problems to a greater extent than did maternal gambling (Walters, 2001).

Parental substance use has also been found to be related to adolescent gambling problems, with problem gambling adolescents more likely to report having a substance using parent than their non-problem gambling counterparts (Dickson et al., 2008; Hardoon et al., 2004). In a study of 178 male adolescents, Gerdner and Svensson (2003) found that when compared to those with fewer gambling problems, participants scoring in the 'pathological'

range were more likely to report parental substance abuse. This association may be particularly important given the elevated rates of alcohol and substance use disorders amongst problem gambling adults (Petty, Stinson, & Grant, 2005).

Temperament and personality

Problem gambling has been associated with personality factors such as impulsivity (Moore & Ohtsuka, 1997; Nower et al., 2004; Vitaro, Arseneault, & Tremblay, 1997; Vitaro, Arseneault, & Tremblay, 1999; Vitaro, Brendgen, & Ladouceur, 2001; Vitaro, Ferland, Jacques, & Ladouceur, 1998), excitability and disinhibition (Gupta & Derevenksy, 1998), intensity-seeking (Nower et al., 2004), and risk-propensity (Dickson et al., 2008; Wood, Gupta, Derevensky, & Griffiths, 2004). In a study of 765 adolescents, Vitaro and colleagues (1998) compared individuals with gambling problems, substance use problems, and both gambling and substance use problems on a measure of impulsivity. They concluded that impulsivity was an important risk factor for both problem gambling and substance use problems. Similarly, another study found that after controlling for socio-demographic factors, impulsivity assessed at age 13 to 14 years significantly predicted problem gambling at the age of 17 years in a sample of 717 adolescent boys (Vitaro et al., 2001). Gupta and Derevensky (1998) found that problem gamblers in a sample of 817 secondary students displayed the highest levels of excitability and disinhibition. Taken together, these findings suggest that youth problem gamblers tend to be impatient, overactive, impulsive, and easily distracted, with an inability to foresee negative consequences and to inhibit behaviour despite unfavorable contingencies.

Cognitive factors

Although coping strategies can be considered to be a behavioural factor, in the biopsychosocial model of Casey and colleagues (2011), these strategies form part of the cognitive domain. It has generally been found that problem gambling adolescents employ less effective coping strategies when compared with non-problem gambling peers (Bergevin, Gupta, Derevensky, & Kaufman, 2006; Dickson et al., 2008; Gupta, Derevensky, & Marget, 2004; Lostutter, Larimer, Neighbors, & Kaljee, 2013; Nower et al., 2004; Turner, Macdonald, Bartoshuk, & Zangeneh, 2008). In addition, findings suggest that there may be gender-specific patterns of coping among adolescent problem gamblers. For instance, in a study of 2156 students, problem gambling participants were more likely to utilise more avoidance-oriented strategies and less task-oriented approaches to coping, but only male problem gamblers reported the use of more emotion-focused coping strategies than their non-problem gambling counterparts (Bergevin et al., 2006). In another study, Nower and colleagues (2004) found that male problem gamblers employed more avoidance-oriented coping (e.g., seeking emotional outlets, distraction with other activities) while female problem gamblers employed less active and solution-focused coping. Overall, adolescent problem gambling appears to be associated with less effective coping skills, although gender differences in coping styles have been found.

Gambling attitudes represent another cognitive factor, and a number of studies have examined the potential relationship between this construct and problem gambling status. These studies have consistently found that positive attitudes to gambling are associated with higher rates of gambling problems (e.g., Delfabbro, Lahn, & Grabosky, 2006; Delfabbro, Lambos, King, & Puglies, 2009; Donati, Chiesi, & Primi, 2013; Strong, Daughters, Lejuez, & Breen, 2004). For example, in a study of 1147 Canadian students which included seven statements reflecting both favourable (e.g., 'gambling is a fun activity') and unfavourable

(e.g., ‘gambling should be for adults’) attitudes, problem gamblers were found to hold both more favourable and less unfavourable attitudes than social gamblers and non-gamblers (Derevensky, Sklar, Gupta, & Messerlian, 2010). These findings are consistent with an earlier review of studies in North America, where Jacobs (2000) reported that pro-gambling attitudes are more prevalent among problem gambling youth than non-problem gambling youth.

Family environment

Several studies have found that youth problem gambling is associated with familial factors, such as parental attachment, parental monitoring, sibling risk behaviours, poor perceived familial social support, family problems, and low family connectedness (Chalmers & Willoughby, 2006; Dickson et al., 2008; Hardoon & Derevensky, 2004; Magoon & Ingersoll, 2006). In a review of family influences on youth gambling, McComb and Sabiston (2010) identified parenting practices as an area of increased interest in the field of adolescent gambling behaviour. As they report, cross-sectional studies have generally found support for the relation between less adaptive parenting practices and adolescent gambling, although there are some contradictory findings. For example, Magoon and Ingersoll (2006) found that problem gambling was associated with lower levels of parental trust, communication and monitoring; however, another study found that although low monitoring was associated with higher gambling frequency, it was poor disciplinary practices that were associated with adolescent gambling problems (Vachon, Vitaro, Wanner, & Tremblay, 2004). In contrast, another study found parental monitoring was not related to gambling frequency after controlling for other factors such as gender, race, socio-economic status, impulsivity, delinquency, and substance use (Barnes, Welte, Hoffman, & Dintcheff, 1999). Gender differences have also been found, in that low parental monitoring and poor parental relationships predicted problem gambling for females but not for males (Chalmers & Willoughby, 2006).

Extra-familial environment

One major influence on adolescent behaviour that exists outside of the family domain is peer relations. Several studies have found a consistent relationship between problem gambling status and peer gambling problems and excessive participation (e.g., Hardoon et al., 2004; Ólason, Skarphedinsson, Jonsdottir, Mikaelsson, & Gretarsson, 2006). Dickson and colleagues (2008) found that having a friend who gambled increased the odds of being a problem gambler by a factor of four, suggesting that having gambling peers is a risk factor for problem gambling in adolescence.

Stressors

The limited research that has examined the links between adolescent problem gambling and stress has typically found higher levels of stress and stressful life events among youth with gambling problems. In one study, the experience of negative life events increased as a function of gambling problem severity, with problem gambling youth more likely to report negative major life events (defined as ‘bad’ events that had an at least moderate effect on their lives) (Bergevin et al., 2006). Similarly, participants with greater levels of problem severity were found more likely to have experienced a number of stressful life events compared to those with lesser problems (Dickson et al., 2008). In a study of emerging adults (aged 16-24) in Vietnam, levels of perceived stress were found to be higher among those with gambling problems (Lostutter et al., 2013). Taken together, these findings suggest that stress is a risk factor for youth problem gambling.

Externalising problems

Consistent findings support a link between substance use and adolescent gambling problems (e.g., Chiu & Woo, 2012; Delfabbro et al., 2006; Fisher, 1993; Hardoon et al., 2004). For example, Gupta and Derevensky (1998) found that compared to those without

gambling problems, problem gambling youth were significantly more likely to engage in regular drug, alcohol and cigarette use, while Gerdner and Svensson (2003) reported that alcohol consumption was the strongest predictor of problem gambling in their study of youth. These authors also found that cigarette smoking was a predictor of problem gambling. In a review of 20 prevalence studies surveying middle and high school youth in North America, Jacobs (2000) concluded that problem gamblers consistently reported twice the rate of frequent tobacco use, twice the weekly use of alcohol, and two to four times the use of marijuana and other illicit substances than their non-problem gambling counterparts. Similarly, a more recent review concluded that problem gambling adolescents are at greater risk for developing other addictive behaviours, including substance use (Blinn-Pike et al., 2010).

Apart from alcohol and substance use, problem gambling behaviour amongst adolescents seems to be part of a constellation of other antisocial, risk-taking, and delinquent behaviours, particularly for males (Jacobs, 2000; Ladouceur et al, 1999; Ladouceur, Dube, & Bujold, 1994; Vitaro et al., 2001; Stinchfield, 2000; Stinchfield, Cassuto, Winters, & Latimer, 1997). These include physical violence, vandalism, shoplifting, illegal activities, truancy, poor academic achievement, school problems, problems with the police, conduct problems, and lower school connectedness (Dickson et al., 2008; Gupta et al., 2004; Hardoon et al., 2004; Huxley & Carroll, 1992; Kearney, Roblek, Thurman, & Turnbough, 1996; Langhinrichsen-Rohling et al., 2004; Stinchfield et al., 1997). For instance, one study found that 55.8% of adolescent problem gamblers and 31.2% of at-risk gamblers met the clinical criteria for conduct problems, indicating that they are likely to break rules, have more problems with individuals in authority, engage in antisocial activities, and display oppositional behavior (Hardoon et al., 2004). A review of 20 prevalence studies surveying middle and high school youth in North America concluded that problem gamblers were at least twice more likely to be recently involved in illegal activities and/or have problems with

the police (Jacobs, 2000), while more recently Blinn-Pike and colleagues (2010) concluded that adolescent problem gamblers are more involved in delinquency and crime compared to those without such problems.

Internalising problems

Findings suggest that adolescents with gambling-related problems, particularly females, report higher rates of a range of mental health issues such as anxiety, depression, and suicidal ideation and attempts (e.g., Blinn-Pike et al., 2010; Delfabbro et al., 2006; Dickson et al., 2008; Gupta & Derevenksy, 1998; Jacobs, 2000; Langhinrichsen-Rohling et al., 2004; Nower et al., 2004) . Ste-Marie, Gupta, and Derevensky (2002) reported that among 1044 secondary school students in Canada, problem gamblers displayed higher state anxiety, trait anxiety, and social stress than their non-problem gambling counterparts. Similarly, Gupta and Derevensky (1998) found that problem gambling secondary students were more likely to meet the criteria for clinical depression (23%) than regular, occasional, or non-gamblers (10-12%), with female problem gamblers reporting the highest occurrence of depression (58%). More broadly, general life dissatisfaction has also been found to be associated with gambling in young people (Sun & Shek, 2010), possibly due to gambling being used in an attempt to escape negative affective states associated with a lack of life satisfaction (Porter, Ungar, Frisch, & Chopra, 2004). Previous findings related to characteristics associated with a decreased risk of adolescent problem gambling

In contrast to factors which may elevate the risk of developing gambling problems, there is a paucity of research into characteristics associated with a lessening of this risk (i.e., protective factors). One study that sought to address this gap was conducted by Dickson and colleagues (2008), who administered a questionnaire to 2179 Canadian students aged 11 to 19 years. These authors studied whether a number of putative protective factors moderated the combined effects of a number of previously identified risk factors. Specifically, trait anxiety,

school problems, low self-perceived academic achievement, stressful life experiences, perceived familial and peer problem behaviour, risk propensity and being male represented the risk factors, while family cohesion, effective coping, mentor relationships, achievement motivation, and involvement in conventional organisations represented protective factors. These authors found that of the protective factors, only family cohesion predicted problem gambling status, although school connectedness had an indirect effect by influencing other variables.

Limitations of previous research

As shown in the previous sections, numerous research findings in relation to the psychosocial characteristics associated with adolescent problem gambling exist. However, several limitations of this literature are apparent. Firstly, the way in which problem gambling is measured varies widely among studies, making comparisons difficult. For instance, while some employ standard measurement tools and employ the original author-defined cut-off scores in order to categorise problem severity, others use modified instruments or alternate scoring rules. In addition, many combine those scoring at different levels of severity into single groups, principally in order to maximise sample sizes. Others use raw scores on the instrument as a continuous measure. Secondly, many studies have included non-standard measures of the characteristics in question, including single items and author-constructed scales. While this is appropriate for some variables, (e.g., demographic information), it may limit the strength of the conclusions that can be drawn in relation to others (e.g., depression, anxiety). Another limitation relates to the statistical methods employed to examine relationships between youth gambling and psychosocial characteristics. Specifically, cross-sectional studies do not allow for the explication of temporal or directional explanations, while those that do not control for the potential effects of other pertinent variables may run the risk of missing important contributory factors to an apparent relationship. As previously

indicated, much of the research has been atheoretical in nature, with a limited emphasis on framing explanatory mechanisms in the context of explicit theoretical predictions or orientations. This can make it difficult to synthesise findings into a coherent theoretical or conceptual framework in order to better understand the interactions and unique influences of particular variables. There is also a lack of research into potential protective factors for the development or amelioration of gambling problems in adolescence. Such characteristics represent potentially important targets for intervention in this population. Finally, while numerous reviews and summarising articles in relation to adolescent gambling exist, they are generally narrative and have been characterised by over-inclusiveness, a lack of quality appraisal, and a lack of specificity due to the inclusion of varying sample populations.

Future research directions

It is clear that a number of characteristics associated with adolescent problem gambling have been identified. However, further research is needed to better understand those which may represent the most effective targets for intervention across different populations. An examination of those characteristics particular to a specific group may be of utility in the provision of effective and efficient interventions appropriately targeted towards youth with gambling problems. In addition, given the wide range of variables across numerous domains, research that is able to identify unique predictors, above and beyond univariate or bivariate associations, could help to further understanding about the nature of associations between these factors and gambling problems. More longitudinal studies are also needed to better understand directionality and causal pathways; however, such studies should also seek to include well validated measures of the characteristics of interest to ensure confidence can be placed in conclusions. Finally, the gap in knowledge regarding possible protective factors should be addressed in order to move beyond a focus on risk factors to incorporate characteristics which may serve to ameliorate the risk of developing

problem gambling, or lessen the harms associated with it.

Chapter 2

Rationale and Aims

Rationale for the current thesis

Adolescent problem gambling has been associated with a range of deleterious outcomes across a number of domains (Blinn-Pike et al., 2010; Chalmers & Willoughby, 2006; Ellenbogen et al., 2007; Gupta & Derevensky, 2000; Jacobs, 2000; Messerlian et al., 2005; Shaffer & Hall, 1996; Valentine, 2008). Psychosocial characteristics represent potentially malleable factors that could be targeted by prevention and intervention efforts to lessen these harms. As such, determining those which have the most robust evidence for their relationship to gambling problems has both research and practical value. Although recently research has begun to focus on the identification of these characteristics, less is known about which are most strongly related to gambling problems in specific populations, and how these characteristics uniquely influence the likelihood of gambling problems in youth. In addition, characteristics that can protect against the risk of developing gambling problems remain an important but under-researched area. Research on characteristics associated with adolescent problem gambling therefore represents an important area of knowledge with the potential to inform prevention and intervention program development. In particular, examination of these factors in relation to a contemporary Australian sample of youth addresses the relative paucity of up to date literature in this research domain.

Research aims of the current thesis

The previous chapter identified a number of limitations to previous research on the characteristics associated with adolescent problem gambling, and provided a number of suggestions for future research. Based on some of these, the first major aim of the thesis is to review the extant literature on the psychosocial characteristics associated with problem gambling in a well-defined population (i.e., high school students). By utilising a rigorous methodology, this review aims to address some of the limitations of past research, and bring together the most robust evidence in relation to this topic. The second major aim of the thesis

is to empirically examine characteristics associated with problem gambling among a sample of Australian high school students. While many studies have presented similar findings, the current thesis seeks to extend this research by incorporating multivariate statistical techniques to uncover unique relationships between the variables and problem gambling status, and by explicitly testing potential protective factors in these models. Given the wide range of characteristics identified, and the lack of a comprehensive and well-supported single theory of adolescent gambling problems, the biopsychosocial conceptual model adapted by Casey et al. (2011) is used as a framework for the current thesis.

The thesis seeks to contribute to the growing literature examining the characteristics associated with adolescent problem gambling. Specifically, it aims to: (1) establish those characteristics for which the best evidence exists in relation to problem gambling in high school students, which will be addressed in Chapter 3; (2) examine whether a number of previously identified characteristics are significantly related to problem gambling in a sample of high school students, and whether the influence of these characteristics is moderated by gender, which is explored in Chapter 4; and (3) use advanced multivariate techniques to examine the relationships between gambling attitudes, gambling involvement and gambling problems, including a test of whether the relationship between gambling involvement and gambling problems is moderated by coping strategies or parenting practices, which is the focus of Chapter 5. The specific hypotheses associated with each of these aims are provided in the relevant chapters. Given that the studies reported in Chapters 5 and 6 are drawn from the same larger study, there is some overlap in the background and research methodology included in each chapter.

Chapter 3

Psychosocial Characteristics Associated with Adolescent Problem

Gambling: A Systematic Review

Introduction to Article One

Overall, previous reviews of adolescent gambling are generally narrative and have been characterised by over-inclusiveness, a lack of quality appraisal, and a lack of specificity. Therefore, while many factors have been reported to co-occur or influence the likelihood of gambling problems in adolescence, it is less clear how strong and reliable the evidence for each of these factors is. Considering the implications for prevention and treatment, it appears essential that purported characteristics which may serve as targets for intervention are robust markers for risk or protection. The following article presents the results from a systematic review that attempts to address some of these limitations by employing strict inclusion and exclusion criteria, and focusing on an explicitly defined population (i.e., high school students) in order to add to the current knowledge of characteristics associated with gambling problems in adolescence.

Declaration for Thesis Chapter 3

Declaration by candidate

In the case of Chapter 3, the nature and extent of my contribution to the work was the following:

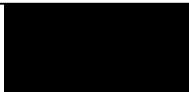
Nature of contribution	Extent of contribution (%)
Formulation of research questions Development and running of search strategy Principally responsible for selection of included articles, including screening, full-text review and selection for inclusion Preparation of manuscript for publication	80%

The following co-authors contributed to the work. If co-authors are students at Monash University, the extent of their contribution in percentage terms must be stated:

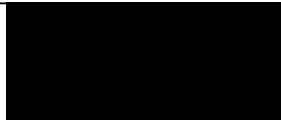
Name	Nature of contribution	Extent of contribution (%) for student co-authors only
A/Prof Nicki Dowling	Primary supervisor; overseeing all phases of the study, including secondary review of articles for inclusion where unclear and assistance with preparation of manuscript for publication	N/A
A/Prof Penelope Hasking	Secondary review of articles for inclusion where unclear and assistance with preparation of manuscript for publication	N/A

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

**Candidate's
Signature**

	Date 10/9/2014
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**Main
Supervisor's
Signature**

	Date 10/9/2014
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*Note: Where the responsible author is not the candidate's main supervisor, the main supervisor should consult with the responsible author to agree on the respective contributions of the authors.

Psychosocial Characteristics Associated with Adolescent Problem Gambling: A Systematic
Review

Ramsay W Dixon¹, Nicki A Dowling^{*2,4,5}, & Penelope Hasking³

¹ Monash Clinical and Imaging Neuroscience (MCIN) Laboratory, School of Psychological
Sciences, Monash University, Melbourne, Australia

² School of Psychology, Deakin University, Melbourne, Australia

³ School of Psychology and Speech Pathology, Curtin University, Australia

⁴ Melbourne Graduate School of Education, University of Melbourne, Australia

⁵ School of Psychological Sciences, Monash University, Melbourne, Australia

* Corresponding author:

School of Psychology, Faculty of Health

Deakin University

Burwood, VIC, 3125

Australia

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Abstract

Adolescent problem gambling has previously been associated with numerous psychosocial characteristics across a number of domains. However, less is known about the strength of these associations in relation to specific populations using standard measures of both gambling and putative risk and protective factors. The current study aimed to address this limitation by performing a comprehensive search of the extant literature and applying a strict set of inclusion and exclusion criteria to retrieved records in order to identify factors associated with problem gambling in high school students. From this search, 19 studies were found, and 46 individual psychosocial characteristics were identified. For the purposes of drawing conclusions, only the 11 characteristics for which a minimum of two studies existed were described further. Using the domains from a biopsychosocial model to organise findings, associations were found between problem gambling and temperament/personality (impulsivity and general risk propensity), cognitive characteristics (less effective coping), family environment (family problems), externalising problems (symptoms of ADHD, substance use, delinquency), and internalising problems (emotional problems and anxiety). It was concluded that methodological issues and a lack of replication have an impact on the ability to determine the strength and direction of relationships between adolescent problem gambling and associated psychosocial characteristics. Implications of the findings for practice and research are also discussed.

Key Words: Problem gambling, Systematic Review, Psychosocial characteristics, Adolescence

According to the most recent version of the *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition; *DSM-5*: American Psychiatric Association [APA], 2013), individuals who display recurrent and maladaptive gambling behaviour, and who display four or more of the nine listed criteria (e.g., preoccupation with gambling; lying to conceal extent of gambling involvement) are diagnosed with Gambling Disorder (APA, 2013). The term ‘problem gambling’ is often used to refer to the entire continuum of gambling problems, including but not limited to those meeting diagnostic criteria (Abbott, 2001; Productivity Commission, 1999, 2010). Such behaviour has been characterised as that which leads to difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others or for the community (Neal, Delfabbro, & O’Neil, 2005). These diagnostic criteria and definitions apply equally to both adult and adolescent populations.

Prevalence of gambling and problem gambling among adolescents

Gambling activity among adolescents is not uncommon, with one review reporting a median lifetime prevalence of 85% (National Research Council, 1999). Rates of adolescent problem gambling generally range from 4% to 8%, representing two to four times the prevalence rate found in adults (Gupta & Derevensky, 2000; Haroon & Derevensky, 2002; Jacobs, 2000; Shaffer & Hall, 1996). These rates have been derived from a number of validated screening instruments which are designed to identify adolescents with gambling problems. These include the South Oaks Gambling Screen – Revised for Adolescents (SOGS-RA; Winters, Stinchfield, & Fulkerson, 1993); the *Diagnostic and Statistical Manual of Mental Disorders-IV-Juvenile* (DSM-IV-J; Fisher, 1992); the *Diagnostic and Statistical Manual of Mental Disorders-IV-Juvenile-Multiple Response* (DSM-IV-MR-J; Fisher, 2000); full *DSM* criteria checklists; and the Massachusetts Gambling Screen (MAGS; Shaffer,

LaBrie, Scanlan, & Cummings, 1994). Given there are no separate *DSM* criteria for adolescent gambling, these measurement tools are typically based on the adult criteria, but the item content has been altered to reflect the age of respondents. Several authors have identified measurement issues in the field of adolescent problem gambling (e.g., Ladouceur et al., 2000; Poulin, 2002), and multiple scoring rules and classification terms have been used. However, each of these standardised instruments attempts to identify youth who are experiencing gambling related harm, and have published cut-off scores to indicate the threshold at which these problems are likely present. Because it has been argued the use of diagnostic labels based on scores from these screening instruments may be inappropriate (Fisher, 2000), the current review employs the term problem gambling to refer to those meeting the cut-off score threshold for a particular measure.

Previous research has found that adolescent problem gambling is associated with a range of interpersonal, familial, economic, psychological and legal problems (e.g., Blinn-Pike, Worthy, & Jonkman, 2010; Ellenbogen, Gupta, & Derevensky, 2007; Jacobs, 2000). Given the comparatively high rates and wide-ranging negative sequelae, problematic adolescent gambling has subsequently emerged as a significant area of research interest. However, because not all adolescents who gamble will develop gambling problems, it has been argued that research should focus on the exploration of potential factors that may increase or ameliorate the risk of developing such difficulties, rather than the broad-based prevalence studies that characterised earlier investigations (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004).

Psychosocial characteristics associated with adolescent problem gambling

A substantial body of research attempting to elucidate factors associated with problematic gambling behaviour in adolescents has emerged. From a prevention science

framework, risk factors are those variables associated with higher levels of severity, earlier onset and longer duration of symptoms, while those which serve to ameliorate the severity of problems or lessen the influence of risk factors are referred to as protective factors (Coie et al., 1993). While it has been argued the term protective factors should be reserved only for variables which directly interact with risk factors to reduce dysfunctional behaviour (see Dickson, Derevensky, & Gupta, 2008), the term is frequently used more broadly within the gambling literature to refer to factors which lessen dysfunction, irrespective of the presence of an interaction with an identified risk factor. This broader application of the term is consistent with a prevention sciences perspective that argues that protective factors may decrease dysfunction directly, interact with a risk factor to buffer its effects, disrupt the mediational chain through which a risk factor operates to cause the dysfunction, or prevent the initial occurrence of a risk factor (Coie et al., 1993).

Given the large number of variables examined in relation to adolescent problem gambling, biopsychosocial models provide a useful conceptual framework to describe and organise findings. Based on previous work attempting to identify and group risk and protective factors related to drug use, Casey and colleagues (2011) adapted the biopsychosocial model of Edwards and colleagues (1981) to understanding problem gambling behaviour in adolescence. This framework categorises proposed risk and protective factors under higher order domains including demographic (e.g., age), family history (e.g., parental problem gambling), temperament and personality (e.g., impulsivity), cognitive (e.g., coping strategies), family environment (e.g., parenting styles), extra-familial environment (e.g., peer associations), stressors (e.g., school, family stress), externalising problems (e.g., substance use, delinquency) and internalising problems (e.g., depression, anxiety). The model also conceptualizes increased gambling involvement (comprising the constructs of frequency, expenditure, type and range, and context) as a risk factor for problem gambling. While such a framework is useful

conceptually, it has not been empirically tested in regards to problem gambling (Casey et al., 2011).

Although a number of narrative reviews have described findings in relation to the variables described by the biopsychosocial model (e.g., Ariyabuddhiphongs, 2013; Griffiths & Wood, 2000; Hardoon & Derevensky, 2002; Messerlian, Gillespie, & Derevensky, 2007; Shead, Derevensky, & Gupta, 2010), they have generally been characterised by a lack of quality appraisal (e.g., inclusion of studies using non-validated measures), a lack of specificity (e.g., inclusion of varying sample populations) and over-inclusiveness (e.g., inclusion of samples of diverse ages). Similar limitations also exist in regard to a previous systematic review (Blinn-Pike et al., 2010), which although more rigorous in methodology, was designed to be very broad in scope and included studies from a wide age range (9 to 21 years), articles derived from a range of different populations (e.g., adolescents with co-morbid substance problems), and studies using adult measures of problem gambling. In addition, comparisons among studies are made difficult by the varying nomenclature and definitions used, and the diversity of variables examined. Overall, while many factors have been reported to co-occur with adolescent problem gambling, or influence the likelihood of its presence, the strength and reliability of the evidence for each of these factors is less clear. A systematic review including the most methodologically rigorous available studies is therefore timely in order to address these limitations, and to build on the previous review (Blinn-Pike et al., 2010) by furthering understanding of which potentially modifiable factors may be most strongly linked with gambling problems in a specific population (i.e., high school students).

Implications for intervention

The accurate identification of risk and protective factors is essential for the development of effective interventions (Evans, 2003). Schools serve as places where broad-

based intervention programs can be implemented efficiently and effectively; however, in order for this to occur, they should be evidence based and cost-effective. A comprehensive, rigorous and focussed systematic review of the literature in relation to problem gambling among high school populations may help to ensure that factors potentially targeted by such intervention efforts are those most likely to lead to harm reduction (Nower & Blaszczynski, 2004; Williams, Wood, & Currie, 2010). Although prior research has discovered a large number of psychosocial characteristics associated with adolescent problem gambling, it is still unclear which are supported by the most robust research for high school aged youth. Further support for the characteristics associated with problem gambling in this population may be of particular importance given the potential for psychosocial factors to fluctuate as a function of specific developmental periods (Coie et al, 1993). Considering the implications for intervention, it is essential that purported factors which may serve as intervention targets are robust markers for risk or protection.

The current systematic review

It is clear that problem gambling behaviour in adolescence is associated with a number of psychosocial characteristics. However, the literature in this area is disparate, and limitations as identified above are apparent. The purpose of the current review therefore, was to draw this literature together to comprehensively examine extant findings by conducting a systematic evaluation of the published methodologically rigorous empirical literature relating to these characteristics among high school students. While demographic factors have been associated with youth problem gambling, the focus of the current review was on psychosocial characteristics that are potentially amenable to prevention and treatment efforts. The identification of the most robust and potentially modifiable risk and protective factors in the high school student population is essential for the provision of universal school-based intervention initiatives in order to reduce the potential associated interpersonal, familial,

economic, psychological and legal harms of problem gambling amongst this group (Ellenbogen et al, 2007; Gaboury & Ladouceur, 1993; Nower & Blaszczynski, 2004; Turner, Macdonald, & Somerset, 2008).

Method

Search strategy

The systematic review was conducted and reported based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA: Moher et al., 2009). The search strategy is depicted in Figure 1 (see p.46). Following a similar strategy employed in a prior meta-synthesis of gambling prevalence among college students (Blinn-Pike, Worthy, & Jonkman, 2007), broad search terms were entered into three electronic databases (PsychINFO, Medline, and EMBASE) to capture all relevant records. The ‘participants’ concept search terms were ‘you\$', ‘adol\$', ‘teen\$’ and ‘child\$', all combined with the OR modifier. The ‘gambling problems’ concept search terms were ‘gambl\$', ‘wager\$', ‘betting’ and ‘gaming’, also combined with the OR modifier. The wildcard symbol (\$) was used to capture all permutations of the search terms (e.g., youth, youthful, young, younger etc.). Results from both of these searches were combined with the AND modifier. The broad search (as opposed to school or gambling problem-specific) terms were chosen to produce a high yield, ensuring all relevant records were captured. The search was limited to articles published in English between 1987 and 2013. The lower limit was chosen due to the regular use of a lack of standard, validated measures of problem gambling before then (i.e., the South Oaks Gambling Screen, [SOGS]; Lesieur & Blume, 1987). A hand search of the reference lists of included studies did not reveal any additional relevant records.

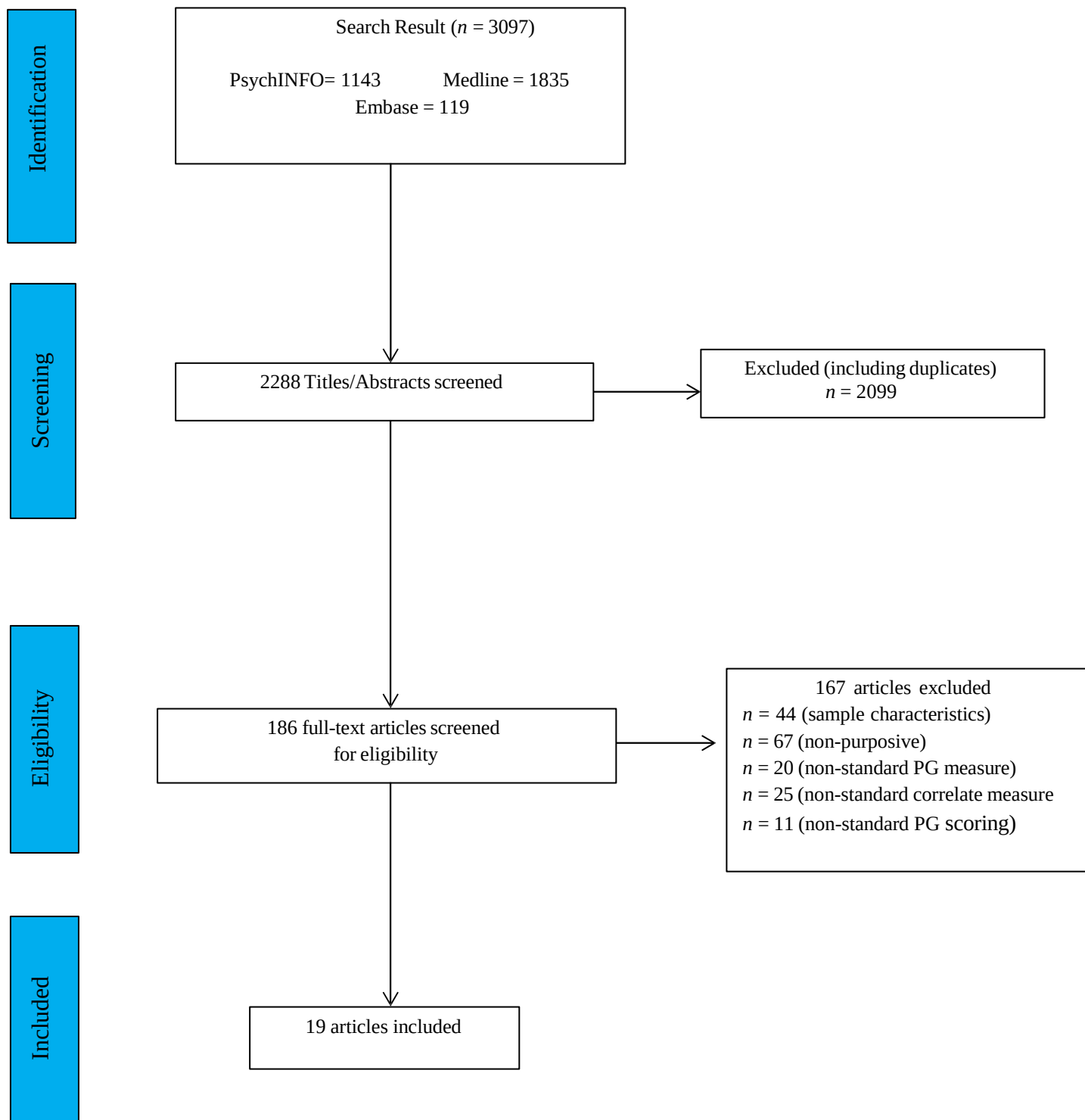


Figure 1 Search strategy for systematic review

Inclusion criteria

The current review sought to include studies that: a) were reported in English; b) appeared in a peer-reviewed journal; c) were published between 1987 and 2013; d) sampled participants from a high-school population, regardless of age; e) were purposive, with a stated aim to investigate psychosocial characteristics associated with problem gambling; f) utilised a standardised and validated measure of adolescent problem gambling (because there is no distinction made between adults and adolescents in the DSM criteria, studies using this criteria were included) ; g) defined problem gambling status using scoring rules consistent with author-defined cut-off scores on the standardised measures if creating groups for comparison (i.e., scores of 4 or greater on the SOGS-RA, DSM-IV-J, DSM-IV-MR-J and *DSM-V* criteria; scores of 5 or more for the MAGS and *DSM-IV* or *DSM-IV-TR* criteria); h) utilised standardised and validated measures (or items derived from such measures) of the psychosocial characteristics related to gambling status, and; i) tested the purported relationship between problem gambling and the psychosocial characteristics using recognised statistical methods.

Exclusion criteria were studies which: a) did not draw participants from a school sample (e.g., population-based surveys), included mixed age-group samples (e.g., high school and college students combined) or sampled special populations (e.g., substance abuse treatment patients); b) included demographic variables only (e.g., gender, age); c) were non-purposive (e.g., prevalence studies, test validation data, or literature reviews) d); did not use a standard gambling measure (i.e., adapted, shortened or adult form etc.); e) did not use scoring criteria consistent with the author-developed cut-off scores of the measure being used if creating groups for comparison; f) combined different levels of gambling severity in analyses (e.g., at-risk/probable pathological gambling), and; g) did not utilise a standard measure (or items derived from such a measure) for each psychosocial characteristic related to problem gambling status (i.e., author-developed scale, single item, composite measure or similar).

Because the inclusion criteria based problem gambling status on the use of cut-off scores, no distinction was made between studies that used terms such as ‘problem gambling’, ‘pathological gambling’, or ‘probable pathological gambling’ to describe those who endorsed the requisite number of items on any given measure. Where it was unclear whether a record met inclusion criteria, it was further examined until a definite criterion was met. Where there was uncertainty over inclusion, two co-authors (ND and PH) reviewed the record and a decision was made by consensus ($k = 3$). In one case, two articles (Derevensky, Pratt, Hardoon, & Gupta, 2007; Hardoon, Gupta, & Derevensky, 2004) reported findings from the same data set, so only unique results were retained.

Selection of studies

During screening, a conservative approach was adopted, such that only obviously irrelevant records were discarded. The full-text of the remaining articles was then examined against the inclusion and exclusion criteria, leaving a total of 19 articles for review. The majority of articles were excluded due to being non-purposive ($k = 67$) or on the basis of sample characteristics ($k = 44$).

Data extraction

The following information was extracted from each included study: a) broad study characteristics, including country of origin and sample size; b) study methodology, including the measurement instruments relating to both problem gambling and the psychosocial characteristic(s) under examination; c) all relevant quantitative data in relation to tested relationships between psychosocial characteristics and problem gambling status.

Results

Study characteristics

Characteristics of the 19 included studies are presented in Table 1. The studies were published in a range of journals including gambling specific ($k=8$), child or adolescent focussed ($k=5$) and addiction focussed ($k=3$). The majority of studies were published between 2004 and 2008 ($k=12$) in Canada ($k=14$). Other countries represented were the United States of America ($k=2$), and one study each from Australia, Greece and China. Sample sizes ranged from 188 to 2336 (mean = 1463.07, SD = 989.22, median = 1044), with an age range of 10 to 19 years. The most frequently used standardised measures of adolescent problem gambling were the DSM-IV-MR-J ($k=7$) and the SOGS-RA ($k=7$), with smaller proportions of studies employing the DSM-IV-J ($k=4$) and the *DSM-IV* criteria ($k=1$). The number of problem gambling participants ranged from 12 to 114, with prevalence rates ranging from 2.6% to 12.8%, the one exception being 26% which was based on the ‘broad’ criteria of the SOGS-RA (Magoon & Ingersoll, 2006). The majority were cross-sectional in design ($k=16$).

Table 1

Characteristics of Included Studies

Author(s)	Year	Country	Sample size	No. male(%)*	Grade(s)/Age Range(s)	Gambling Measure(s)	Psychosocial characteristic ^a	No. of problem gamblers in sample <i>n</i> (%)	Study design	Journal
Delfabbro, Lahn, & Grabosky	2006	Australia	926	473(51)	7-12/11-19 Mean = 14.46	DSM-IV-J	Self-esteem Physical health Social alienation	41(4.4) ^b	Cross-sectional	Aust N Z J Psychiatry
Derevensky, Pratt, Hardoon, & Gupta	2007	Canada	2336	981(42)	7-13/12-19 Mean = 14.76	DSM-IV-MR-J	ADHD ^c symptoms	114(4.9)	Cross-sectional	J Addict Med
Dickson, Derevensky, & Gupta	2008	Canada	2179	921(42)	7-13/11-19 Mean NR	DSM-IV-MR-J ^c	Family cohesion Achievement motivation School problems Coping strategies Trait anxiety Risk propensity	109(5.0)	Cross-sectional	Int Gambl Stud
Dussault, Brendgen, Vitaro, Wanner, & Tremblay	2011	Canada	1004	1004(100)	14-17/NR Mean NR	SOGS-RA ^d	Impulsivity Depressive symptoms	51(5.1)	Longitudinal	J Child Psychol Psychiatry
Faregh & Derevensky	2011	Canada	1130	561(50)	7-12/11-19 Mean NR	DSM-IV-MR-J	Family problems Emotional problems Conduct problems Cognitive problems Anger control problems ADHD symptoms Internalising symptoms Externalising symptoms	34(3.0)	Cross-sectional	J Gambl Stud
Floros, Siomos, Fisoun, & Geroukalis	2013	Greece	2017	1046(52)	Junior & senior grades/12-19 Mean = 15.08	DSM-IV-MR-J	Parental bonding	83(4.1)	Cross-sectional	J Gambl Stud
Gillespie, Derevensky, & Gupta	2007	Canada	1013	432(43)	7-11/11-18 Mean = 14.77	DSM-IV-MR-J	Gambling expectancies	51(5.0)	Cross-sectional	J Gambl Issues
Gupta, Derevensky, & Marget	2004	Canada	587	220(37)	NR/12-17 Mean = NR	DSM-IV-J	Coping	38(6.5)	Cross-sectional	Child Adolesc Ment Health
Gupta, Derevensky, & Ellenbogen	2006	Canada	817	417(51)	7, 9 & 11/12-17	DSM-IV-J	Warmth Intelligence Emotional Stability	31(3.8)	Cross-sectional	Can J Beh Sci

							Dominance Cheerfulness Conformity Boldness Sensitivity Withdrawal Apprehension Self-sufficiency Self-discipline Tension Sensation seeking			
Hardoon, Gupta, & Derevensky	2004	Canada	2336	981(42)	7-13/12-19 Mean = 14.76	DSM-IV-MR-J	Family problems Emotional problems Conduct problems Cognitive problems Anger control problems ADHD symptoms Social support Substance use	113(4.9)	Cross-sectional	Psychol Addict Behav
Ladouceur, Boudreault, Jacques, & Vitaro	1999	Canada	3426	1682(49)	7-11/12-18 Mean = 14.8	SOGS ^e	Delinquency	89(2.6)	Cross-sectional	J Child Adoles Subst Abuse
Magoon & Ingersoll	2006	USA	116	49(42)	9-12/14-19 Mean = 16.8	SOGS-RA	Parental support Parental monitoring	12(10) 30(26) ^f	Cross-sectional	J Gambl Stud
Parker, Taylor, Eastabrook, Schell, & Wood	2008	Canada	667	249(37)	NR/13-18 Mean = 16.2	SOGS-RA ^g	Internet addiction Emotional intelligence Problem video game use	NR	Cross-sectional	Pers Indiv Differ
Ste-Marie, Gupta, & Derevensky	2006	Canada	1044	512(49)	7-11/12-17 Mean = 14.31	DSM-IV-MR-J	Anxiety Social stress	47(4.5)	Cross-sectional	J Gambl Stud
Tang & Wu	2012	China	2835	1596(56)	NR/11-17 Mean = 14.41	DSM-IV criteria ^h (Chinese version)	Cognitive biases	101(3.6)	Cross-sectional	J Gambl Stud
Vitaro, Brendgen, Ladouceur, & Tremblay	2001	Canada	717	717(100)	NR/13-14; 16-17 ⁱ Mean = NR	SOGS-RA (French version)	Delinquency Substance use Impulsivity	NR	Longitudinal	J Gambl Stud
Wanner, Vitaro, Carbonneau, & Tremblay ^j	2009	Canada	1165	1165(100)	NR/16 Mean = NR	SOGS-RA (French version)	Theft Violence Substance use	NR	Longitudinal	Psychol Addict Behav
Wickwire, Whelan, Meyers, & Murray	2007	USA	188	86(46)	Sophomore/NR	SOGS-RA	Perceived environment	24(12.8)	Cross-sectional	J Abnorm Child Psychol

Wood, Gupta, Derevensky, & Griffiths	2004	Canada	996	441(44)	7-11/10-17 Mean = NR	DSM-IV-J	Risk approach/avoidance	66(6.6)	Cross-sectional	J Child Adoles Subst Abuse
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* where percentages reported, no. male calculated and rounded to nearest whole number

% = attention deficit hyperactivity disorder

^a only characteristics of interest for current study captured, even if others (e.g., demographics) formed part of study design

^b includes 9 additional participants who scored highly on a non-validated measure (Victorian Gambling Screen); reported no differences in results when included/excluded

^c item six amended such that responses 'sometimes' or 'often' received a score of 1

^d SOGS-RA administered when participants 17; other measures at 14

^e ≥ 5 = PPG; based on adult scoring

^f based on 'broad' criteria

^g total scores as continuous variable

^h presented as a yes/no checklist; lifetime time frame; total scores generated

ⁱ longitudinal study; impulsivity/peer deviancy/parental supervision at 13-14; gambling problems /delinquency/substance use at 16-17

^j consisted of two samples combined; relevant subsample only; only measures taken at age 16 included

Identification of psychosocial characteristics

From the 19 studies, 46 single psychosocial characteristics were identified. These are shown below in Table 2, grouped by domains from the biopsychosocial model (Casey et al., 2011). Of the 46 constructs, 36 were the subject of one study, 7 were the subject of 2 studies, 2 were the subject of 3 studies, and 1 was the subject of 5 studies.

Table 2

Psychosocial Characteristics of Problem Gambling Grouped by Domain and Frequency of Study

Domain	Psychosocial characteristics		
	<i>Single studies</i>	<i>Two studies</i>	<i>Three or more studies</i>
Temperament and personality	Warmth Intelligence Emotional Stability Excitability Dominance Cheerfulness Conformity Boldness Sensitivity Withdrawal Apprehension Self-sufficiency Self-discipline Tension Sensation seeking Achievement motivation	Impulsivity Risk propensity	
Cognitive	Gambling expectancies Emotional intelligence Coping strategies Cognitive biases	Cognitive problems	
Family environment	Family cohesion Parent bonding Parental monitoring Parent support	Family problems	
Extra-familial environment	Social support Social alienation Social stress Perceived environment		
Stressors	School problems		
Externalising problems	Externalising symptoms Internet addiction Problem video game use	Anger control problems	ADHD [%] symptoms Delinquency ^a Substance use
Internalising problems	Depressive symptoms Internalising symptoms Self-esteem	Anxiety Emotional problems	
Other	Physical health		

% = attention deficit hyperactivity disorder; ^a subject of five studies

Characteristics associated with problem gambling

To ensure that conclusions regarding the identified characteristics were as robust as possible, only the findings for those variables for which at least two studies were identified were examined further. Table 3 summarises these findings, grouped by variable, from each of the 12 studies that met this requirement.

Table 3

Psychosocial Characteristics With at Least Two Studies in Common, Grouped by Domain

Domain	Characteristic	Author and Year	Measure	Findings
Temperament and personality	Impulsivity	Dussault et al., 2011	EIS; SBQ	Significant positive correlation between impulsivity (age 14) and SOGS-RA scores at age 17; significant link between impulsivity and PG found using SEM
		Vitaro et al., 2001	EIS	Significantly positively correlated with PG scores (SOGS-RA); mean scores at ages 13-14 significantly predictive of PG at age 17
	Risk propensity	Dickson et al., 2008	RIPS	PG higher scores than other groups
		Wood et al., 2004	RTQ	Significantly positively related to severity of gambling behaviour
Cognitive	Coping strategies	Dickson et al., 2008	ACCOPE	PG less likely to employ effective coping than other groups; small mean differences only however; more likely to utilise ineffective coping skills
		Gupta et al., 2004	CISS	PG significantly higher on emotion, avoidance and distraction-oriented coping than social and non-gamblers; no differences on task-focussed or social diversion subscales
	Cognitive problems	Faregh & Derevensky, 2011	CASS:L	Higher among PG independent of ADHD status; not significant when entered simultaneously with other CASS:L scales overall and for ADHD subgroup
		Hardoon et al., 2004	CASS:L	PG exhibit more psychopathology on all subscales
Family environment	Family problems	Faregh & Derevensky, 2011	CASS:L	Higher among PG independent of ADHD status; not significant when entered simultaneously with other CASS:L scales overall and for ADHD subgroup
		Hardoon et al., 2004	CASS:L	PG more problems than AR/social/non gamblers; predictor of PG status in regression
Externalising problems	ADHD symptoms	Derevensky et al., 2007	CASS:L	PG sig higher on all four ADHD scales than others; female PG higher hyperactivity and ADHD 'at-risk' index than male PG; when grouped using clinical cut offs for ADHD: PG higher on all scales
		Faregh & Derevensky, 2011	CASS:L	Those with ADHD symptoms more likely to have PG; inattention and hyperactivity-impulsivity significantly higher among PG only for non-ADHD subgroup
		Hardoon et al., 2004	CASS:L	Hyperactivity and inattentive subscales not retained as predictors in regression
	Substance use	Hardoon et al., 2004	PESQ	PG significantly higher mean scores (problem severity) than AR/ social/non-gamblers; predictor of PG status in regression
		Vitaro et al., 2001	PESQ - PS	Significantly positively correlated with PG scores (SOGS-RA); predictive of PG at age 17 when measured at age 16; PG does not explain increase from age 16-17
		Wanner et al., 2009	PESQ – PS; SRDQ	Significant positive correlation with PG scores (SOGS-RA) at age 16 for sample B only
	Anger control	Faregh & Derevensky, 2011	CASS:L	No relationship to PG found, but linear trend such that scores higher among PG

	problems			independent of ADHD status; not entered into regression due to lack of participants meeting threshold for clinical significance
		Hardoon et al., 2004	CASS:L	PG more problems than AR/social/non gamblers; not retained as predictor in regression
	Delinquency	Faregh & Derevensky, 2011	CASS:L	Higher conduct problems among PG independent of ADHD status; not significant when entered simultaneously with other CASS:L scales overall and for ADHD subgroup
		Hardoon et al., 2004	CASS:L	PG more problems than AR/social/non gamblers; predictor of PG status in regression
		Ladouceur et al. 1999	SRDS	PG higher on delinquency scale than other groups
		Vitaro et al., 2001	SRDQ	PG at age 16-17 positively related to delinquency scores at ages 16-17; at age 16 not predictive of PG at 17
		Wanner et al., 2009	DISC-C	Theft and violence significantly positively correlated with gambling problems at age 16
Internalising problems	Anxiety	Dickson et al., 2008	STAI	PG higher scores than other groups (trait anxiety)
		Ste-Marie et al., 2006	STAI; BASC - BAS	Trait anxiety and state anxiety mean scores significantly increase with gambling severity (STAI); no significant differences between PG and NG on BASC scores (anxiety); when grouped by level of anxiety (high, med, low), PG significantly higher trait anxiety but not state anxiety
	Emotional problems	Faregh & Derevensky, 2011	CASS:L	PG significantly differed from all other groups (non; social; AR); significant predictor when entered simultaneously with other CASS:L scales for overall group and ADHD subgroup; not significant for non-ADHD subgroup
		Hardoon et al., 2004	CASS:L	PG more problems than AR/social/non gamblers; not retained as predictor in regression

PG = problem gambling; SEM = structural equation modelling; ADHD = attention deficit – hyperactivity disorder; EIS = Eysenck Impulsivity Scale (5 items); SBQ = Social Behavior Questionnaire (other report); CASS: L = Conners-Wells' Adolescent Self-Report Scale: Long Version (87 items, 10 subscales); PESQ = Personal Experience Screening Questionnaire; PESQ - PS = Personal Experience Screening Questionnaire – Problem Severity Subscale; SRDQ = Self-Reported Delinquency Questionnaire; DISC-C = Diagnostic Interview Schedule for Children – Child Informant; STAI = State-Trait Anxiety Inventory; BASC - BAS = Behaviour Assessment System for Children – Anxiety Scale; SRDS = Self-Reported Delinquency Scale; RIPS (Mod.) = Perceived Benefits and Perceived Risks subscales; Risk Involvement and Perception Scale – modified version: General High Risk Behavior Involvement Subscale; ACOPE = Adolescent Coping Orientation for Problem Experiences; CISS = Coping Inventory for Stressful Situations

Findings related to each of the characteristics are presented below grouped by the model domains of Casey and colleagues (2011): Temperament and personality (impulsivity, risk propensity); cognitive factors (coping strategies, cognitive problems); family environment (family problems); externalising problems (delinquency, conduct problems, ADHD symptoms, substance use, and anger control problems), and internalising problems (emotional problems, anxiety).

Temperament and Personality

Impulsivity. Two studies explored the relationship between problem gambling and impulsivity, both of which found a positive association (Dussault et al., 2011; Vitaro et al., 2001). In one study, impulsivity at age 14 years was found to be significantly and positively associated with gambling problems at age 17 using correlations and structural equation modelling techniques (Dussault et al., 2011). In the other, a significant correlation was found between impulsivity at age 14 and gambling problems at 16 years of age after controlling for socioeconomic factors (Vitaro et al., 2001). Using a saturated path model, these authors also found that impulsivity at age 14 years was predictive of gambling problems at age 17 years; however, the strength of this relationship was described as weak ($\beta = .13$). Both these studies were drawn from the same cohort of French-speaking male Caucasian students from disadvantaged neighbourhoods; however, the number of participants included differed in each due to the availability of complete data for relevant measures.

Risk propensity. The relationship between risk propensity and problem gambling was also examined in two studies, both of which reported that the propensity to engage in risky behaviours was elevated in those with gambling problems (Dickson et al., 2008; Wood et al., 2004). Based on frequency analysis and univariate analysis of variance, Dickson and colleagues (2008) found that those with more gambling problems had higher mean scores on

a measure of risk propensity than their non-problem gambling counterparts. In their study, Wood and colleagues (2004) found a significant positive correlation between gambling problems and scores on a risk-taking measure. These authors further explored this relationship by deriving categories describing three levels of risk (bottom quartile, middle 50% and top quartile) and comparing the percentage of participants with gambling problems who fell within each. They found that problem gamblers made up almost 70% of those in the highest risk (i.e., top quartile) group.

Cognitive factors

Coping strategies. Two studies examined coping strategies (Dickson et al., 2008; Gupta et al., 2004). Both reported that students with gambling problems were more likely to employ ineffective coping strategies, characterised by avoidance strategies and a focus on distress management rather than problem solving when compared to those without gambling problems. In regards to adaptive coping, characterised by a focus on problem solving, the studies differed in that one found students with gambling problems were less likely to use adaptive strategies (Dickson et al., 2008), while the other found no difference in the level of effective coping skills utilised by problem gamblers when compared to their non-problem gambling counterparts (Gupta et al., 2004).

Cognitive problems. Both of the studies that examined the association between cognitive problems and problem gambling reported that these were more prevalent among problem gambling adolescents (Faregh & Derevensky; 2011; Hardoon et al., 2004). However, one study found that this was not predictive of problem gambling when other problem subscales from the CASS:L were included in a multinomial logistic regression (Faregh & Derevensky, 2011). These findings suggest that cognitive problems were not unique predictors of problem gambling status, and that problem gambling status was better

accounted for by the emotional problems subscale of the CASS:L which remained significant in the regression analysis.

Family environment

Family problems. Two studies examined family problems (characterised by low perceived support, uncaring and critical interactions, and feeling emotionally disconnected from family members) and adolescent problem gambling (Faregh & Derevensky; 2011; Hardoon et al., 2004). While both studies found that such problems were more frequent among problem gambling students, only one study found that this construct was predictive of problem gambling status when controlling for the effects of other variables (Hardoon et al., 2004). This difference may have been due to the inclusion of gender, perceived social support and substance use in addition to CASS:L subscales as covariates in the latter study.

Externalising problems

Delinquency. The association between problem gambling and delinquency was examined in five studies (Faregh & Derevensky, 2011; Hardoon et al., 2004; Ladouceur et al., 1999; Vitaro et al., 2001; Wanner et al., 2009). In one study, problem gamblers were found to have significantly higher mean scores on a measure of delinquency than their non-problem gambling peers (Ladouceur et al., 1999). In another, Vitaro and colleagues (2001) found that although delinquency at ages 16 years and 17 years was positively correlated with gambling problems at ages 16 years and 17 years, delinquency at 16 years did not predict gambling problems at age 17 years when entered into a saturated path model with gambling frequency and substance use.

Conduct problems. Two studies examined the association between conduct problems (characterised by rule breaking, antisocial activity, and oppositional behaviour) and problem

gambling (Faregh & Derevensky, 2011; Hardoon et al., 2004). Although both studies reported greater frequency of conduct problems among problem gamblers, only one (Hardoon et al., 2004) found this construct to be predictive of problem gambling status after controlling for other variables such as family problems, emotional problems, anger control problems, attentional difficulties, hyperactivity and substance use severity. In the last study, theft and violence were significantly positively correlated with gambling problems at age 16 (Wanner et al., 2009).

ADHD symptoms. Three studies examined the association between symptoms of ADHD and student problem gambling (Derevensky et al., 2007; Faregh & Derevensky, 2011; Hardoon et al., 2004). Typically, problem gamblers had elevated symptoms of ADHD compared to others, although one study failed to find hyperactivity and inattention predictive of gambling problems (Hardoon et al., 2004). One study reported gender differences, in that female problem gamblers scored higher on subscales of hyperactivity and an ADHD Index than male problem gamblers (Derevensky et al., 2007). Limitations across these studies were noted, including a lack of control for medication status, self-report bias (Derevensky et al., 2007; Faregh & Derevensky, 2011), and lack of control for other comorbid mental health disorders that have been associated with adolescent problem gambling (e.g., substance abuse; Derevensky et al., 2007). Although not likely to impact significantly on findings, it is worth noting that although the CASS: L is normed for adolescents aged 12-17 years (Derevensky et al., 2007), all of the studies utilising it included participants up to age 19 years, with one also including 11 year olds (Faregh & Derevensky, 2011).

Substance use. The association between substance use and adolescent problem gambling was also examined in three studies (Hardoon et al., 2004; Vitaro et al., 2001; Wanner et al., 2009), with substance use generally found to be greater amongst those with gambling problems. In one study (Hardoon et al., 2004), problem gamblers had higher scores

on a measure of substance use severity than other non-problem gambling comparison groups. In addition, severity of substance use also emerged as a significant predictor of problem gambling, but only increased the likelihood of being classed as such by a factor of 1.1. Another study found a significant positive correlation between gambling problems and substance use at ages 16 and 17 years while controlling for socioeconomic factors (Vitaro et al., 2001). Drug and alcohol use at age 16 years was also found to significantly predict gambling problems at age 17 years using path analysis, although this relationship was reportedly weak ($\beta = .13$). In the third study, a significant positive correlation was found between substance use and gambling problems at age 16 years (Wanner et al., 2009).

Anger control problems. Two studies (Faregh & Derevensky, 2011; Hardoon et al., 2004) examined the relationship between problem gambling and anger control problems. One found more frequent anger control difficulties among problem gamblers compared to those without gambling problems, but this construct was not predictive of problem gambling status after controlling for other variables such as family problems, emotional problems, anger control problems, attentional difficulties, hyperactivity and substance use severity (Hardoon et al., 2004). The other reported a linear trend such that scores were higher among problem gamblers; however, this scale was not included in subsequent regression analyses due to it being deemed clinically insignificant based on low subscale totals (Faregh & Derevensky, 2011).

Internalising problems

Emotional problems. The same two studies (Faregh & Derevensky, 2011; Hardoon et al., 2004) examined the association between problem gambling and emotional problems (characterised by low self-esteem, low self-confidence and feelings of loneliness and isolation). Although both studies reported greater frequency of emotional problems among

problem gamblers, only one (Faregh & Derevensky, 2011) found this construct to be predictive of problem gambling status. In this study, Faregh and Derevensky (2011) found that emotional problems were the only significant predictor when all CASS:L problem scales were examined simultaneously for the full sample and in a separate analysis for those with ADHD only. However, this relationship disappeared when participants with no ADHD symptoms were analysed separately, which the authors interpreted as an indication that this construct was not a significant factor in gambling problems.

Anxiety. The association between anxiety and gambling problems was examined in two studies (Dickson et al., 2008; Ste-Marie et al., 2006), with both reporting a positive relationship between trait anxiety and problem gambling status. Although state anxiety was also higher among problem gambling adolescents in one study (Ste-Marie et al., 2006), this relationship was not remain significant when the proportion of problem gamblers in a high state-anxiety group was compared to two other groups comprising medium and low state-anxiety students. In addition, no differences were found by problem gambling status on one of the included anxiety measures (BASC – BAS), which the authors attributed to methodological considerations, such as item content, psychometric limitations, and response biases, rather than a true null finding (Ste-Marie et al., 2006).

Discussion

The current study represents the first attempt to systematically review the methodologically sound literature on psychosocial characteristics associated with significant gambling problems among high school students. Unlike previous reviews, this systematic review used replicable procedures to collate all available evidence, used an explicitly defined problem gambling criterion based on the use of standard instruments, employed an inclusion criteria that required standard measures of psychosocial characteristics, and focussed on a specific population. Overall, 19 studies met inclusion criteria, although only 12 studies

included variables that were the subject of at least two studies. Using the domains from a biopsychosocial model to organise findings (Casey et al., 2011), associations were found between problem gambling and temperament/personality (impulsivity and risk propensity), cognitive characteristics (less effective coping strategies), family environment (family problems), externalising problems (symptoms of ADHD, substance use, delinquency), and internalising problems (emotional problems and anxiety).

The current review found two characteristics in regard to temperament and personality to be associated with problem gambling. The association between impulsivity and gambling behaviour is consistent with a number of other findings in regard to other risky behaviours in adolescence, such as risky sexual behaviour (Cooper et al., 2000; Zietsch, Verweij, Bailey, Wright, & Martin, 2010), current substance use (e.g., Butler & Montgomery, 2004; Cooper et al., 2000; Krank et al., 2011; Mason et al., 2011; Solowij et al., 2012), and antisocial behaviour (Mason et al., 2011; Mishra et al., 2011). It is also consistent with findings in regard to adult problem gambling where elevated scores on measures of impulsivity have been found (e.g., Blaszczynski, Steel, & McConaghy, 1997; Lorains, Stout, Bradshaw, Dowling, & Enticott, 2014). This link may reflect a neurobiological vulnerability, such that those with a high sensitivity to reward may engage in high risk activities such as gambling to regulate dopaminergic functioning (Dussault et al., 2011; Moodie & Finnigan, 2006). In addition, the tendency for impulsive individuals to act without thinking of the consequences may place them at risk for continued gambling despite negative outcomes, a central feature of gambling problems as opposed to participation (APA, 2013; Dussault et al., 2001; Moodie & Finnigan, 2006).

Given that gambling is an inherently risky activity, it is perhaps unsurprising an association between risk propensity and problem gambling was found; however, there are

numerous possible explanatory mechanisms for this link. For example, it has been suggested that gambling behaviour may represent an attempt to regulate arousal levels (Wood et al., 2004), or provide a means of achieving valued outcomes on the basis of the perceived benefits of gambling (Dickson et al., 2008). It may also be that high risk individuals are more likely to form peer groups that normalise and encourage risk taking behaviour, which in turn increases the risk of developing problems with gambling (Beauvais, Chavez, Oetting, Deffenbacher, & Cornell, 1996; Evans, 2003; Oetting & Beauvais, 1990). In addition, while engaging in gambling may be just another behavioural expression of a high-risk temperament, how this trait may place someone at risk of developing gambling problems as distinct from non-harmful participation is yet to be articulated. A likely explanation, however, is that increased participation is itself a risk factor for developing gambling problems in adolescence as has been found in adults (Kessler et al., 2008). Moreover, because the studies which included risk taking did not also include impulsivity, the relative influence of these characteristics was not able to be ascertained by the current review.

Two measurement issues in regard to the construct of impulsivity are worth noting. Firstly, both of the included studies employed a five-item impulsivity scale derived from a longer measure (the EIS; Eysenck & Eysenck, 1977). Given the multidimensional nature of the construct of impulsivity (Evenden, 1999; Lorains et al., 2014), it remains unclear which particular facets of this characteristic are most associated with adolescent problem gambling. For instance, although impulsivity is considered a core feature of problem gambling in adults, differences have been found amongst self-report and laboratory-based measures. In a study of treatment-seeking adult problem gamblers, Lorains and colleagues (2014) found that while self-reported impulsivity was higher amongst problem gamblers than controls, there was no clear evidence of diminished performance on inhibitory control tasks. In addition, self-reported rates of impulsivity were not related to inhibitory task performance. Given this,

future research utilising multidimensional measures of impulsivity could provide important and useful information about the relationship between impulsivity and gambling problems in adolescence. Secondly, no information was provided about which EIS subscale the impulsivity items were taken from. Because the EIS (Eysenck & Eysenck, 1977) includes risk-taking as one of the four factors of impulsivity, possible confounding effects exist, whereby it is possible that the associations found between impulsivity and problem gambling are more reflective of a generally risky temperament.

From the cognitive domain, the current results suggest that having less effective coping strategies may place adolescents at risk for gambling problems. It may be that gambling serves as a way to cope with distress in the absence of more effective strategies or that gambling problems prevent the development of more adaptive strategies (Gupta et al., 2004). These findings are consistent with the adult literature that suggests that problem gamblers often report motivations related to emotion regulation and escape from aversive emotional states (Francis, Dowling, Jackson, Christensen, & Wardle, 2014). From this perspective, gambling behaviour can be viewed as a maladaptive coping strategy in itself, which mediates the relationship found between emotional distress and gambling problems. However, although coping skill deficits may be present in adolescent problem gamblers, these deficits cannot, in and of themselves, explain why some youth engage in gambling while others do not. It may be that maladaptive coping potentially moderates or exacerbates the association between emotional distress and problem gambling.

In relation to the family environment domain, current findings suggest that family problems are associated with problem gambling in high school students. This is consistent with previous findings that family conflict and antisocial behaviour within the family during adolescence predict problem gambling in young adulthood (Scholes-Balog, Hemphill, Dowling, & Toumbourou, 2014). Neither study included in the current review provided an

explanatory mechanism for this association. It may be that this relationship is moderated by other factors, such as coping strategies. For instance, adolescents who have adaptive coping skills may not engage in gambling in an effort to relieve distress associated with family issues. Alternatively, youth with gambling problems may cause family issues to arise due to family member responses to this behaviour and its associated problems (Dowling et al., 2014). Poor parental relationships may also be implicated in a failure to intervene in youth gambling activity at an early stage prior to the development of more serious problems.

Consistent with previous findings that a range of risky behaviours co-occur in adolescence (e.g., Calvert, et al., 2010; Donovan & Jessor, 1985; Donovan, Jessor, & Costa, 1988), a number of externalising problems appear related to problem gambling, including substance use, delinquency, and ADHD symptoms. Consistent with problem behaviour theory (Jessor & Jessor, 1977), substance use and delinquency can be viewed as part of a syndrome of risky behaviours that co-occur in adolescence. From this perspective, gambling behaviour is another part of this syndrome (Evans, 2003; Jackson et al., 2008). From another perspective, findings from this domain, along with impulsivity, risk taking propensity and family problems provide some support for the Pathways Model (see Gupta, Nower, Derevensky, Blaszczyński, Faregh, & Temcheff, 2013; Nower & Blaszczyński, 2002; Nower & Blaszczyński, 2004), which has been described in relation to adolescence (Nower & Blaszczyński, 2004) and empirically supported in adolescent samples (Gupta et al., 2013). This model posits that one of the pathways to the development of gambling problems is the ‘anti-social impulsivist’ or ‘biologically-based’ pathway, which is characterised by youth who are typically impulsive, have a need for excitement and engage in a range of antisocial behaviours. Moreover, a recent empirical study identified a subset of adolescent gamblers that could be characterised as antisocial and impulsive individuals, who also reported family discord (Gupta et al., 2013). Although in the current review, ADHD symptoms were

associated with problem gambling, the extent to which inattention and hyperactivity are related to gambling problems as distinct from impulsivity is unclear in the absence of studies designed to separate these constructs or test for potential mediation effects.

An association between problem gambling and internalising problems was found in the current review. Consistent with explanations of gambling as a maladaptive coping response (Francis et al., 2014), it may be that youth with more emotional distress are more likely to participate in gambling to relieve this distress, in turn increasing the risk of developing gambling problems. Alternatively, it may be that youth with gambling problems develop emotional distress as a consequence of their gambling. In either case, the association between these constructs is consistent with criteria for gambling disorder, which explicitly refers to gambling when feeling distressed (APA, 2013). Purported explanations for the association between anxiety and problem gambling include the moderating effect of trait anxiety on other risk and protective factors, and the role of anxiety in inhibiting general preventive health behaviours (Dickson et al., 2008). It has also been suggested that gambling may function as a means of coping with daily stresses and anxiety provoking situations (Ste-Marie et al., 2006). In addition, state anxiety may serve as a proximal marker for risky gambling activity, while trait anxiety may reflect a general risk factor that indirectly influences the risk for gambling problems. Further research is needed to understand how these types of anxiety may impact on youth gambling problems, although anxiety management in general appears to be a potential target for prevention and intervention efforts.

Overall, findings of the current systematic review suggest that a number of personal, environmental and behavioural characteristics across a range of biopsychosocial domains are associated with problem gambling among high school students. Some of the associated psychological characteristics reported in a previous systematic review (Blinn-Pike et al., 2010) were supported, such as risk-taking, substance abuse, anxiety, coping, delinquency,

and family problems. However, the current review did not find evidence for the relationship between problem gambling and other psychosocial constructs identified in this previous review (Blinn-Pike et al., 2010), such as low self-esteem, depression, dissociation, excitability, extroversion, conformity, self-discipline, crime, and academic performance. While this in itself does not indicate a lack of association between these other characteristics and problem gambling in youth, it does suggest that evidence for the constructs identified in the current study, which employed stringent inclusion criteria, is more robust. It should also be noted however, that this may reflect the focus of the current review on high school students, rather than adolescents in general. Even with the strict inclusion criteria, 46 separate constructs were identified from 19 studies. The current study therefore reveals the heterogeneity of characteristics that have been examined in relation to problem gambling among high school students. Given this diversity, it is perhaps not surprising that there was minimal consistency among variables, with only 11 constructs being the focus of at least 2 studies. However, from a total of 186 full-text records, the fact that only 12 studies used standard scoring of a gambling instrument along with the use of a standard measure for other variables, and could be compared to at least one other study that examined the same construct was illuminating. Moreover, only 2 constructs were explored in three studies, and only one was the subject of five studies.

Clinical implications for practice and research

The findings of the current systematic review suggest that gambling problems in high school students are associated with a number of other behavioural and emotional difficulties. Gambling problems therefore represent a significant issue of clinical relevance, however due to the lack of obvious external signs, such difficulties may not be as apparent as some other problematic behaviours (Evans, 2003; Lesieur & Klein, 1987). Adolescent school students who are anxious, impulsive risk takers who are engaging in substance use and other

problematic behaviours in the context of family and emotional problems, and who lack adaptive coping strategies appear at greatest risk. This is generally consistent with the profile of adolescent problem gamblers in treatment (Gupta & Derevensky, 2000). Given the potential negative consequences, clinicians, educators, and others involved in the care of young people in school contexts should be prepared to ask directly about gambling behaviour and gambling problems, even in situations where this may not be the presenting issue.

In terms of prevention and intervention programs, the current results provide further support for arguments that teaching effective coping strategies in treating problem gambling among youth should be an important feature of harm reduction initiatives (Nower & Blaszczynski, 2004). Several authors have incorporated the teaching of these skills into both individual treatment (e.g., Gupta & Derevensky, 2000) and school-based prevention (e.g., Gaboury & Ladouceur, 1993; Turner et al, 2008) programs. Based on current findings, a number of stressors, including family issues, emotional problems, and anxiety may place adolescents at risk for gambling problems in the absence of more adaptive coping strategies. However, while approaches to intervention also incorporate a number of target variables not captured in the current review (e.g., gambling-related cognitive distortions; problem solving), there appears to be less focus on addressing the potential for impulsivity to increase the risk of gambling problems. Results from the current study suggest that the development of consequential thinking and strategies for managing urges to gamble may be useful additions to intervention, particularly given the potential for impulsivity to interfere with the capacity to apply other strategies (Sharpe & Tarrier, 1993). There may also be a role for pharmacological treatments, particularly where impulsivity and ADHD are present, with some support being found for the efficacy of psychostimulant medications (such as bupropion) for adults with co-morbid ADHD and problem gambling (Black et al., 2007). In addition, medication management has been identified as an important feature of treatment for adolescents from the anti-social impulsivist (biologically-based) pathway (Gupta et al., 2013;

Nower & Blaszczynski, 2002; Nower & Blaszczynski, 2004).

Limitations and future research directions

Based on the findings of the current review, a number of limitations regarding the literature in relation to adolescent problem gambling are apparent. It is clear that in the absence of a 'gold standard' measure, a wide variety of measures and scoring rules are used to classify problem gamblers (Boudreau & Poulin, 2007; Poulin, 2002). Optimally, as argued by Fisher (2000), the development of an accepted and reliable common measure for youth problem gambling would provide a consistent basis for comparisons across studies. In the absence of such a measure, future research may benefit from using standard scoring rules in order to enable direct comparisons; however, this may not always be possible where only a small number of participants score highly enough to enable sufficient sample sizes for statistical analyses.

The use of non-standard measures of psychosocial constructs was also apparent. While this is sometimes a function of the variable being studied (e.g., understanding of randomness), it appears that single-item or non-validated measures are selected to balance brevity with data maximisation in school-based studies in other cases (e.g., a single item asking about anxiety and depression; e.g., Gerdner & Svensson, 2003). However, some caution should be exercised in interpreting these findings, particularly when the construct parallels a diagnosable psychiatric disorder.

Despite the large range of psychosocial characteristics subject to empirical study, it appears that many of the relationships between these characteristics and gambling behaviour have not been the subject of replication. The current results indicated that a large number of variables were the subject of single studies. To address this, future research may seek to include measures of similar constructs in order to increase the robustness of findings. In addition, the use of explicit theory to guide research and to aid in interpreting results and generating explanatory mechanisms for relationships would be beneficial.

Apart from limited longitudinal findings in regard to impulsivity, the current review was unable to draw conclusions in regard to the causal or temporal relationship between a number of these psychosocial characteristics and problem gambling amongst high school students. The use of longitudinal, prospective designs and statistical techniques that go beyond bivariate associations, such as structural equation modelling, would also be useful to assist in better understanding how variables interact and influence each other and problem gambling. Given that a number of characteristics were associated with problem gambling status at a bivariate level, but not significant in predictive equations, future research should employ statistical techniques that can identify mediation and moderation effects in order to better understand the relative influence of these variables on problem gambling.

Finally, there is a relative paucity of literature exploring those factors which may ameliorate the risk of adolescent problem gambling (e.g., Dickson et al., 2008; Scholes-Balog et al., 2014). Given the potential for such factors to minimise the harms related to problem gambling, future research that can improve the understanding of these factors, beyond adaptive coping, could be important for intervention and prevention efforts.

By addressing some of these limitations, it may be possible to generate a number of robust findings which could then be analysed in future systematic reviews using meta-analytical techniques. Unfortunately, measurement issues and a lack of sufficient studies to generate necessary coefficients precluded the use of such techniques in the current review. However, such a comprehensive quantitative analysis would be of great utility in identifying the most salient characteristics associated with problem gambling in high school populations. Overall, while balancing brevity with data maximisation is an important consideration in high school studies, future research may benefit from including a smaller number of theoretically driven variables, measured using psychometrically sound instruments, in order to replicate previous findings.

Finally, the current review is not without its own limitations. Due to the strict

inclusion criteria employed, the current study only focussed on a limited number of variables, meaning that data in relation to other constructs of potential interest was not included.

Further, few studies assessing each characteristic were identified, meaning the conclusions that can be drawn remain somewhat limited. In addition, by only capturing samples that met cut-off scores for problem gambling, data relating to ‘at-risk’ or other sub-threshold gambling groups were not included. As some have argued, these groups may not be dissimilar from problem gambling groups (e.g., Derevensky et al., 2007; Dickson et al., 2008; van Hamel et al., 2007), and a future review incorporating both samples could be informative.

Although the current study focused on high school samples in order to identify potential intervention with this population, the review did not include other adolescent samples for whom different results may have been found (e.g., those with more severe psychosocial difficulties). Generalizability was also limited by the narrow range of jurisdictions represented, with many of the studies coming from similar regions of Canada. It is therefore possible that different characteristics may be associated with problem gambling in high school students from other geographical locations, and that consistent findings across studies reflect similarities in the populations studied. Finally, although the current study purposely focused on reviewing published empirical studies, a future review that more broadly incorporates the full knowledge base, including other sources (e.g., government reports, grey literature), could be useful in order to improve the breadth of studies for inclusion, and may provide sufficient data to perform a meta-analysis.

Conclusion

Adolescent problem gambling has emerged as a significant area of research interest, and this behaviour has been associated with a number of potential harms. While research aiming to identify characteristics associated with this behaviour has become prevalent in the

literature, much remains to be learnt about the relationships between these variables, and which represent the most effective targets for school-based intervention programs. The current review found evidence for a range of characteristics across numerous domains, however findings were limited by the low weight of available evidence. As the field continues to grow, research utilising robust measures and advanced statistical methods may provide additional evidence about which characteristics not only place adolescent students at risk for gambling problems, but also which may serve to protect them against this risk.

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Chapter 4

Risk and Protective Factors Associated With Adolescent Problem

Gambling

Introduction to Article Two

Article one reviewed the psychosocial characteristics associated with problem gambling among high school students. Following on from this, Article two addresses a second key aim of the current thesis, by empirically examining a number of psychosocial characteristics in a contemporary sample of Australian high school students. This article involves the secondary analysis of data derived for a larger study on the familial transmission of gambling problems. It explores some factors that are traditionally considered risk factors for the development of adolescent gambling problems and extends the research by exploring the role of several proposed protective factors, including the potentially moderating effect of female gender against the influence of identified putative risk and protective factors. It also includes a multivariate analysis of these characteristics in order to better understand which are uniquely predictive of problem gambling status.

Declaration for Thesis Chapter 4

Declaration by candidate

In the case of Chapter 4, the nature and extent of my contribution to the work was the following:

Nature of contribution	Extent of contribution (%)
Formulation of research questions Preparation of secondary data file for analyses Data analysis Preparation of manuscript for publication	75%

The following co-authors contributed to the work. If co-authors are students at Monash University, the extent of their contribution in percentage terms must be stated:

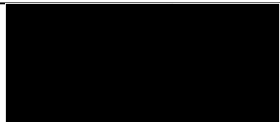
Name	Nature of contribution	Extent of contribution (%) for student co-authors only
A/Prof Nicki Dowling	Primary supervisor; overseeing all phases of the study; assistance with data analysis; assistance with preparation of manuscript for publication	N/A
A/Prof Penelope Hasking	Assistance with data analysis; assistance with preparation of manuscript for publication	N/A
Prof Murat Yücel	Assistance with preparation of manuscript for publication	N/A
Prof Alun Jackson	Assistance with preparation of manuscript for publication	N/A

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

**Candidate's
Signature**

	Date 10/9/2014
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**Main
Supervisor's
Signature**

	Date 10/9/2014
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*Note: Where the responsible author is not the candidate's main supervisor, the main supervisor should consult with the responsible author to agree on the respective contributions of the authors.

Risk and Protective Factors Associated With Adolescent Problem Gambling

Ramsay W Dixon¹, Nicki A Dowling^{*2,4,5}, Penelope Hasking³, Murat Yücel¹, & Alun C Jackson⁴

¹ Monash Clinical and Imaging Neuroscience (MCIN) Laboratory, School of Psychological Sciences, Monash University, Melbourne, Australia

² School of Psychology, Deakin University, Melbourne, Australia

³ School of Psychology and Speech Pathology, Curtin University, Australia

⁴ Melbourne Graduate School of Education, University of Melbourne, Australia

⁵ School of Psychological Sciences, Monash University, Melbourne, Australia

* Corresponding author:

School of Psychology, Faculty of Health

Deakin University

Burwood, VIC, 3125

Australia

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[REDACTED]

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Abstract

Using a biopsychosocial conceptual model, the aim of the current study was to expand the extant literature examining the demographic and psychosocial characteristics associated with adolescent problem gambling to include both putative risk and protective factors and explore the extent to which gender moderated the relationships between these characteristics and gambling problems in high school students. Participants ($N = 612$, 240 males, 371 females, 1 unreported) recruited from 17 secondary schools across Victoria, Australia, completed a self-report questionnaire. Problem gambling status was predicted by the proposed risk factors of younger age of onset, perceived paternal problem gambling, perceived paternal problem drinking, inconsistent discipline, number of gambling friends, positive gambling attitudes, non-productive coping, stressful life events, smoking, and marijuana and other drug use. However, none of the proposed protective factors (female gender, positive parenting, parental involvement, problem focused coping, coping through reference to others, and life satisfaction) were significantly associated with problem gambling status. An unexpected finding was that female gender moderated the relationship between perceived paternal problem drinking and problem gambling status, such that this variable was predictive of problem gambling only for females. Although further research using larger samples is required to validate the current findings, results from the current study have implications for identification and intervention targets for risky gambling behaviour in high school students.

Key Words: Problem gambling, Adolescent, Risk factors, Protective factors

As a result of the various negative impacts on adolescent functioning and inflated rates when compared to adults, adolescent problem gambling has emerged as a significant area of research interest (Chalmers & Willoughby, 2006; Gupta & Derevensky, 2000; Messerlian, Derevensky, & Gupta, 2005; Shaffer & Hall, 1996; Valentine, 2008). Problem gambling can be conceptualised as existing on a continuum ranging from short-term, moderate problems at one end, to chronic and severe behaviour at the other (Abbott, 2001; Productivity Commission, 1999, 2010). In this framework, the term ‘problem gambling’ refers to the entire spectrum of negative gambling impacts, including but not limited to the most serious gambling behaviour. Problem gambling behaviour has been characterised as that which leads to difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others or for the community (Neal, Delfabbro, & O’Neil, 2005). Those meeting criteria for the most severe problems are currently captured by the Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition; *DSM-5*: American Psychiatric Association [APA], 2013) under the diagnosis of Gambling Disorder (formerly pathological gambling). These criteria apply equally to both adults and adolescents.

Among adolescents, several studies have found high rates of both lifetime (e.g., National Research Council, 1999) and past year (e.g., Moore & Ohtsuka, 2000) participation, with median rates of over 80% being reported (National Research Council, 1999). Moreover, a large meta-analytic study found rates of adolescent problem gambling between 14% and 22% when ‘at-risk’ and ‘serious problem/pathological’ gambler categories were combined (Shaffer & Hall, 1996). These rates indicate that a significant number of young people may be at risk of suffering from the negative sequelae of adolescent problem gambling, which can affect interpersonal, familial, economic, psychological and legal domains (e.g., Blinn-Pike, Worthy, & Jonkman, 2010; Dixon, Dowling, & Hasking, 2014; Ellenbogen, Gupta, & Derevensky, 2007; Jacobs, 2000). Research is therefore required to identify potential factors

that may increase or ameliorate the risk of developing such difficulties (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004).

From a prevention science framework, risk factors are those variables associated with higher levels of severity, earlier onset and longer duration of symptoms (Coie et al., 1993). While it has been argued the term ‘protective factors’ should be reserved only for variables which directly interact with risk factors to reduce dysfunctional behaviour (see Dickson, Derevensky, & Gupta, 2008), the term is frequently used more broadly within the gambling literature to refer to factors which lessen dysfunction, irrespective of the presence of an interaction with an identified risk factor. This broader application of the term is consistent with a prevention sciences perspective that argues that protective factors may decrease symptoms directly, interact with a risk factor to buffer its effects on symptoms, disrupt the mediational chain through which a risk factor operates to cause the symptoms, or prevent the initial occurrence of a risk factor (Coie et al., 1993). Research that can contribute to the identification of both risk and protective factors is an important part of the current research agenda for problem gambling in youth.

Reflecting the breadth of this research, a recent systematic review of the psychosocial characteristics associated with problem gambling among high school students found that 46 separate characteristics across numerous psychosocial domains were examined across 19 included studies (Dixon et al., submitted). To better organise potential risk and protective factors, Casey and colleagues (2011) adapted a biopsychosocial model of drug use (Edwards et al., 1981) to adolescent problem gambling. This model contains a number of higher order domains, under which proposed risk and protective factors are grouped, including demographic, biological, family history, cognitive, family environment, extra-familial, and stressor domains. The model hypothesises that these factors exert an influence on gambling participation, which in turn leads to greater risk for developing gambling problems.

Consistent with both the general deviance theory of Jessor (1987) and the general addictions theory of Jacobs (1986), internalising and externalising problems are grouped with gambling problems as shared outcomes of the influence of the risk and protective factors (Casey et al., 2011). Although this model has not yet been empirically tested in relation to problem gambling, it provides a useful conceptual framework within which to organise the putative risk and protective factors derived from previous literature.

Demographic characteristics

The literature investigating the degree to which demographic factors are associated with adolescent problem gambling has tended to focus predominantly on the effects of gender and age. The vast majority of findings indicate that gambling problems are more common among male adolescents compared to their female counterparts (e.g., Adlaf & Ialomiteanu, 2000; Chalmers & Willoughby, 2006; Derevensky, Pratt, Hardoon, & Gupta, 2007; Jackson, Dowling, Thomas, Bond, & Patton, 2008; Jacobs, 2000; Lesieur & Klein, 1987; Nower, Derevensky, & Gupta, 2004; Stinchfield, 2000; Welte, Barnes, Tidwell, & Hoffman, 2008). In a recent study of young adult problem gambling that included a number of risk and protective factors measured in adolescence, female gender was found to be a protective factor against the risk of problem gambling (Scholes-Balog, Hemphill, Dowling, & Toumbourou, 2014). Findings in regard to age are less clear. While some studies have found that problem gambling increases with age (e.g., Dickson et al., 2003), others have found no differences (e.g., Adlaf & Ialomiteanu, 2000) or that gambling problems decrease as a function of age (Forrest & McHale, 2012). Earlier age of gambling onset has also been found to be associated with an increased risk for the development of gambling problems (Gerdner & Svensson, 2003; Shead, Derevensky, & Gupta, 2010). Moreover, there is also some evidence that adolescents from ethnic minority backgrounds are over-represented as problem gamblers

(Delfabbro et al. 2005; Langhinrichsen-Rohling, Rhode, Seeley, & Rohling, 2004; Stinchfield 2000).

Family history

The family history domain refers to factors present in the family of origin, which may impact on the gambling behaviour of children (Casey et al., 2011). Although there are some exceptions (e.g., Chiu & Woo, 2012), a large number of studies have found support for the notion that gambling behaviour and problem gambling among family members is associated with a greater frequency of adolescent gambling problems (e.g., Delfabbro, Lahn, & Grabosky, 2005; Govoni, Rupcich, & Frisch, 1996; Magoon & Ingersoll, 2006; McComb & Sabiston, 2010). There is also evidence that this association may be more pronounced in relation to paternal gambling problems. For instance, one study found that paternal problem gambling scores contributed significantly more to offspring problem gambling scores than maternal problem gambling scores (Oei & Raylu, 2004). Another study, using structural equation modelling, found that although the gambling frequency and problems of both parents were associated with adolescent gambling frequency, only severity of paternal gambling problems was related to adolescent gambling problems (Vachon, Vitaro, Wanner, & Tremblay, 2004). The authors of this study posited that parental gambling may impact on children's attitudes and beliefs about gambling, in addition to modelling of gambling behaviour. The lack of a similar finding in relation to maternal problem gambling was attributed to the limited variance of gambling problems among mothers in the study sample. A meta-analysis of 19 family and twin studies on gambling and problem gambling revealed that paternal gambling raised the risk for the development of gambling problems more than maternal gambling (Walters, 2001). Parental substance use has also been found to be related to adolescent gambling problems, with problem gambling adolescents more likely to report

having a substance using parent than their non-problem gambling counterparts (Dickson et al., 2008; Gerdner & Svensson, 2003; Hardoon et al., 2004).

Family environment

In a review of family influences on youth gambling, McComb and Sabiston (2010) identified parenting practices as an area of increased interest in the field of adolescent gambling behaviour. As they report, cross-sectional studies have generally found support for the relation between less effective parenting practices and adolescent gambling participation and problems, although there are some contradictory findings. For example, Magoon and Ingersoll (2006) found that adolescent problem gambling was associated with lower levels of parental trust, communication and monitoring. Another study, however, found that although low monitoring was associated with more frequent gambling participation, poor disciplinary practices (and not monitoring) was associated with adolescent gambling problems (Vachon et al., 2004). In contrast, another study found parental monitoring was not related to gambling frequency after controlling for a range of other factors including gender, race, socio-economic status, impulsivity, delinquency, and substance use (Barnes, Welte, Hoffman, & Dintcheff, 1999). Moreover, gender seems to moderate the relationship between parenting practices and adolescent problem gambling, in that low parental monitoring and poor parental relationships predict problem gambling for female adolescents but not for male adolescents (Chalmers & Willoughby, 2006). Overall, it appears that while adaptive parenting may protect against gambling problems in youth, less effective parenting practices may represent a risk factor; however, gender differences may exist and the direction of causation is unclear.

Peer influence

One major influence on adolescent behaviour that exists in the extra-familial environment domain is peer relations. Several studies have consistently found a relationship between excessive gambling or problem gambling status and peer gambling problems (e.g., Hardoon et al., 2004; Ólason, Skarphedinsson, Jonsdottir, Mikaelsson, & Gretarsson, 2006). Dickson and colleagues (2008) found that adolescents who reported having a friend who gambled were four times more likely to report gambling problems, suggesting that having gambling peers is associated with problem gambling in adolescence.

Stressors

The limited research that has examined the links between adolescent problem gambling and stress has typically found higher levels of stress and stressful life events among youth with gambling problems than their non-problem gambling counterparts. In one study, the experience of negative life events increased as a function of gambling problem severity, with problem gambling youth more likely than others to report negative major life events (defined as ‘bad’ events that had at least a moderate effect on their lives; Bergevin, Gupta, Derevensky, & Kaufman, 2006). Similarly, high school students with greater levels of problem gambling severity have been found more likely to have experienced a greater number of stressful life events compared to those with lesser problems (Dickson et al., 2008). In a study of emerging adults (aged 16-24) in Vietnam, levels of perceived stress were higher among those with gambling problems than in non-gamblers (Lostutter et al., 2013). Taken together, these findings suggest that stress is associated with problem gambling.

Cognitive factors

Although coping strategies can be considered to be a behavioural factor, in the biopsychosocial model of Casey and colleagues (2011), these strategies form part of the cognitive domain. It has generally been found that problem gambling adolescents employ less adaptive coping strategies when compared with non-problem gambling peers (Bergevin et al., 2006; Dickson et al., 2008; Gupta, Derevensky, & Marget, 2004; Lostutter et al., 2013; Nower, Derevenksy, & Gupta, 2004; Turner, Macdonald, Bartoshuk, & Zangeneh, 2008). For example, in a study of 2156 students, adolescents with gambling problems were more likely to utilise avoidance-oriented strategies, and less likely to use task-oriented approaches to coping than non-gamblers and social gamblers (Bergevin et al., 2006). Further, male problem gamblers reported the use of more emotion-focused coping strategies than their male non-problem gambling counterparts. In another study, Nower and colleagues (2004) found that non-gamblers were more likely than social, problem or pathological gamblers to utilise active, task-oriented coping. These authors also found that male, but not female, problem gamblers were more likely than non-gamblers or social gamblers to seek emotional outlets or utilise distraction strategies.

A number of researchers have also examined the potential relationship between another cognitive factor, gambling attitudes, and problem gambling status. These studies have consistently found that positive attitudes to gambling are associated with higher rates of gambling problems (e.g., Delfabbro, Lahn, & Grabosky, 2006; Delfabbro, Lambos, King, & Puglies, 2009; Donati, Chiesi, & Primi, 2013; Strong, Daughters, Lejuez, & Breen, 2004). In a study in which 1147 Canadian students were administered seven statements reflecting both favourable (e.g., ‘gambling is a fun activity’) and unfavourable (e.g., ‘gambling should be for adults’) attitudes, problem gamblers were found to hold both more favourable, and less unfavourable, attitudes than social gamblers and non-gamblers (Derevensky, Sklar, Gupta, &

Messerlian, 2010). These findings are consistent with an earlier review of studies in North America, where Jacobs (2000) reported that pro-gambling attitudes are more prevalent among problem gambling youth than non-problem gambling youth. There is also evidence that male adolescents hold more positive attitudes towards gambling than female adolescents (Moore & Ohtsuka, 1997; Jackson et al., 2008; Wood & Griffiths, 1998; Wood, Gupta, Derevensky, & Griffiths, 2004).

Externalising and internalising problems

Consistent findings support a link between substance use and adolescent gambling problems (e.g., Chiu & Woo, 2012; Delfabbro et al., 2006; Fisher, 1993; Hardoon et al., 2004). For example, Gupta and Derevensky (1998) found that compared to youth without gambling problems, problem gambling youth were significantly more likely to engage in regular drug, alcohol and cigarette use. Similarly, Gerdner and Svensson (2003) reported that cigarette smoking and alcohol consumption were significant predictors of youth problem gambling but that alcohol consumption was the strongest predictor. Several systematic reviews have found that adolescent problem gambling is associated with substance use (Blinn-Pike et al., 2010; Dixon et al., submitted). Gender differences have also been found in relation to this relationship. Jackson and colleagues (2008) found that marijuana and alcohol use predicted more frequent gambling participation for males, but not females. The authors of this study suggested these gender differences might be due to the differential influence of risk factors for boys and girls in the genesis of adolescent gambling behaviour.

Internalising problems have also been the subject of several empirical investigations. Findings suggest that adolescents with gambling-related problems, particularly females, report higher rates of mental health issues including anxiety, depression, and suicidal ideation and attempts (e.g., Blinn-Pike et al.; Delfabbro et al., 2006; Dickson et al., 2008; Gupta &

Derevensky, 1998; Jacobs, 2000; Langhinrichsen-Rohling et al., 2004; Nower, Gupta, & Blaszczynski, 2004). Ste-Marie, Gupta, and Derevensky (2002) reported that among 1044 secondary school students in Canada, problem gamblers displayed higher state anxiety, trait anxiety, and social stress than their non-problem gambling counterparts. Similarly, Gupta and Derevensky (1998) found that problem gambling secondary students were more likely to meet the criteria for clinical depression (23%) than regular, occasional, or non-gamblers (10-12%), with female problem gamblers reporting the highest occurrence of depression (58%). More broadly, general life dissatisfaction has also been found to be associated with gambling in young people (Sun & Shek, 2010), possibly due to gambling being used in an attempt to escape negative affective states associated with a lack of life satisfaction (Porter, Ungar, Frisch, & Chopra, 2004).

Aims and hypotheses

Compared to factors that are hypothesised to increase the risk of adolescent problem gambling, there is clearly a relative paucity of literature exploring those factors which may directly ameliorate the risk of adolescent problem gambling or buffer the effects posed by established risk factors (e.g., Dickson et al., 2008; Scholes-Balog et al., 2014). Given the potential for such factors to minimise the harms related to problem gambling, future research that can improve the understanding of these factors is important for intervention and prevention efforts. The aim of the current study was therefore to expand the extant literature examining the demographic and psychosocial characteristics associated with adolescent problem gambling to include both putative risk and protective factors, and to examine these using a contemporary sample of Australian high school students. Specifically, it was hypothesised that gambling problems would be positively associated with several proposed risk factors (older age, non-Australian born status, earlier age of onset, perceived parental problem gambling, perceived parental problem drinking, inconsistent discipline, number of

gambling friends, positive gambling attitudes, non-productive coping, stressful life events, life dissatisfaction, and alcohol and substance use) and negatively associated with several proposed protective factors (female gender, positive parenting, parental involvement, problem focussed coping, and reference to others). In addition, the degree to which gender moderated the relationships between these characteristics and adolescent problem gambling was also explored.

Method

Participants

The sample consisted of 612 students (240 males, 371 females, 1 unreported) aged between 12 and 18 years ($M = 16.0$, $SD = 1.3$, median = 16.0) attending 17 (15 Metropolitan) secondary schools in Victoria, a South Eastern state of Australia. Demographic characteristics of the sample are displayed in Table 1. Almost one quarter of the sample spoke both English and another language at home, and this was similar for males and females. The majority of participants lived with both parents, with approximately one-fifth of the sample reporting living in a single parent home. Participants most commonly reported having one or two siblings. In terms of parental work status, the majority reported that their father was in full time work, while mothers tended to be employed either full time or part-time.

Table 1

Summary of Sample Characteristics

	Total sample (<i>n</i> = 612) ^{a b}	Males (<i>n</i> = 240)	Females (<i>n</i> = 371)
Language spoken at home			
English	424 (69.5%)	163 (67.9%)	260 (70.5%)
Another language	42 (6.9%)	19 (7.9%)	23 (6.2%)
English and another language	144 (23.6%)	58 (24.2%)	86 (23.3 %)
Parents' living situation			
Living together	435 (71.3%)	174 (72.5%)	261 (70.7%)
Separated or divorced	130 (21.3%)	48 (20.0%)	81 (22.0%)
Have never lived together	9 (1.5%)	4 (1.7%)	5 (1.4%)
Something else	36 (5.9%)	14 (5.8%)	22 (6.0%)
Number of siblings			
0	101 (16.6%)	39 (16.3%)	62 (16.8%)
1	252 (41.4%)	96 (40.2%)	155 (42.0%)
2	168 (27.6%)	64 (26.8%)	104 (28.2%)
3	57 (9.4%)	23 (9.6%)	34 (9.2%)
4	12 (2.0%)	5 (2.1%)	7 (1.9%)
5+	19 (3.1%)	12 (5.0%)	7 (1.9%)
Father/male guardian employment status			
Full-time	455 (74.3%)	182 (75.8%)	272 (73.3%)
Part-time	42 (6.9%)	16 (6.7%)	26 (7.0%)
Not working	44 (7.2%)	16 (6.7%)	28 (7.5%)
Retired	30 (4.9%)	11 (4.6%)	19 (5.1%)
Mother/female guardian employment status			
Full-time	274 (45.0%)	106 (44.2%)	168(45.7%)
Part-time	176 (28.9%)	65 (27.1%)	111 (30.2%)
Not working	128 (21.0%)	59 (24.6%)	68 (18.5%)
Retired	18 (3.0%)	5 (2.1%)	13 (3.5%)

^a One participant did not report gender^b Variation in sample size is due to missing data**Measures**

Participants completed a self-report questionnaire containing questions relating to demographic characteristics (age, gender, age of gambling onset), gambling participation, and

problem gambling, as well as measures designed to evaluate relevant variables from several domains from the biopsychosocial model, including family history, family environment, extra-familial environment, cognitive factors, stressors, and externalising and internalising problems (Casey et al., 2011).

Problem gambling. Problem gambling was assessed using the DSM-IV-Multiple Response-Juvenile (DSM-IV-MR-J; Fisher, 2000). Based on criteria from the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition, text revised; APA, 2000), the DSM-IV-MR-J assesses gambling problems in adolescents. It comprises 12 questions assessing nine dimensions of pathological gambling (gambling disorder): preoccupation, tolerance, loss of control, withdrawal, escape, chasing, lies, unsocial/illegal acts, falling out with family/truancy. Example items include, ‘In the past year, how often have you found yourself thinking about gambling’ (*Never; Once or twice; Sometimes; Often*) and ‘In the past year, after losing money gambling, have you returned another day to try and win back money you lost?’ (*Never; Less than half the time; More than half the time; Every time*). To score the instrument, the number of ‘yes’ responses is determined according to a set of criteria as defined by Fisher (2000). These are then totalled, and a cut-off score of four or more is used to indicate problem gambling. Several studies have also employed scores of 2-3 on the DSM-IV-MR-J to indicate ‘at-risk’ gambling behaviour (e.g., Felsher, Derevensky, & Gupta, 2003; Hardoon et al., 2004; Ólason, Sigurdardóttir, & Smári, 2006; Skokauskas, Burba, & Freedman, 2009). The DSM-IV-MR-J has been shown to have adequate construct validity and factor structure and has displayed acceptable internal consistency in previous research ($\alpha = .75$) (Fisher, 2000) and the current study ($\alpha = .78$).

Family history. A single item assessed perceived paternal (father/male guardian) and maternal (mother/female guardian) problem gambling. Based on the definition of Neal and colleagues (2005), participants were asked ‘*Have you ever thought that your [family member]*

had a gambling problem? (This means someone spending too much money or time on gambling which causes problems for themselves or other people)'. The perceived presence of paternal (father/male guardian) and maternal (mother/female guardian) problematic alcohol consumption was assessed using a series of single screening items consistent with the National Health and Medical Research Council (NHMRC) Australian guidelines to reduce health risks from drinking alcohol (Commonwealth of Australia, 2009). Participants were asked, 'Have you ever thought that your [family member] had a drinking problem? (This means regular and repeated drinking that resulted in harm to health and well-being)'. For the purposes of analysis, responses to all the family history items were dichotomously coded on the basis of endorsement of lifetime (i.e., past or current) perceived problems.

Family environment. Parenting styles were assessed using the Positive Parenting (PP), Parental Involvement (INV), and Inconsistent Discipline (ICD) subscales of the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996). The 6-item PP scale assesses the use of positive reinforcement (e.g., '*Your parents/guardians tell you that you are doing a good job*'), the 10-item INV scale measures the perceived degree of parental involvement (e.g., '*Your parents/guardians talk to you about your friends* ') and the 6-item ICD scale evaluates consistency in applying discipline (e.g., '*The punishment your parents/guardians give depends on their mood*') respectively. The items are evaluated on a 5-point response scale from (1) *never* to (5) *always*, and subscale totals are summed such that higher scores indicate more frequent use of the particular parenting style. The subscales have good reliability and validity (Dadds, Maujean, & Fraser, 2003; Shelton, Frick, & Wootton, 1996). Internal consistency coefficients for the current sample for PP, INV and ICD were .90, .90 and .70 respectively.

Extra-familial environment. A single item was employed to evaluate how many friends of the participants gambled. Response options included *None of my friends*; *Some of my friends*; and *Most of my friends*.

Cognitive factors. The Gambling Attitude Scale (GAS; Moore & Ohtsuka, 1997) was used to evaluate attitudes towards gambling. Participants indicated the extent to which they agreed with 12 statements reflecting six positive (e.g., ‘*Gambling is a fun activity*’) and six negative (e.g., ‘*Gambling destroys families*’) attitudes towards gambling. Items are rated using a five-point response scale ranging from (1) *strongly disagree* to (5) *strongly agree*. After reverse scoring some items, a total score is calculated, with higher scores representing more positive attitudes towards gambling. Internal consistency for the GAS has been good ($\alpha = .79$) in previous research (Moore & Ohtsuka, 1997) and in the current study ($\alpha = .84$).

Coping strategies were assessed using the Adolescent Coping Scale – General (Short Form; ACS; Frydenberg & Lewis, 1993). This instrument contains 18 items retained from the original 79-item version, and contains three subscales: Problem Focussed Coping (PFC), Reference to Others (RTO), and Non-Productive Coping (NPC). The 6-item PFC subscale evaluates the use of adaptive strategies that involve attempting to solve the problem whilst remaining physically fit and socially connected (e.g., ‘*Work at solving the problem to the best of my ability*’). The 4-item RTO subscale captures strategies characterised by referring to others in a bid to deal with the concern (e.g., ‘*Talk to other people about my concern to help me sort it out*’). The 8-item NPC subscale evaluates avoidance strategies generally associated with more ineffective coping (e.g., ‘*Wish a miracle would happen*’). The items are rated using a five-point scale ranging from (1) *doesn’t apply to me or don’t do it* to (5) *used a great deal*, and a total score is summed for each subscale, with higher subscale totals indicating more frequent use of a given coping style.

The authors report Cronbach’s alpha reliability coefficients of .66 (PFC), .69 (NPC) and .66 (RTO) (Frydenberg & Lewis, 1993). However, given these were lower in the current sample (.61, .61 and .50 respectively), and correlations were noted between the subscales, the 18-items were subjected to principal components analysis (PCA) to ensure scale integrity. The factorability of the correlation matrix was identified by reference to established tests (i.e.,

Kaiser Meyer-Olkin > .6, [Kaiser, 1970, 1974]; significance of Bartlett's Test of Sphericity [Bartlett, 1954]) and a 3-factor solution consistent with the original structure was found to be acceptable after examination of the scree plot, pattern and structure matrices, and parallel analysis. Given this, all three subscales were retained for the purposes of analysis.

Stressors. Six items from the Adolescent-Family Inventory of Life Events and Changes (A-FILE; McCubbin, Patterson, Bauman, & Harris, 1982) were employed to ascertain if participants had experienced a range of stressful events in the past year. Items asked about parental unemployment, parental separation/divorce, family member serious illness or injury, financial debts due to credit cards or charges, and family member jail, juvenile detention, or court probation. Items employ a dichotomous yes/no response format, with the number of endorsed events summed to produce a total score.

Externalising and internalising problems. Four single items from the Centre for Adolescent Health Gatehouse Project Survey (Bond et al., 2004; Patton et al., 2000) relating to lifetime alcohol (*'How often do you have a drink containing alcohol?'*), cigarette, marijuana and other drug use were employed (*'Have you ever used any of the following drugs?'*). Although the alcohol item was originally answered on a 6-point scale ranging from 'don't drink' to 'every day', scores were dichotomised (yes/no) to reflect lifetime drinking given the very low number of participants endorsing the higher frequency response categories. A single item, also from the Centre for Adolescent Health Gatehouse Project Survey (Bond et al., 2004; Patton et al., 2000), was employed to measure life dissatisfaction. Using a 3-point scale (*Satisfied; Neutral; Dissatisfied*), participants answered the question, *'How satisfied with your life have you been overall?'*

Procedure

This study involves secondary data analysis from a larger study investigating the familial transmission of gambling problems (Dowling, Jackson, Thomas, & Frydenberg,

2010). Ethics approval was obtained from the University of Melbourne Human Research Ethics Committee (No. 0825006), the Monash University Standing Committee on Ethics in Research Involving Humans (No. CF07/1346 – 2007/0363), the Victorian Department of Education and Early Development (No. SOS003985), the Catholic Education Office Melbourne (No. GE0810009), the Catholic Diocese of Ballarat (August 8, 2008), and the Catholic Diocese of Sale (August 12, 2008). Ethics approval was also provided by each participating independent school.

The research procedure involved the administration of a quantitative survey to adolescents (aged 12 to 18 years) sampled from secondary schools (Years 8 to 12) in both metropolitan and regional areas of Victoria, Australia. In Australia, the legal gambling age is fixed nationwide, whereby all participants in licensed gambling activities must be at least 18 years of age. The difficulty in regulating gambling over the internet or as a private activity among friends and family, however, has increased the availability and accessibility of gambling for adolescents. Data for this study were collected from November 2008 to October 2009. Of the 119 schools contacted, 17 agreed to participate. In Victoria, schools generally fall into two major categories. Those run by the State government are open to all students and do not require payment of fees to attend, while Independent schools are privately run and attendance involves payment of fees. The participating schools included 14 government schools (including one community school specifically catering for students who have had difficulty at larger schools, and one long distance education school where students do not attend but study via correspondence), and three independent schools (two female-only and one male-only school). Each metropolitan region and two regional areas were represented by at least one school.

School principals were contacted via telephone and provided with a letter of request. Principals who displayed interest in the study were provided with copies of a detailed information statement, the survey, the relevant ethics approval letter, the parent and student

plain language statements and consent forms. A follow-up telephone call was placed to each school within one week of initial contact. When a school agreed to participate in the study, a member of the research team provided a full explanation of the research project (including potential risks associated with participation and information about referral to appropriate services should they be required) to the school's principal or nominee. The researchers negotiated with each school individually regarding their preferred administration of the questionnaire.

Consent forms and plain language statements describing the purpose of the study were distributed to parents via school administration departments. All students who received parental permission were also given information about the project and were required to provide verbal assent in order to participate. Administration of the survey was organised during the school day, at a time that was most convenient to the participating school. Surveys were administered using standard (i.e., hard copy; $n = 448$) and online versions ($n = 164$) according to the preference of the participating school. Regardless of format, each survey was identical in content. Participants were informed that their participation was voluntary, that their responses were anonymous, and that they were free to withdraw during the data collection procedure. Students were advised to cease completing the survey if they became distressed, and that they could be referred to the school counsellor or other appropriate support if necessary. Participants required approximately 20 minutes to complete the survey, and received a movie ticket upon completion as compensation for their time.

Data analysis

Initial screening revealed that less than 5% of data from the major study variables were missing, apparently at random, and this was therefore not considered a threat to data integrity (Tabachnick & Fidell, 2007). Respondents completing less than 70% of any scale or subscale were excluded from analysis associated with that scale or subscale using pair-wise deletion. Estimation Maximisation methods (Tabachnick & Fidell, 2007) were used to impute

missing data for cases with less than 30% missing data on individual scales or subscales. Two values on the Gambling Attitudes Scale were identified as univariate outliers, and these scores were replaced with the next extreme value for that variable (Tabachnick & Fidell, 2007). A number of extreme outliers were identified in the DSM-IV-MR-J scale. Extreme values that did not represent a response error were retained due to an expected uneven distribution of scores in a problem gambling screen. No other univariate and bivariate outliers were evident in scatterplots of independent and dependent variables. Normality testing revealed that several variables (DSM-IV-MR-J, GAS, ACS, and APQ) were significantly skewed, although this was expected given the nature of the constructs being investigated. Because transformations (square root and logarithm) failed to significantly improve the normality of the DSM-IV-MR-J distribution, logistic regression analyses were employed as they do not require normally distributed dependent data (Tabachnick & Fidell, 2007).

As an initial step, prevalence estimates were calculated for each of the gambling categories on the basis DSM-IV-MR-J scores. Consistent with the continuum framework, those who were either 'at-risk' (scores 2-3) or 'problem' (scores 4+) were combined into a single 'problem gambling' group, and compared with non-gamblers and non-problem gamblers combined ('non-problem gamblers'). This was also desirable in order to enable statistical comparisons due to the low numbers endorsing four or more symptoms ($n = 4$). Next, a series of logistic regression analyses were conducted to examine whether each variable of interest predicted youth problem gambling. Those variables which emerged as significant predictors were then entered into a multivariate logistic regression to see which variables were most salient in predicting problem gambling. To investigate the potential moderating effects of gender on these relationships, a series of hierarchical logistic regression analyses were conducted for each demographic and psychosocial characteristic, regardless of whether or not they displayed a significant relationship with problem gambling status. For each hierarchical logistic regression analysis, the characteristic was entered in the first step,

gender was entered in the second step, and the interaction term between the characteristic and gender was entered in the third step. As commonly recommended, continuous variables were centred prior to these analyses (Aiken & West, 1991; Tabachnick & Fidell, 2007). For those relationships that were significantly moderated by gender, simple slopes analyses (Aiken & West, 1991) were conducted to facilitate interpretation, and follow up logistic regressions for males and females separately were also performed.

Results

Overall, 67.5% (398) of the sample had gambled in the past year, with similar percentages reported amongst males (68.0%) and females (67.5%). The most common gambling activities were instant scratch tickets/lotteries (47.4%), private card games (49.8%), and off-course horse or dog racing (20.6%). Using the DSM-IV-MR-J (Fisher, 2000), 95% were classified as non- problem gamblers (scores of 0), 4.4% (16 female, 10 male) were classified as at-risk gamblers (scores of 2 or 3), and 0.7% (1 female, 3 male) were classified as problem gamblers (scores of 4 or more).

Results from the first series of bivariate logistic regression analyses examining each of the hypothesised risk and protective factors with problem gambling status (dichotomised) as the dependent variable are shown in Table 3. The table shows that a number of the hypothesised risk factors across demographic (age of gambling onset, Odds Ratio [OR] = 0.88), family history (perceived paternal problem gambling, OR = 5.33; perceived paternal drinking problem, OR = 4.64), family environment (inconsistent discipline, OR = 1.14), extra-familial environment (number of gambling friends, OR = 1.01), cognitive (gambling attitudes, OR = 1.15; non- productive coping, OR = 1.10), stressors (number of stressful life events, OR = 1.85), and externalising problems (lifetime cigarette, OR = 3.04; marijuana, OR = 4.46; and other drug use, OR = 5.65) domains were significantly predictive of problem gambling. Table 3 also shows that there was no significant relationship between

any of the putative protective factors (female gender, positive parenting, parental involvement, problem focussed coping, reference to others, and life satisfaction) and problem gambling. In addition, other hypothesised risk factors such as age, Australian born status, perceived maternal problem gambling, perceived maternal problem drinking, reference to others, lifetime alcohol use and life dissatisfaction were not predictive of problem gambling status.

Table 3

Logistic Regression Analyses Predicting Problem Gambling Status

Domain	Variable	<i>B</i>	S.E.	Wald	Odds ratio	95% Confidence interval		<i>p</i> -value
						Lower limit	Upper limit	
Demographics	Age	< 0.001	0.14	<.001	1.00	0.76	1.33	0.10
	Gender (female)	0.19	0.38	0.24	1.20	0.57	2.53	0.63
	Australian born	-0.36	0.45	0.65	0.70	0.29	1.67	0.42
	Gambling age of onset	-0.13	0.06	5.06	0.88	0.79	0.98	0.02
Family history	Maternal problem gambling	< 0.01	0.01	0.01	1.00	0.98	1.02	0.91
	Paternal problem gambling	1.67	0.47	12.63	5.33	2.12	13.40	< 0.001
	Maternal problem drinking	<.001	0.10	< 0.01	1.00	0.98	1.02	0.97
	Paternal problem drinking	1.54	0.40	14.55	4.64	2.11	10.21	< 0.001
Family environment	Positive parenting	< - 0.01	0.01	0.09	0.10	0.97	1.02	0.77
	Parental involvement	- 0.01	0.01	0.50	0.99	0.98	1.01	0.48
	Inconsistent discipline	0.13	0.04	9.96	1.14	1.05	1.23	< 0.01
Extra-familial environment	Number gambling friends	0.01	0.01	4.45	1.01	1.00	1.02	0.04
Cognitive Factors	Gambling attitudes	0.14	0.03	21.61	1.15	1.08	1.21	< 0.001
	Problem focussed coping	0.01	0.04	0.03	1.01	0.94	1.08	0.86
	Reference to others	0.09	0.05	2.66	1.09	0.98	1.22	0.10
	Non-productive coping	0.09	0.03	12.87	1.10	1.04	1.16	< 0.001
Stressors	Stressful life events	0.62	0.14	20.43	1.85	1.42	2.42	< 0.001
Externalising and internalising problems	Cigarette use (lifetime)	1.11	0.38	8.65	3.04	1.45	6.37	0.003
	Alcohol use	0.56	0.40	2.01	1.76	0.81	3.82	0.16
	Marijuana use	1.50	0.39	14.91	4.46	2.09	9.52	< 0.001
	Other drug use	1.73	0.43	16.14	5.65	2.43	13.14	< 0.001
	Life satisfaction	- 0.45	0.29	2.52	0.64	0.36	1.11	0.64

Note. Significant results are in **bold**. Odds ratio greater than 1 indicates that those with higher levels of the independent variable indicate higher odds of being a problem gambler.

From these analyses, all variables that had a significant relationship with problem gambling were entered into a multivariate logistic regression model to determine which constructs continued to predict problem gambling while accounting for the effects of all other variables. One variable (age of onset) was not included as it was only answered by participants who had gambled. The results from this analysis are displayed in Table 4. Overall, the model was significant, [χ^2 (10, $N = 365$) = 70.97, $p < 0.001$], and explained between 17.7% (Cox & Snell R^2) and 44.9% (Nagelkerke R^2) of the variance in problem gambling status. From the whole sample, the model correctly categorised 94.5% of cases. Specifically, 99.1% of non-problem gambling cases were correctly classified, compared to 32% of the problem gambling cases. Controlling for other predictors, problem gambling status was independently predicted by perceived paternal problem gambling (OR = 4.60), perceived paternal problem drinking (OR = 3.51), number of gambling friends (OR = 3.19), stressful life events (OR = 1.71), and gambling attitudes (OR = 1.17). The three strongest predictors were perceived paternal problem gambling, perceived paternal problem drinking and number of gambling friends. As can be seen in Table 4, inconsistent discipline, non-productive coping, marijuana use, and other drug use failed to remain significant in the multivariate model.

Table 4

Multivariate Logistic Regression Analysis of Significant Predictors From Univariate Logistic Regression Analyses

Domain	Variable	B	S.E.	Wald	Odds ratio	95% Confidence interval		p-value
						Lower limit	Upper limit	
Family history	Paternal problem gambling	1.53	0.67	5.19	4.60	1.24	17.09	0.02
	Paternal alcohol	1.26	0.61	4.18	3.51	1.05	11.68	0.04
Family environment	Inconsistent discipline	0.05	0.06	0.67	1.05	0.93	1.19	0.41
Extra-familial environment	Number gambling friends	1.16	0.48	5.90	3.19	1.25	8.15	0.02
Cognitive Factors	Non-productive Coping	0.07	0.04	2.60	1.07	0.99	1.15	0.11
	Gambling attitudes	0.16	0.04	12.86	1.17	1.07	1.27	< 0.001
Stressors	Stressful life events	0.54	0.21	6.25	1.71	1.12	2.60	0.01
Externalising and internalising problems	Cigarette use (lifetime)	-0.35	0.62	0.32	0.70	0.21	2.39	0.57
	Marijuana use (lifetime)	-0.16	0.66	0.06	0.85	0.23	3.12	0.81
	Other (lifetime)	0.85	0.75	1.27	2.34	0.53	10.25	0.26

Note. Significant results are in **bold**. Odds ratio greater than 1 indicates that those with higher levels of the independent variable indicate higher odds of being a problem gambler.

To examine the potential moderating effects of gender on the relationship between the demographic and psychosocial characteristics and problem gambling status, a series of hierarchical logistic regression analyses were conducted (Table 5). Significant interaction terms were found for perceived paternal alcohol problems ($B = -2.41$, $OR = 0.09$, 95% CI 0.01 – 0.92, $p < .05$), positive parenting ($B = 0.19$, $OR = 1.20$, 95% CI 1.05 – 1.38, $p < .01$), and parental involvement ($B = 0.13$, $OR = 1.14$, 95% CI 1.04 – 1.24, $p < .01$).

Table 5

Results From the Moderated Logistic Regression (Interaction Terms Only)

Domain	Variable	B	S.E.	Wald	Odds ratio	95% Confidence interval		p-value
						Lower limit	Upper limit	
Demographics	Age	0.50	0.30	2.86	1.65	0.92	2.93	0.09
	Age of onset	0.08	0.11	0.55	1.09	0.87	1.36	0.46
	Australian born	0.30	0.90	0.11	1.35	0.23	7.89	0.74
Family History	Paternal PG	-1.96	1.22	2.57	0.14	0.01	1.55	0.11
	Paternal alcohol	-2.41	1.19	4.12	0.09	0.01	0.92	0.04
Family environment	Positive Parenting	0.19	0.07	7.14	1.20	1.05	1.38	0.008
	Parental Involvement	0.13	0.05	7.85	1.14	1.04	1.24	0.005
	Inconsistent discipline	-0.10	0.08	1.55	0.90	0.77	1.06	0.21
Extra-familial environment	Number gambling friends	0.61	0.76	0.64	1.84	0.41	8.17	0.42
Cognitive Factors	Gambling attitudes	0.05	0.06	0.59	1.05	0.93	1.18	0.44
	Problem Focussed Coping	0.03	0.07	0.22	1.04	0.90	1.20	0.64
	Reference to Others	0.10	0.11	0.90	1.11	0.90	1.37	0.34
		-0.10	0.05	3.24	0.91	0.82	1.01	0.07

	Non-Productive Coping							
Stressors	Stressful life events	-0.51	0.31	2.72	0.60	0.33	1.10	0.10
Externalising and internalising problems	Cigarette use (lifetime)	-0.84	0.79	1.13	0.43	0.09	2.03	0.29
	Alcohol use (lifetime)	0.29	0.81	0.13	1.34	0.28	6.51	0.72
	Marijuana use (lifetime)	-0.69	0.79	0.76	0.50	0.11	2.35	0.38
	Other (lifetime)	0.33	0.87	0.14	1.39	0.25	7.67	0.71
	Life satisfaction	0.92	0.63	2.14	2.51	0.73	8.61	0.14

Note. Significant results are in **bold**. Odds ratio greater than 1 indicates that those with higher levels of the independent variable indicate higher odds of being a problem gambler. PG = Problem gambling. Two variables (maternal problem gambling and maternal problem drinking) could not be included in the regression analysis due to low expected cell counts.

Figures 1 to 3 graphically depict each of these significant interactions. As can be seen in Figure 1, the perception of a paternal drinking problem was associated with an increased probability of problem gambling. However, simple slopes analysis found that the relationship between perceived paternal problem drinking and problem gambling was significant only for females, and a follow up logistic regression for males and females separately confirmed this (female, $B = 2.29$, $OR = 9.87$, 95% $CI\ 3.57 - 27.29$, $p < .001$; $n = 357$).

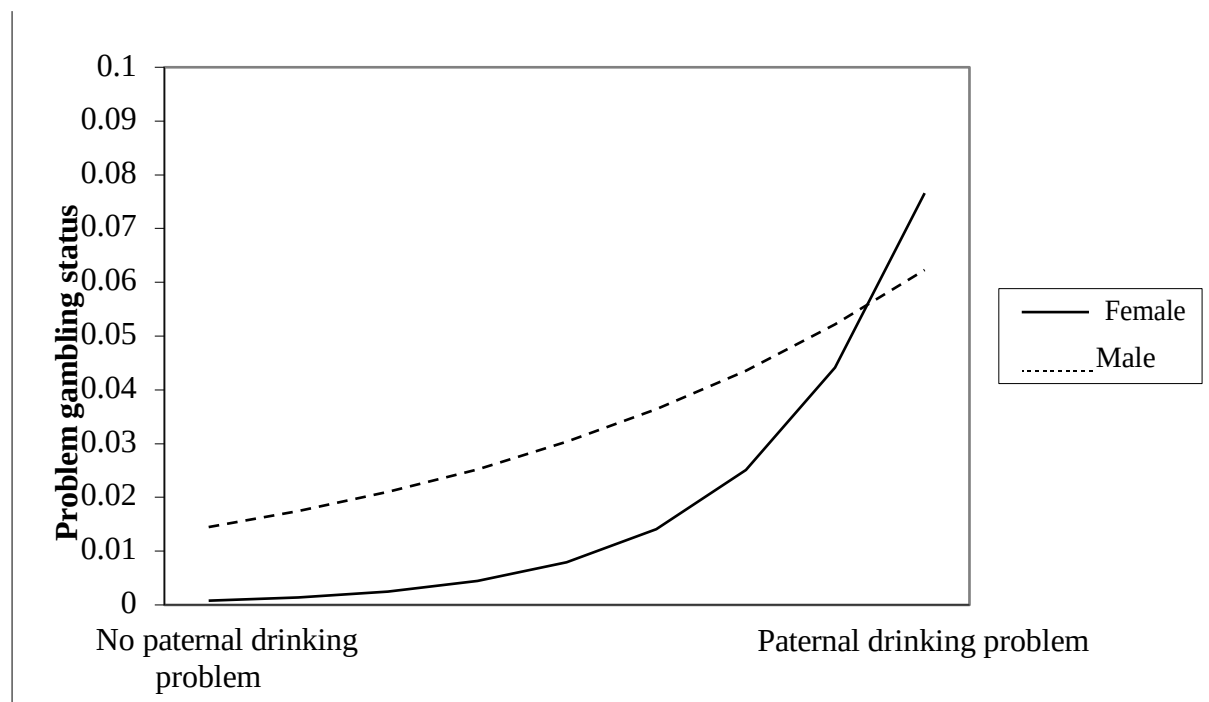


Figure 1. Interaction between perceived paternal drinking problem and gender for the prediction of problem gambling.

Although positive parenting and parental involvement were not independently related to problem gambling, significant interactions were found between these variables and gender in predicting problem gambling status (see Figures 2& 3). Specifically, simple slopes analysis found that the relationships between positive parenting, parental involvement and problem gambling were significant only for females, for whom both positive parenting and parental

involvement mitigated against probability of problem gambling. Follow up logistic regression for males and females separately confirmed this (female, positive parenting: $B = -0.13$, OR = 0.88, 95% CI 0.80 – 0.95, $p < .01$; $n = 361$; female, parental involvement: $B = -0.11$, OR = 0.89, 95% CI 0.84 – 0.95, $p < .01$; $n = 360$).

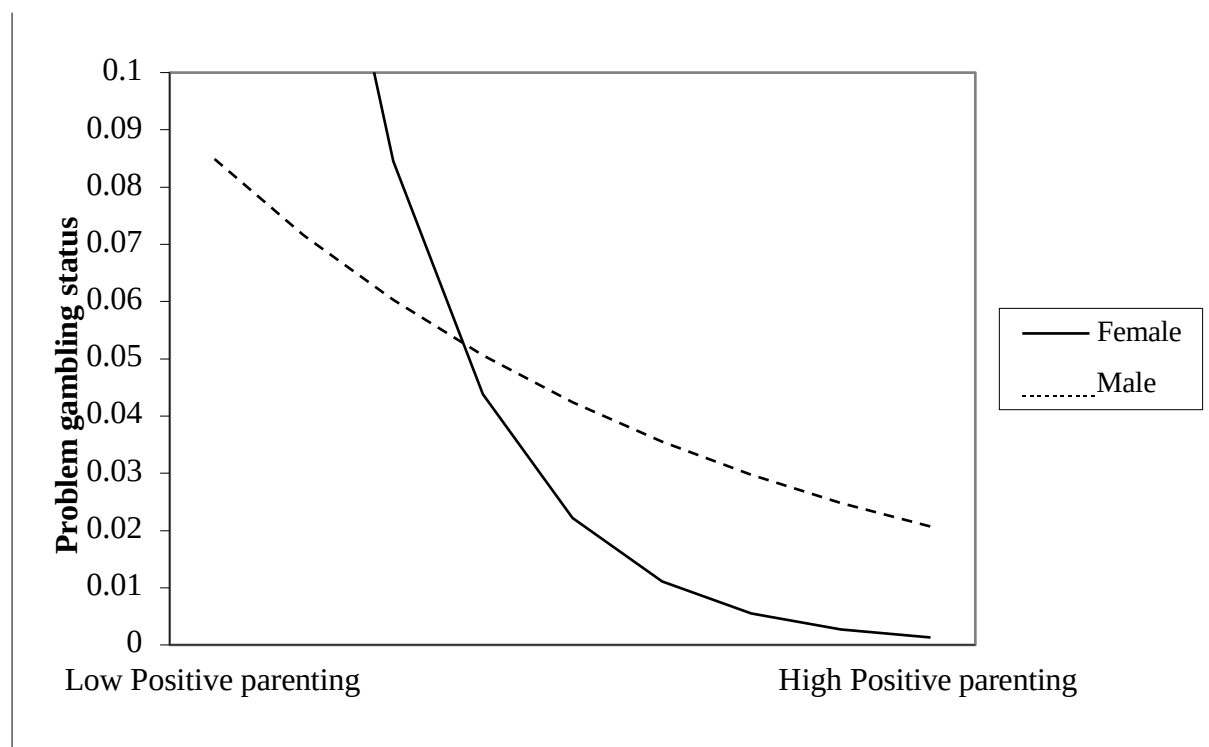


Figure 2. Interaction between perceived level of positive parenting and gender for the prediction of problem gambling.

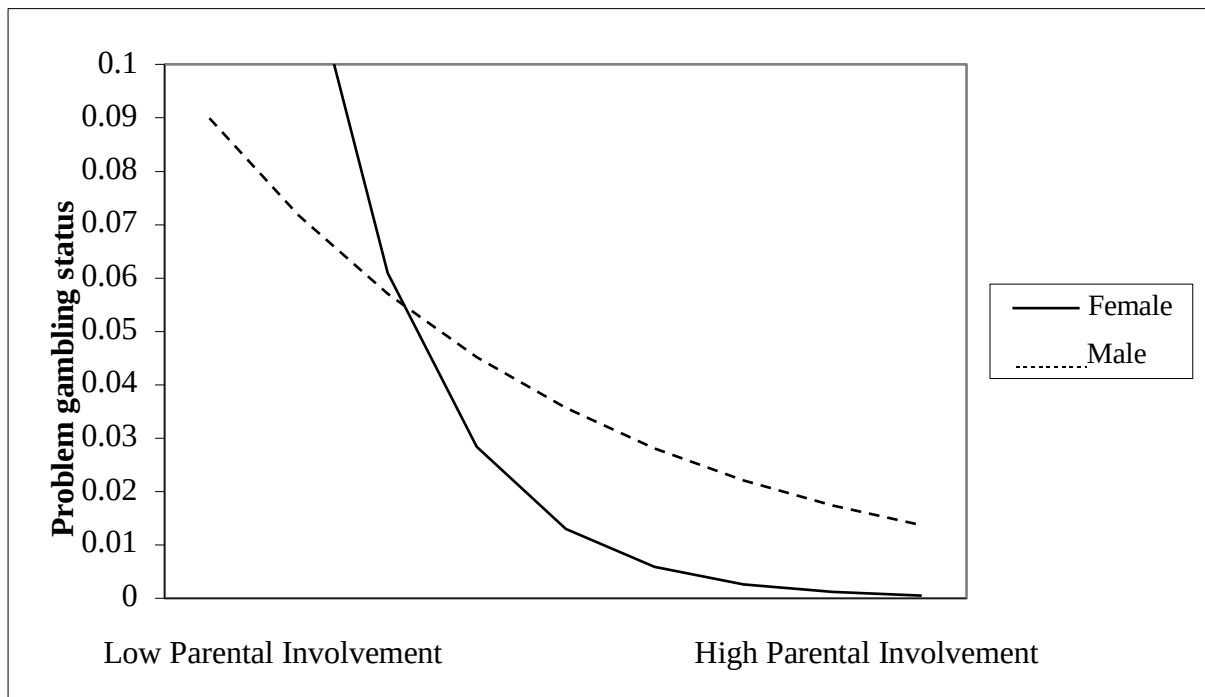


Figure 3. Interaction between perceived level of parental involvement and gender for the prediction of problem gambling.

Discussion

The current study investigated a number of suggested risk and protective factors for problem gambling among a sample of Australian high school students. Findings showed that when considered separately, a wide range of predictors from a variety of domains grouped conceptually using a biopsychosocial model were predictive of problem gambling. These included perceived paternal problem gambling, perceived paternal drinking problems, inconsistent discipline, number of gambling friends, gambling attitudes, non-productive coping, number of stressful life events, and lifetime cigarette, marijuana and other drug use. In contrast, none of the protective factors (female gender, positive parenting, parental involvement, problem-focussed coping) were associated with problem gambling status. When entered into a multivariate model, characteristics uniquely associated with problem gambling included those from the family history (perceived paternal problem gambling, perceived paternal drinking problem), extra-familial environment (number of gambling friends), cognitive (gambling attitudes) and stressors (stressful life events) domains. In addition, an interaction between gender and perceived paternal alcohol use was found, such that having a father with a perceived drinking problem increased the probability of problem gambling status for female, but not male, adolescents. Finally, interactions between positive parenting and parental involvement indicated that adaptive parenting practices may be more relevant to the gambling status of females than males.

The finding that paternal, but not maternal, problem gambling was predictive of problem gambling is consistent with prior research which has found a similar relationship (e.g., Oei & Raylu; Vachon et al., 2004; Walters. 2000). This finding is partially consistent with that of Hardoon and colleagues (2004), who found that problem gambling youth (not

separated by gender) were significantly more likely to report having a father or step-father with a substance use problem, but this relationship was not significant in relation to maternal figures. Although other studies have found parental substance use to be more prevalent among adolescent problem gamblers, the parental gender differences found in the current study either were not found (e.g., Dickson et al., 2008) or parental use was not separated into paternal or maternal use (e.g., Gerdner & Svensson, 2003). The finding that perceived paternal gambling problems predicted gambling status equally for male and female adolescents is inconsistent with findings from a meta-analysis which suggested that paternal gambling has a more pronounced effect on male children, which the author suggested may be due to modelling effects or sex-linked genetic factors (Walters, 2000). Alternatively, given there were no significant differences in the number of males and females with gambling problems in the current study, it may be that meta-analytical findings were influenced by base rate differences in the included studies which accounted for the father-son effect (Walters, 2000).

The current study found that the only risk factor moderated by the influence of gender was the perception of a paternal drinking problem. In contrast to expectations, the current results showed that although this variable was a unique predictor of problem gambling, this was only true for female adolescents, indicating that female students who perceived their father had a drinking problem were at greater risk for gambling problems than males. In general, it appears little is known about the possible link between adolescent problem gambling in the daughters of fathers with an alcohol problem. Similarly to findings in relation to problem gambling which have found stronger associations among sons of problem gambling fathers, it may be that problem drinking affects father-daughter dyads in a way that uniquely increases vulnerability to gambling problems. Alternatively, it may be that female adolescents experience paternal problem drinking as more disruptive than male adolescents, which drives them to spend more time gambling to cope with this stress or to spend time with

problem gambling peers in order avoid the impact of their father's alcohol use. The finding that a significantly greater proportion of females ($n = 54$) than males ($n = 19$) reported paternal problem drinking could also suggest that female adolescents are more sensitive to perceiving paternal drinking as problematic; however, in the absence of collateral assessment of parental alcohol consumption, the current study could not test this possibility. Given that the strength of this effect was weak, replication is required to further understanding in regard to this potentially important relationship.

The importance of peer gambling was underscored by the finding that for each additional gambling friend, the odds of being classified as a problem gambler increased by a factor of 3 (Table 4). This is consistent with the current hypothesis, and a number of previous findings (e.g., Hardoon et al., 2004; Ólason et al., 2006), particularly those of Dickson and colleagues (2008) who reported a factor of four in a similar analysis. It may be that youth with gambling problems have more gambling peers because they seek out those with similar interests to their own (Beauvais et al., 1996; Evans, 2003; Hardoon et al., 2004; Oetting & Beauvais, 1990). This explanation is consistent with practice-based evidence reported by Gupta and Derevensky (2000), who report that adolescent problem gamblers in treatment report moving away from pro-social peers towards gambling associates as their gambling problems developed. Of course, it may also be that gambling problems develop in the context of a normative social milieu, or that some youth are more vulnerable to the influence of gambling friends, or that peer pressure is a precipitant for engaging in gambling behaviour (Hardoon et al, 2004). Such pressure may be more common among those who gamble with their friends. These mechanisms are not mutually exclusive, and may co-occur in the same individual. In either case, the current results indicate that the social environment is an important influence on adolescent gambling problems in both males and females, at least for those in high school settings. The finding that the association between gambling problems and number of gambling peers was not moderated by gender is in contrast to some previous

findings. For instance, Chalmers and Willoughby (2006) found that female involvement in gambling was more susceptible to influence from peers than was the case for males. However, the peer-related variables in that study did not include gambling behaviour.

As predicted, and consistent with past research (e.g., Delfabbro et al., 2006; Derevensky et al., 2010), gambling attitudes were a unique predictor of problem gambling status. What is less clear from the current findings is what differentiates those who participate in gambling activity due to holding positive attitudes towards it, from those with similar attitudes for whom gambling becomes a problem, beyond the risk of increased gambling frequency itself. In addition, the direction of this relationship remains unclear. It may be that gambling behaviour can influence attitudes; for instance, an adolescent who has an early big win may be more likely to view gambling as a positive past-time or a good way to make money. Future research may be needed to help further understand what factors may be involved in this distinction, and how attitudes interact with other variables to influence gambling participation and the development of problem gambling.

The hypothesis that more stressful life events would be associated with a greater likelihood of gambling problems was also supported, and is consistent with the limited research in this regard (e.g., Bergevin et al., 2006; Dickson, 2008; Lostutter et al., 2010). Such a finding provides indirect support for the notion that gambling may serve as a coping mechanism for dealing with stressful events (Bergevin et al., 2006). This may be particularly true for those lacking in more adaptive coping strategies, although the current study did not find any significant predictors among the coping variables in the multivariate model. Due its cross-sectional nature, the current study also cannot exclude the possibility that rather than being a consequence, gambling problems may increase the probability of experiencing stressful life events. It is also unclear from the current findings whether the life stress items employed in this study reflect difficulties arising from paternal pathology. For instance, items from the A-FILE include emotional problems among family members and financial

problems, potentially indicating that life stress is a mediational variable between the paternal pathology indicators and youth problem gambling. Alternatively, the uniquely predictive nature of life stressors indicates that this particular set of stressors had an influence on gambling problems over and above those related to paternal pathology (e.g., maternal emotional problems). Although the possible interactions between paternal pathology and stressful life events were not the focus of the current study, future research may explore the mediational links between these variables.

Findings in regard to positive parenting and parental involvement revealed a similar pattern in that these parenting styles were associated with a lower risk of gambling problems for female students, but not males. In addition, at high levels of positive parenting and involvement, female adolescent gambling problems appeared to be almost non-existent; however, the same was not true for males. These findings suggest that parenting may be of particular importance for female gambling behaviour, and are consistent with the findings of Chalmers and Willoughby (2006), who found that parental monitoring was a predictor of gambling problems for female, but not male adolescents. However, it should be noted that the strength of these effects was weak, with only small changes in the probability of increased gambling problems being found.

The finding that a number of the significant variables from the initial analyses were no longer predictive of problem gambling when entered into a multivariate model suggests the association between these factors and gambling status may be explained by their shared variance. For instance, a possible interpretation of the finding that inconsistent discipline was no longer significant in the multivariate model is that this style of parenting may be the result of paternal drinking problems or gambling problems. Similarly, drug use may have failed to remain significant because it may tap into more of a general deviance of which gambling forms a part (e.g., Jessor, 1977). In addition, non-productive coping may be a symptom of high levels of life stressors, such that the coping style itself is not related to problem

gambling, but those under stress use this style more in an attempt to cope with stressful events or the family impacts of paternal gambling and drinking problems. This is consistent with findings suggesting that co-morbid parental problems lead to greater adjustment problems in children of problem gambling parents (Lesieur & Rothschild, 1989)

In addition, the failure of cigarette and drug use to predict gambling status in the multivariate model may suggest that the bivariate relationships found are explained by the association with peers engaging in a range of problem behaviours, of which gambling is one. Peer pressure may be particularly relevant to gambling behavior, especially given the most frequently endorsed activity among problem gamblers in the current sample was private card games, which represent a social form of gambling. In contrast to expectations, alcohol use was not associated with problem gambling status in the current study. Given the large amount of previous research that has found this link, this non-significant finding may reflect the use of a single item measuring lifetime alcohol use. For instance, some previous studies finding this association have used items from a standard measure of alcohol consumption problems (Gerdner & Svensson, 2003), or elicited information pertaining to current alcohol consumption (Gupta & Derevensky, 1998). It therefore may be that alcohol problems or current use may be related more closely to gambling problems than lifetime exposure.

The current study did not find the predicted associations in regard to a number of other variables in the bivariate logistic regression. In regards to age, no association was found which is consistent with some (e.g., Adlaf & Ialomiteanu, 2000), but not other (e.g., Dickson et al., 2008) previous research. Given the mixed findings in this regard, further research may be needed to better explicate the relationship between age and problem gambling. In contrast to previous research, no association was found between gambling problems and Australian born status. It may be that country of birth is not a proxy for ethnic minority status, which other studies have found to be associated with gambling behaviour (e.g., Delfabbro et al. 2005, Stinchfield 2000). The lack of association between the proxy measure for internalising

difficulties suggests that the broad, single item question pertaining to life dissatisfaction may not have tapped into the same constructs as previous research which has used more robust measures (e.g., Sun & Shek, 2010) or more specific questions regarding mental health symptoms (Delfabbro et al., 2006; Dickson et al., 2008; Gupta & Derevenksy, 1998). Future research may benefit from the use of these more robust measures, particularly in regard to internalising disorders beyond general life dissatisfaction (Dixon et al., submitted).

The current study has several important implications for intervention and treatment. The findings suggest that factors across a range of domains exert influence over the likelihood of adolescent high school students developing gambling problems, although future research with larger samples is needed to further explore the mutual interactions and relationships between these factors. Specifically, perceived paternal gambling problems, life stressors, and problem gambling peers represent potential markers for identifying risky gambling behaviour in high school students. Moreover, attitudes supportive of gambling represent a potentially modifiable individual factor, which if changed may lessen the impact of social pressures to participate, reduce the likelihood of progressing from gambling participation to gambling problems, or prevent youth from turning to gambling in order to cope with stress. Finally, perceived paternal problem drinking appears to be a unique risk factor for female adolescent students, and taken together with the interactions between gender, positive parenting, and parental involvement, suggests that the family environment may be of particular importance in relation to female gambling behaviour and problems.

Limitations

Although the current study found evidence for a number of variables predictive of problem gambling, some limitations exist. Despite using the terms risk and protective factors in this study, the cross-sectional nature of the current study precludes inferences regarding directions of causation, which will be important to establish in regards to intervention. For

instance, if fathers turn to drinking in order to cope with offspring who gamble problematically, treating paternal drinking may not lead to a cessation of problem gambling behaviour by the child. Longitudinal research is required to establish true risk and protective factors.

Although the current study included over 600 participants, the overall sample is relatively small compared to other studies of similar populations, and was limited to high school students. Even though the current study combined risk categories in order to facilitate meaningful group comparisons (as in other similar studies), the low number of problem gamblers identified limits the generalizability of the results. Replication of the findings using a larger sample with a greater number of problem gamblers is therefore required to further strengthen their validity.

In addition, it should be noted that although the model predicting problem gambling status was significant (see Table 4), its predictive power was relatively low, as it was only able to correctly classify 32% of problem gamblers as opposed to 99.1% of non-problem gamblers. Therefore, further research that incorporates a range of other factors not included in the current study may further illuminate those characteristics more able to discriminate problem gambling status.

The current study also did not control for potential clustering effects, and so it is possible that the 17 schools included may not be representative of the general population of Australian high school children. In addition, the current study employed some single-item, non-standard measures, and combined participants from different levels of problem gambling severity to allow an adequate sample size for comparison. Such limitations have previously been found to limit the strength and generalisability of results (Dixon et al., submitted). It should also be noted that the parental gambling and alcohol problem variables were based only on the participant's self-reported perceptions. It is possible therefore that the true presence of such problems was inaccurately reported, especially in regards to

problem gambling, which may be difficult to detect. Future studies could address this by including a contemporaneous assessment of family members. Finally, the low reliability of the coping measure may have impacted on the ability for the current study to find statistically meaningful associations in relation to this construct.

Conclusion

The current study suggests that perceived paternal problem gambling, number of gambling friends, gambling attitudes, and stressful life events are predictive of gambling problems in high school students, even when controlling for shared variance among them. In addition, perceived paternal problem drinking was a risk factor for problem gambling for female, but not male, students. It appears that although adaptive parenting was protective for female students, none of the other putative protective factors including female gender and problem focussed coping, were related to problem gambling status, suggesting that more remains to be discovered about factors that protect against the development of problem gambling in high school students. Overall, it therefore appears that problem gambling in the student population is associated with multiple factors, and that some of these relationships may be gender-specific. Further understanding of the nature of these interactions will be important to increase the understanding of gambling problems among adolescent high school populations. Research that utilises multivariate techniques with large numbers of problem gambling participants is required to inform school-based prevention and intervention approaches to ensure these are evidence-based.

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Chapter 5

The Relationship Between Gambling Attitudes, Involvement, and Problems in Adolescence: Examining the Moderating Role of Coping Strategies and Parenting Styles

Introduction to Article Three

Article two presented findings in relation to a number of predictors of problem gambling in high school students, including an exploration of the potential moderating effect of gender. Although several factors were found to be related to an increased risk of problem gambling, it remains unclear how these factors may interact or influence each other in the development of these problems. The negative skewness of the dependent data (DSM-IV-MR-J) was overcome in the previous article by combining gambling groups in order to employ logistic regression analyses, which does not require normally distributed dependent data. Article three extends this work, by simultaneously exploring the relationships between positive gambling attitudes, higher levels of involvement, and gambling problems, with a particular focus on whether coping and parenting are potential moderators of the relationship between gambling involvement and problems. The negative skewness of the dependent distribution was overcome in this study by using a multivariate zero-inflated Poisson regression model, which takes the zero-inflated distribution of the dependent data into consideration. This study has been submitted as a brief report to the *Journal of Research on Adolescence*.

Declaration for Thesis Chapter 5

Declaration by candidate

In the case of Chapter 5, the nature and extent of my contribution to the work was the following:

Nature of contribution	Extent of contribution (%)
Formulation of research questions Preparation of secondary data file for analyses Data analysis Preparation of manuscript for publication	70%

The following co-authors contributed to the work. If co-authors are students at Monash University, the extent of their contribution in percentage terms must be stated:

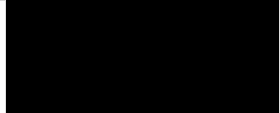
Name	Nature of contribution	Extent of contribution (%) for student co-authors only
A/Prof Nicki Dowling	Primary supervisor; overseeing all phases of the study; assistance with data analysis; assistance with preparation of manuscript for publication	N/A
A/Prof Penelope Hasking	Assistance with preparation of manuscript for publication	N/A
Dr George Youssef	Assistance with data analysis; assistance with preparation of manuscript for publication	N/A
Prof Murat Yücel	Assistance with preparation of manuscript for publication	N/A
Prof Alun Jackson	Assistance with preparation of manuscript for publication	N/A

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

Candidate's Signature

	Date 10/9/2014
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Main Supervisor's Signature

	Date 10/9/2014
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*Note: Where the responsible author is not the candidate's main supervisor, the main supervisor should consult with the responsible author to agree on the respective contributions of the authors.

The Relationship Between Gambling Attitudes, Involvement, and Problems in Adolescence:

Examining the Moderating Role of Coping Strategies and Parenting Styles

Ramsay W Dixon¹, Nicki A Dowling^{*2,4,5}, Penelope Hasking³, George Youssef¹, Murat Yücel¹, & Alun C Jackson⁴

¹ Monash Clinical and Imaging Neuroscience (MCIN) Laboratory, School of Psychological Sciences, Monash University, Melbourne, Australia

² School of Psychology, Deakin University, Melbourne, Australia

³ School of Psychology and Speech Pathology, Curtin University, Australia

⁴ Melbourne Graduate School of Education, University of Melbourne, Australia

⁵ School of Psychological Sciences, Monash University, Melbourne, Australia

* Corresponding author:

School of Psychology, Faculty of Health

Deakin University

Burwood, VIC, 3125

Australia

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[REDACTED]

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Abstract

Several factors have been found to be associated with an increased risk of adolescent problem gambling, including positive gambling attitudes, higher levels of involvement, coping strategies and parenting practices. However, it is less clear how these factors may interact or influence each other in the development of problem gambling behavior in high school-aged adolescents. The aim of the current study was to simultaneously explore these predictors, with a particular focus on the extent to which coping skills and parenting styles may moderate the expected association between gambling involvement and gambling problems. Data from 612 high school participants were analysed using a zero-inflated Poisson (ZIP) regression model, controlling for gender. Results showed that gambling involvement fully mediated the relationship between positive gambling attitudes and gambling problem severity and that more adaptive coping strategies (problem focussed and reference to others) and more consistent parental discipline significantly moderated the relationship between gambling involvement and problem severity, whereby adolescents utilising less effective coping strategies or are subject to inconsistent discipline appear more likely to have gambling problems, even at low levels of involvement. These findings have implications for the development of school-based prevention and intervention efforts for problem gambling in high school populations.

Key Words: Problem gambling, Adolescence, Attitudes, Coping, Parenting, Moderation

Although ostensibly an activity legally restricted to adults in most jurisdictions, median lifetime rates of adolescent involvement in gambling have been found to be as high as 85% (National Research Council, 1999). In addition, prevalence studies have generally found past year participation rates of over 60%, (e.g., Welte, Barnes, Tidwell, & Hoffman, 2008; Wardle et al., 2010), with regular participation having been reported as high as 35% (Rossen, 2001; for a review, see Volberg et al., 2010). Moreover, gambling problems appear to be more prevalent amongst youth when compared to adults, with rates two to four times those of adults (Shaffer & Hall, 1996; Volberg et al., 2010; Wardle et al., 2010). The term ‘problem gambling’ is employed to refer to the entire spectrum of negative gambling impacts, including but not limited to the most severe problems. Given the relatively inflated rates and associated negative consequences, understanding the factors which may be associated with the development or maintenance of gambling problems has implications for prevention and treatment efforts.

One potentially relevant factor that has attracted research interest is that of gambling attitudes. Results from studies have consistently found that positive attitudes towards gambling are associated with higher rates of adolescent gambling participation (Jackson, Dowling, Thomas, Bond, & Patton, 2008; Strong, Daughters, Lejuez, & Breen, 2004; Wood & Griffiths, 2004) and problems (e.g., Delfabbro, Lambos, King, & Pugliese, 2009; Derevensky, Sklar, Gupta, & Messerlian, 2010; Donati, Chiesi, & Primi, 2013). Less is known, however, about the differential influence of attitudes on less problematic patterns of participation as opposed to gambling problems.

A common finding among studies conducted with both adolescent (Chalmers & Willoughby, 2006; Moore & Ohtsuka, 2000) and adult samples (Kessler et al., 2008) is that higher levels of involvement are associated with greater gambling problems. Biopsychosocial models (e.g., Casey et al., 2011) theorise that gambling frequency mediates the link between

risk and protective factors and gambling problems. It is therefore possible that gambling involvement mediates the link between positive gambling attitudes and problem gambling or that the relationship between more frequent involvement and gambling problems is moderated by other relevant factors. However, the explanatory mechanisms of the increased risk of involvement beyond that due to increased exposure to gambling remains unknown. Further research attempting to explain why there is a significant relationship between gambling involvement and problem gambling is required.

One factor with the potential to moderate the relationship between gambling involvement and gambling problems is coping strategies. It has been argued that the availability of effective coping strategies is a key factor that differentiates those who gamble non-problematically from those who have gambling problems (Sharpe & Tarrier, 1993). Research confirms that problem gambling adolescents employ less effective coping skills, such as avoidance-oriented strategies and less task-oriented strategies, than their non-problem gambling peers (Bergevin, Gupta, Derevensky, & Kaufman, 2006; Dickson, Derevensky, & Gupta, 2008; Dixon, Dowling, & Hasking, 2014; Gupta & Derevensky, 1998). Moreover, it has been argued that gambling behaviour is a maladaptive coping response that represents an effort to escape unpleasant emotional experiences (Francis, Dowling, Jackson, Christensen, & Wardle, 2014; Gupta & Derevensky, 2000).

Another variable that may moderate the link between adolescent gambling participation and problems is parenting styles. Although there are some contradictory findings (Barnes, Welte, Hoffman, & Dintcheff, 1999), parenting practices have been identified as an area of increased interest in the field of adolescent gambling behaviour (McComb & Sabaston, 2010). Magoon and Ingersoll (2006) found that problem gambling was associated with lower levels of parental trust, communication and monitoring; however, another study found that although low monitoring was associated with higher gambling frequency, it was poor disciplinary practices that were associated with adolescent gambling

problems (Vachon, Vitaro, Wanner, & Tremblay, 2004).

Aims and Hypotheses

It has been argued that much of the adolescent gambling literature does not take into account the complex relationships between gambling problems and those factors thought to be associated with them (Ariyabuddhiphongs, 2012; Blinn-Pike, Worthy, & Jonkman, 2010; Dixon et al., 2014). Accordingly, the current study aimed to utilise multivariate statistical techniques to examine the relationship between gambling attitudes, involvement, and gambling problems, and to explore the moderating effects of coping strategies and parenting practices on the association between gambling involvement and problems among a contemporary sample of Australian high school students. It was hypothesised that a positive relationship between gambling attitudes and gambling problems would be mediated by gambling involvement, and that adaptive coping and parenting would buffer the link between involvement and problems, and maladaptive coping and parenting would exacerbate the relationship. These hypothesised links are presented in Figure 1.

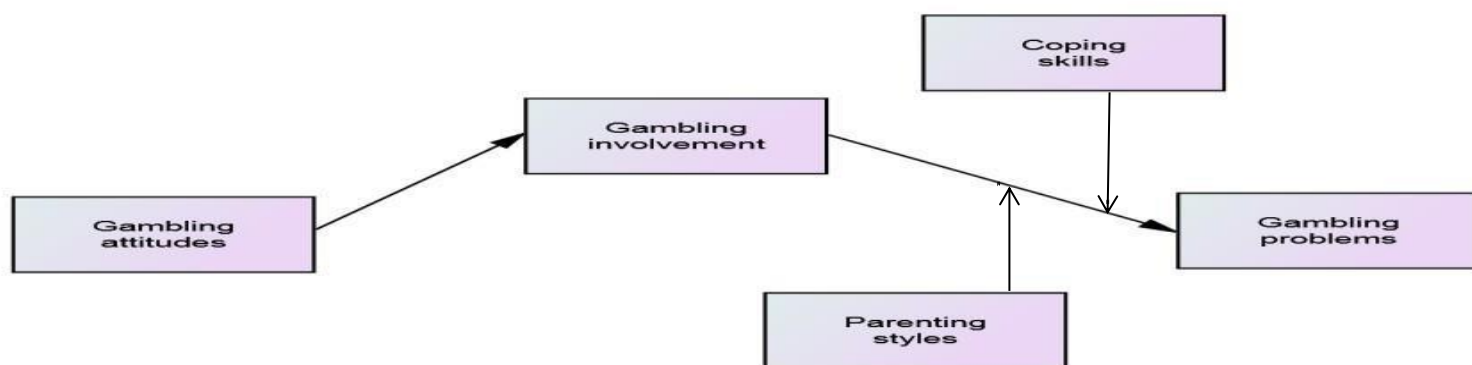


Figure 1. Hypothesised pathways for the relationships between gambling attitudes, gambling involvement, and gambling problems, with coping skills and parenting styles as potential moderators.

Method

Participants

The sample has been described before (see Dixon, Dowling, Hasking, Yücel, & Jackson, 2014), and is presented only briefly here. It consisted of 612 students (240 males, 371 females, 1 unreported) aged between 12 and 18 years ($M = 16.0$, $SD = 1.3$, median = 16.0) attending 17 (15 Metropolitan) secondary schools in Victoria, a South Eastern state of Australia. Almost a quarter of the sample spoke both English and another language at home. The majority of participants lived with both parents and had one or two siblings. The majority reported that their father was in full time work, while mothers tended to be employed either full time or part-time.

Measures

Participants completed a self-report questionnaire measuring demographic characteristics, gambling involvement, problem gambling, gambling attitudes, coping strategies, and parenting styles.

Gambling involvement. Participants were presented with a number of gambling activities and asked to indicate how often they gambled on each with money or possessions during the previous 12 months. Response options were: Never; At least once; Once a month or more often, with each of these responses coded as 0, 1, or 2 respectively. Gambling

activities included: Scratch tickets/lottery; Sports betting (not including horse or dog racing); Off-track horse or dog racing; Horse or dog racing at the racetrack; Table games at the casino; Electronic gaming machines; Internet gambling; Private card games, and; Other. To operationalize the gambling involvement domain of the biopsychosocial model (Casey et al., 2011), a composite index of gambling frequency was calculated by summing the numerical responses to each of the activities, with higher scores indicating a greater level of gambling involvement.

Problem gambling. Problem gambling was assessed using the DSM-IV-Multiple Response-Juvenile (DSM-IV-MR-J; Fisher, 2000). It comprises 12 questions with different response options, which assess nine dimensions of pathological gambling: preoccupation, tolerance, loss of control, withdrawal, escape, chasing, lies, unsocial/illegal acts, falling out with family/truancy. The total number of ‘yes’ responses, determined according to a set of criteria defined by Fisher (2000), is summed. The DSM-IV-MR-J has been shown to have adequate construct validity and factor structure and has displayed acceptable internal consistency ($\alpha = .75$) in previous research (Fisher, 2000) and in the current study ($\alpha = .78$).

Gambling attitudes. The Gambling Attitude Scale (GAS; Moore & Ohtsuka, 1997) was used to evaluate attitudes towards gambling. Participants indicated the extent to which they agreed with 12 statements reflecting six positive and six negative attitudes towards gambling on a five-point response from (1) *strongly disagree* to (5) *strongly agree*. After appropriate score reversals, a total score is calculated, with higher scores representing more positive attitudes towards gambling. Reliability for the GAS is good in previous research ($\alpha = .79$) (Moore & Ohtsuka, 1997) and in the current sample ($\alpha = .84$).

Coping strategies. Coping strategies were assessed using the 18-item Adolescent Coping Scale – General (Short Form; ACS; Frydenberg & Lewis, 1993). This instrument contains three subscales: the 6-item Problem Focussed Coping subscale (the use of adaptive strategies that involve attempting to solve the problem whilst remaining physically fit and

socially connected), the 4-item Reference to Others subscale (referring to others in a bid to deal with the concern), and the 8-item Non-Productive Coping subscale (avoidance strategies generally associated with more ineffective coping). Response options range from 1) *doesn't apply to me or don't do it* to (5) *used a great deal*. Three subscale totals are calculated, with higher totals indicating more frequent use of the particular coping strategy. The authors report Cronbach's alpha reliability coefficients of .66 (PFC), .69 (NPC) and .66 (RTO) (Frydenberg & Lewis, 1993). However, given these were lower in the current sample (.61, .61 and .50 respectively), and correlations were noted between the subscales, the 18-items were subjected to principal components analysis (PCA) to ensure scale integrity. The factorability of the correlation matrix was identified by reference to established tests (i.e., Kaiser Meyer-Olkin > .6, [Kaiser, 1970, 1974]; significance of Bartlett's Test of Sphericity [Bartlett, 1954]) and a 3-factor solution consistent with the original structure was found to be acceptable after examination of the scree plot, pattern and structure matrices, and parallel analysis. All three subscales were therefore retained for the purposes of analysis.

Parenting styles. Parenting styles were assessed using the 6-item Positive Parenting (use of positive reinforcement), the 10-item Parental Involvement (perceived degree of parental involvement), and the 6-item Inconsistent Discipline (consistency in applying discipline) subscales of the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996). The items are evaluated on a 5-point response scale from (1) never to (5) always, and responses to items for each subscale are summed. Higher scores indicate a greater perceived frequency of each particular parenting style. The subscales have good reliability and validity (Dadds, Maujean, & Fraser, 2003; Shelton et al., 1996). Reliability coefficients for the current sample for the Positive Parenting, Parental Involvement, and Inconsistent Discipline subscales were .90, .90 and .70 respectively.

Procedure

This study involved secondary data analysis from a study investigating the familial transmission of gambling problems (Dowling, Jackson, Thomas, & Frydenberg, 2010). Ethics approval was obtained from the University of Melbourne Human Research Ethics Committee (No. 0825006), the Monash University Standing Committee on Ethics in Research Involving Humans (No. CF07/1346 – 2007/0363), the Victorian Department of Education and Early Development (No. SOS003985), the Catholic Education Office Melbourne (No. GE0810009), the Catholic Diocese of Ballarat (August 8, 2008), and the Catholic Diocese of Sale (August 12, 2008). Ethics approval was also individually provided by each participating independent school.

A detailed discussion of the procedure is provided elsewhere (see Dixon et al., submitted). Briefly, between November 2008 and October 2009, a quantitative survey was administered to adolescents (aged 12 to 18 years) sampled from secondary schools (Years 8 to 12) in both metropolitan and regional areas of Victoria, Australia. Each metropolitan region and two regional areas were represented by at least one school. The researchers negotiated with each school individually regarding their preferred administration of the questionnaire. Students who received parental permission were required to provide verbal assent prior to participating. In Australia, the legal gambling age is fixed nationwide, whereby all participants in licensed gambling activities must be at least 18 years of age. The difficulty in regulating gambling over the internet or as a private activity among friends and family, however, has increased the availability and accessibility of gambling for adolescents.

Administration of the survey was organised at a convenient time during the school day. Surveys were administered using standard (i.e., hard copy; $n = 448$) and online versions ($n = 164$). Participants required approximately 20 minutes to complete the survey. A movie ticket was given to participants in compensation for their time.

Data analysis

PASW/SPSS Statistics (Version 17) was used for data preparation and basic descriptive analyses and Mplus (Version 7.2, Muthén & Muthén, 2012) was used to estimate a Zero-inflated Poisson (ZIP) regression model. Data screening revealed two values on the attitudes scale were univariate outliers, and these scores were replaced with the next extreme value for that variable (Tabachnick & Fidell, 2007). Missing data represented less than five percent of the total sample data. For participants with less than 30% missing data on individual scales or subscales, a single imputation approach using the expectation maximisation algorithm in SPSS was employed. Of the remaining dataset, (i.e., those missing more than 30%), data was found to be missing completely at random (MCAR), based on Little's (1988) test [χ^2 (126, $n = 612$) = 147.90 $p = .09$]. As such, the full information-maximum likelihood (FIML) method in Mplus to account for the remaining missingness was used. This method is robust when data is MCAR (Schafer & Graham, 2002).

As the dependent variable (DSM-IV-MR-J score) was a count variable which was highly negatively skewed, with a large majority of zero responses (i.e., no gambling problems), a ZIP regression model was estimated (Lambert, 1992). This method has an advantage over simple transformation of variables when the mean of the data cannot be moved to the centre due to the overdispersion of zero responses, and where the mean is small compared to the variance (Grace-Martin, 2013; Mouatassim & Ezzahid, 2012). As described by Brewer and Kimbro (2014), this model assumes that participants form two latent groups: those who have no probability of experiencing gambling problems, and those who do. The method simultaneously models how the predictor variables influence both outcomes (i.e., having a zero response or having a non-zero response on the gambling measure). It therefore allows for two separate interpretations of the data. Firstly, the direct and indirect effects of predictor variables on endorsing the inflate portion of the model (i.e., having a zero response) allow for conclusions regarding what differentiates those who scored zero (i.e., reported no

gambling problems) from those who did not score zero (i.e., reported at least one gambling problem). Secondly, conclusions can be made as to what impact the predictor variables have on the severity of gambling problems for those who endorsed the count portion of the model (i.e., having a non-zero response) (Grace-Martin, 2013). Mplus employs the Maximum Likelihood- with Robust χ^2 and Standard Errors (MLR) estimator in ZIP models. Montecarlo integration was used to reduce computation time.

Prior to being entered into the model, the variables were centred and interaction terms computed for gambling involvement with the coping and parenting subscales. To examine whether coping styles or parenting practices moderated the relationship between gambling involvement and problems, the three coping subscales, three parenting subscales, and the six interaction terms (coping styles x gambling involvement; parenting styles x gambling involvement) were regressed on the gambling involvement measure. For those relationships that were significantly moderated by gender, simple slopes analyses (Aiken & West, 1991; Preacher, Curran, & Bauer, 2006) were conducted to facilitate interpretation. Due to the statistical modelling used, a mixed-model comparing gender was not possible, and so any potential effects of gender were controlled for by entering it as a covariate in the model.

Results

Overall, 67.5% (398) of the sample had gambled in the past year, with similar percentages reported amongst males (68.0%) and females (67.5%). The most common gambling activities were instant scratch tickets/lotteries (47.4%), private card games (49.8%), and off-course horse or dog racing (20.6%). Using the DSM-IV-MR-J (Fisher, 2000), 95% were classified as non- problem gamblers (scores of 0), 4.4% were classified as at-risk gamblers (scores of 2 or 3), and 0.7% were classified as problem gamblers (scores of 4 or more).

The correlation matrix for the measures (Table 2) reveals that DSM-IV-MR-J problem gambling was significantly and positively correlated with the majority of the other

measures, except for ACS problem focussed coping, APQ positive parenting, and APQ parental involvement. Gambling involvement was positively correlated with GAS gambling attitudes, ACS non-productive coping and APQ inconsistent discipline, and negatively correlated with APQ parental involvement. Table 3 shows the means and standard deviations for the measures in which the low mean score for DSM-IV-MR-J measure is apparent.

Table 2

Correlation Matrix for Measures of Gambling, Gambling Attitudes, Coping Strategies, and Parenting Practices

	1	2	3	4	5	6	7	8	9
1. DSM-IV-MR-J problem gambling	-								
2. Gambling involvement	.44**	-							
3. GAS gambling attitudes	.25**	.37**	-						
4. ACS reference to others	.10*	-.02	-.09*	-					
5. ACS problem focussed coping	.01	.01	-.07	.48**	-				
6. ACS non-productive coping	.15**	.10*	.07	.51**	.35**	-			
7. APQ positive parenting	-.04	-.07	-.18**	.23**	.32**	-.06	-		
8. APQ parental involvement	-.07	-.09*	-.15**	.21**	.31**	-.11**	.75**	-	
9. APQ inconsistent discipline	.17**	.17**	.12**	.21**	.11**	.30**	.09*	.09*	-

* $p < .05$; ** $p < .01$

Table 3

Means and Standard Deviations for All Study Variables

	Mean	Standard deviation
DSM-IV-MR-J problem gambling	0.23	0.68
Gambling involvement	9.78	1.99
GAS gambling attitudes	33.87	7.85
ACS reference to others	9.87	3.35
ACS problem focussed coping	20.68	5.14
ACS non-productive coping	24.23	7.27
APQ positive parenting	20.84	5.55
APQ parental involvement	33.67	8.69
APQ inconsistent discipline	16.49	4.70

Results from the ZIP model regression analysing the relationships between DSM-IV-MR-J problem gambling, gambling involvement and GAS gambling attitudes are presented in Table 4. An examination of Table 4 reveals that no significant relationships were found between the study variables and the inflated portion of the model. In regard to the count portion, both gambling involvement and APQ inconsistent discipline were positively predictive of DSM-IV-MR-J problem gambling ($\beta = 0.58$ and 0.52 respectively). GAS gambling attitudes were also positively predictive of gambling involvement ($\beta = 0.36$). Table 4 also shows that there was a significant indirect effect of GAS gambling attitudes on DSM-IV-MR-J problem gambling via gambling involvement. Significant interaction terms were found for gambling involvement, such that ACS problem focussed coping, ACS reference to others and APQ inconsistent discipline moderated the relationship between gambling involvement and DSM-IV-MR-J problem gambling.

Table 4

Results from Zero Inflated Poisson Regression Analysis For All Study Variables

Specified Paths	B	SE	Lower 95% CI	Upper 95% CI	p	β
Inflated portion						
<i>Direct pathways</i>						
Gambling involvement → DSM-IV-MR-J problem gambling	0.12	0.32	-0.51	0.75	0.71	0.09
GAS gambling attitudes → DSM-IV-MR-J problem gambling	-0.08	0.18	-0.43	0.27	0.65	-0.24
ACS problem focussed coping → DSM-IV-MR-J problem gambling	-0.07	0.10	-0.27	0.13	0.52	-0.13
ACS non-productive coping → DSM-IV-MR-J problem gambling	0.08	0.15	-0.21	0.37	0.59	0.23
ACS reference to others → DSM-IV-MR-J problem gambling	-0.21	0.29	-0.78	0.36	0.46	-0.27
APQ positive parenting → DSM-IV-MR-J problem gambling	0.10	0.30	-0.49	0.69	0.74	0.20
APQ parental involvement → DSM-IV-MR-J problem gambling	-0.07	0.21	-0.48	0.34	0.75	-0.22
APQ inconsistent discipline → DSM-IV-MR-J problem gambling	0.29	0.55	-0.79	1.37	0.60	0.51
Gender → DSM-IV-MR-J problem gambling	0.19	3.76	-7.18	7.56	0.96	0.03
<i>Interaction pathways</i>						
Gambling involvement x ACS problem focussed coping → DSM-IV-MR-J problem gambling	0.06	0.07	-0.08	0.20	0.35	0.26
Gambling involvement x ACS non-productive coping → DSM-IV-MR-J problem gambling	-0.02	0.03	-0.08	0.04	0.50	-0.10
Gambling involvement x ACS reference to others → DSM-IV-MR-J problem gambling	0.07	0.08	-0.09	0.23	0.38	0.16
Gambling involvement x APQ positive parenting → DSM-IV-MR-J problem gambling	-0.06	0.11	-0.28	0.16	0.59	-0.26
Gambling involvement x APQ parental involvement → DSM-IV-MR-J problem gambling	0.04	0.07	-0.10	0.18	0.51	0.31
Gambling involvement x APQ inconsistent discipline → DSM-IV-MR-J problem gambling	-0.03	0.04	-0.11	0.05	0.50	-0.13
<i>Indirect pathway</i>						
GAS gambling attitudes → Gambling involvement → DSM-IV-MR-J problem gambling	0.01	0.03	-0.05	0.07	0.71	NR
Count portion						
<i>Direct pathways</i>						
Gambling involvement → DSM-IV-MR-J problem gambling	0.41	0.07	0.27	0.55	< 0.001	0.58
GAS gambling attitudes → DSM-IV-MR-J problem gambling	0.01	0.03	-0.05	0.07	0.74	0.05
ACS problem focussed coping → DSM-IV-MR-J problem gambling	-0.06	0.03	-0.12	0.00	0.07	-0.22
ACS non-productive coping → DSM-IV-MR-J problem gambling	0.08	0.05	-0.02	0.18	0.11	0.38
ACS reference to others → DSM-IV-MR-J problem gambling	-0.06	0.06	-0.18	0.06	0.34	-0.14
APQ positive parenting → DSM-IV-MR-J problem gambling	0.04	0.07	-0.10	0.18	0.61	0.15

APQ parental involvement → DSM-IV-MR-J problem gambling	-0.02	0.04	-0.10	0.06	0.57	-0.14
APQ inconsistent discipline → DSM-IV-MR-J problem gambling	0.16	0.06	0.04	0.28	0.01	0.52
Gender → DSM-IV-MR-J problem gambling	0.03	1.11	-2.15	2.21	0.98	0.01
<i>Interaction pathways</i>						
Gambling involvement x ACS problem focussed coping → DSM-IV-MR-J problem gambling	0.03	0.01	0.01	0.05	0.01	0.21
Gambling involvement x ACS non-productive coping → DSM-IV-MR-J problem gambling	-0.02	0.01	-0.04	0.00	0.05	-0.16
Gambling involvement x ACS reference to others → DSM-IV-MR-J problem gambling	0.03	0.02	-0.01	0.07	0.03	0.15
Gambling involvement x APQ positive parenting → DSM-IV-MR-J problem gambling	-0.01	0.02	-0.05	0.03	0.55	-0.09
Gambling involvement x APQ parental involvement → DSM-IV-MR-J problem gambling	0.01	0.01	-0.01	0.03	0.61	0.07
Gambling involvement x APQ inconsistent discipline → DSM-IV-MR-J problem gambling	-0.03	0.01	-0.05	-0.01	0.03	-0.23
<i>Indirect pathway</i>						
GAS gambling attitudes → Gambling involvement → DSM-IV-MR-J problem gambling	0.04	0.01	0.02	0.06	< 0.001	NR
Prediction of involvement by attitudes						
GAS gambling attitudes → Gambling involvement	0.09	0.01	0.07	0.11	< 0.001	0.36

Note. NR = not reported; standardised coefficients are not applicable for indirect effects

The standardised results of the interaction analyses are represented diagrammatically in Figures 2 to 4. Overall, a similar pattern was found for each interaction, in that at low levels of gambling involvement, productive-focussed coping, reference to others, and a perception of more consistent parental discipline were associated with lower levels of gambling problems. However, at higher levels of gambling involvement, the relationship between gambling involvement and gambling problems was stronger for each of these factors. Simple slopes analyses indicated that regression slopes were significant at both high and low levels of the three moderators, indicating that there was still a strong relationship between gambling involvement and gambling problems even with the presence of each of the moderators. Results from these analyses are included in the figure captions.

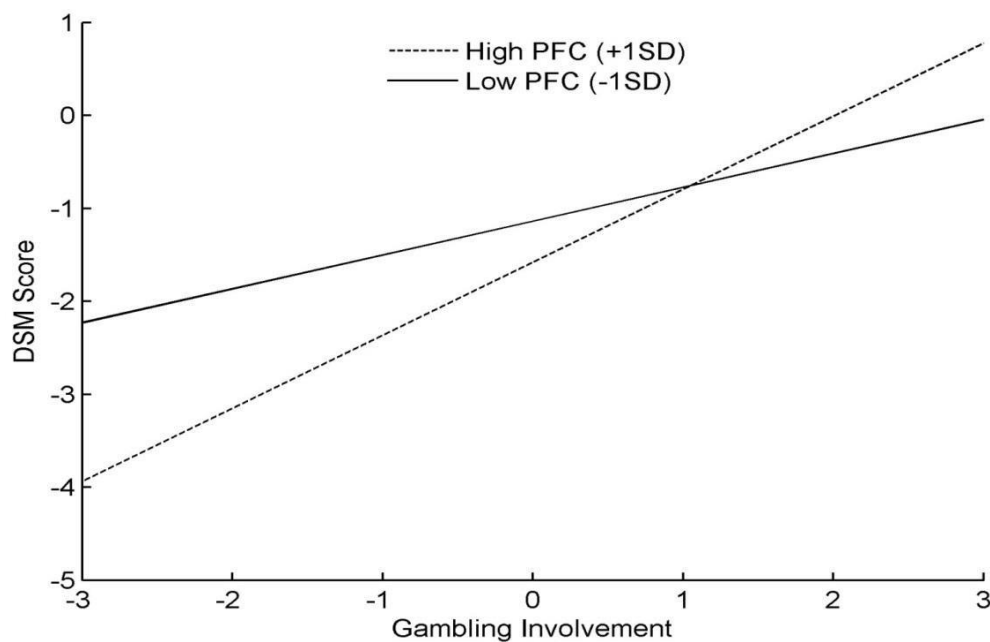


Figure 2. Interaction between gambling involvement and problem focussed coping predicting problem gambling score; PFC = problem focussed coping; simple slopes analysis found significance at both high ($b = 0.56$, $SE = 0.10$, $p < 0.001$, 95% CI [0.36,0.75], $\beta = 0.79$) and low ($b = 0.27$, $SE = 0.06$, $p < 0.001$, 95% CI [0.14,0.40], $\beta = 0.36$) levels of PFC.

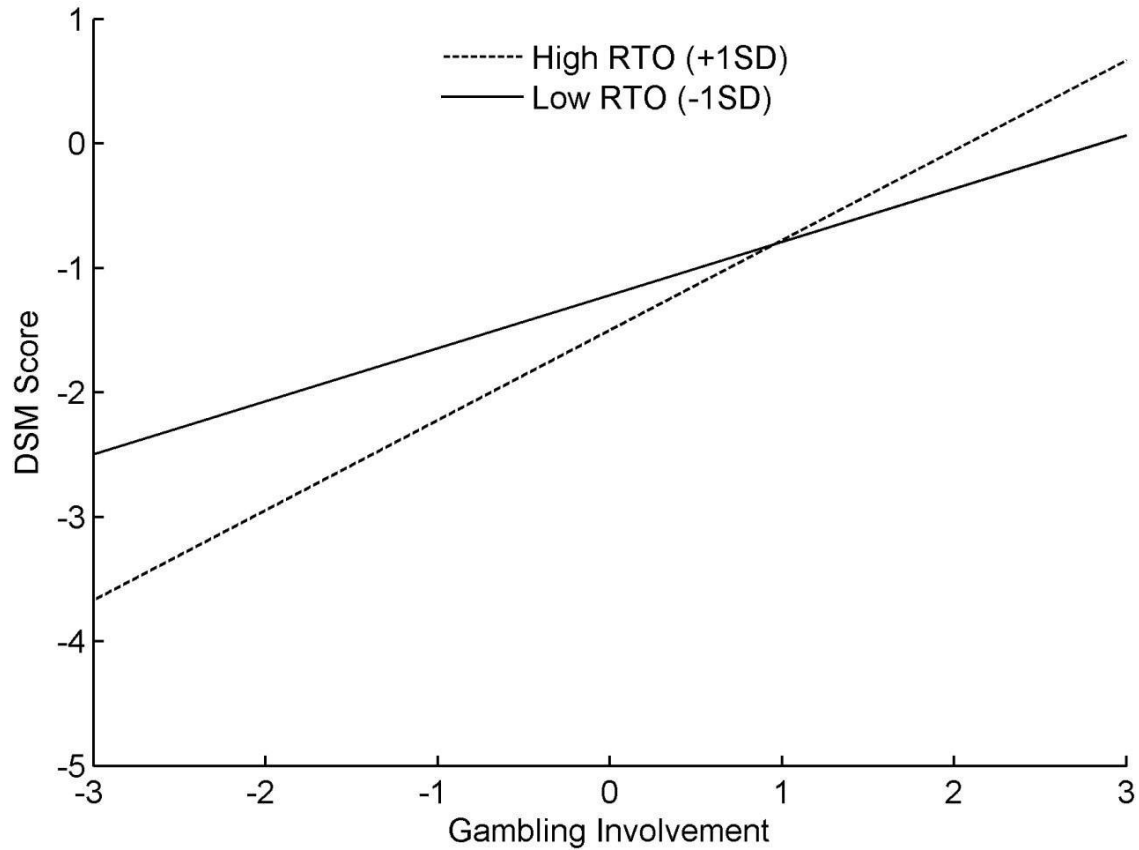


Figure 3. Interaction between gambling involvement and reference to others predicting problem gambling score; RTO = reference to others; simple slopes analysis found significance at both high ($b = 0.53$, $SE = 0.09$, $p < 0.001$, $95\%CI[0.36, 0.70]$, $\beta = 0.72$) and low ($b = 0.30$, $SE = 0.08$, $p < 0.001$, $95\% CI[0.14, 0.46]$, $\beta = 0.43$) levels of RTO.

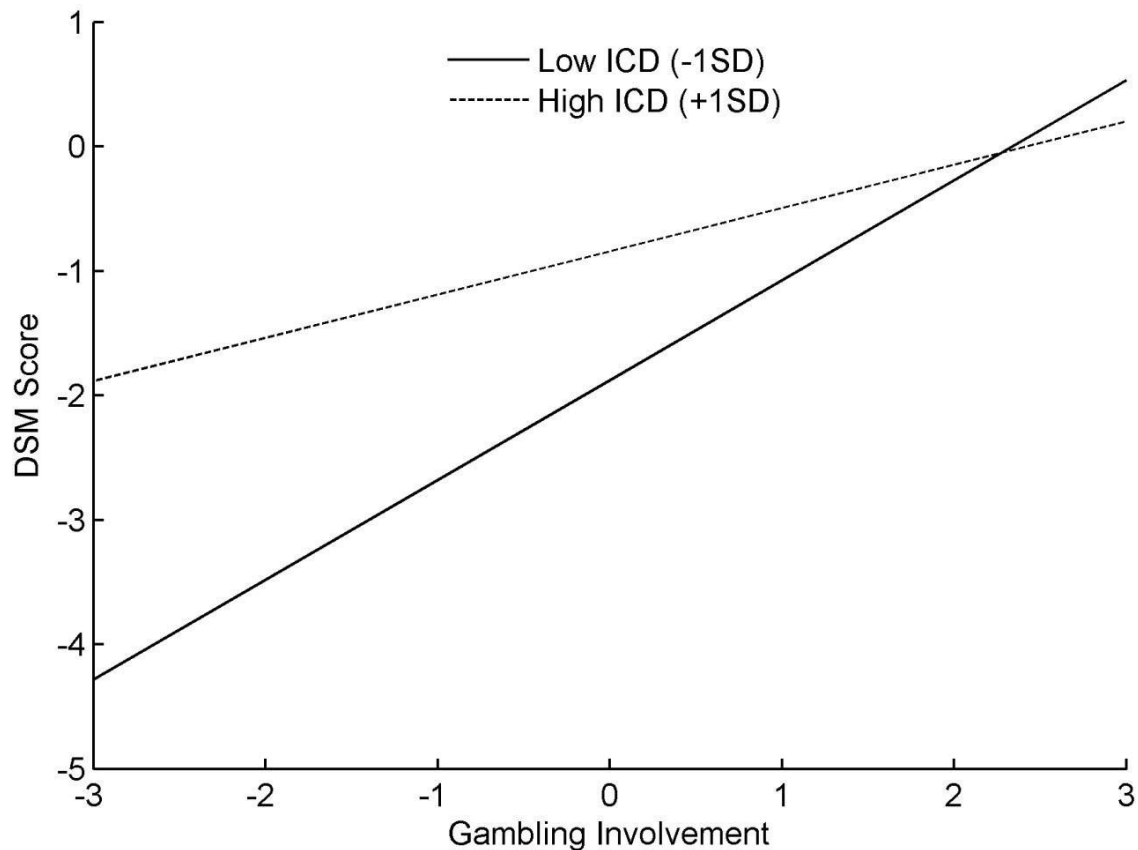


Figure 4. Interaction between gambling frequency and inconsistent discipline predicting problem gambling score; ICD = inconsistent discipline; simple slopes analysis found significance at both high ($b = 0.28$, $SE = 0.06$, $p < 0.001$, 95% CI [0.16, 0.41], $\beta = 0.35$) and low ($b = 0.54$, $SE = 0.11$, $p < 0.001$, 95% CI [0.33, 0.76], $\beta = 0.80$) levels of ICD.

Discussion

The current study used advanced multivariate statistics to examine the relationships between gambling attitudes, gambling involvement, coping strategies, perceived parenting styles and gambling problems in a sample of Australian high schools students. A number of significant results were found in relation to predicting the number of DSM-IV-MR-J problem gambling symptoms (i.e., the count portion of the model). However, none of the included predictors were related to the probability of having at least one gambling problem (i.e., the inflated portion of the model). The finding that the study variables did not significantly differentiate those who had gambling problems from those who did not

suggests that different processes are involved for the presence of gambling problems as opposed to their severity. However, what these processes may be requires further research to uncover.

Consistent with previous research (e.g., Delfabbro et al., 2009; Derevensky et al., 2010; Donati et al., 2013), the hypothesis that gambling attitudes would be related to increased gambling involvement and problems was supported. Further exploration of these relationships using more sophisticated multivariate techniques, however, revealed that the relationship between gambling attitudes and problem gambling was fully mediated by gambling involvement. This suggests that adolescent students who hold positive attitudes to gambling are more likely to have numerous gambling problems due to a greater level of gambling involvement. These findings are consistent with previous findings that higher levels of gambling involvement are predictive of more severe gambling problems (e.g., Chalmers & Willoughby, 2006; Moore & Ohtsuka, 2000; Kessler et al., 2008) and biopsychosocial models (e.g., Casey et al., 2011) that theorise that gambling frequency mediates the link between risk and protective factors and gambling problems. The current study, however, was unable to ascertain the direction of these relationships. It may be, for example, that adolescents who experience positive outcomes from gambling participation may develop more positive gambling attitudes.

Inconsistent discipline was the only other independent predictor of problem gambling severity. This is consistent with some prior research which has found poor disciplinary practices to be associated with adolescent problem gambling (Vachon et al., 2004). It may be that inconsistent discipline is a response to challenging child behaviours, including gambling, whereby parents struggle to enforce consistent rules and consequences (Vachon et al., 2004). Alternatively, a lack of consistent discipline may make a child vulnerable to engaging in such a pattern due to a lack of boundaries. The finding that inconsistent discipline is not an independent predictor of adolescent problem gambling after taking

additional characteristics, such as parental problem gambling, into consideration (Dixon et al., submitted) may suggest that the association between inconsistent parenting and problem gambling severity reflects the impact of parental pathology. Further research is needed to tease apart the direction and mutual influences of these factors. Such studies would benefit from the inclusion of collateral information regarding parenting styles beyond the self-report of participants, as the current study was unable to verify the presence of inconsistent disciplinary practices.

Findings in regard to the moderating effect of coping strategies and perceived parenting styles revealed that effective coping (problem focussed and reference to others) and poorer perceived parenting practices (inconsistent discipline) significantly moderated the relationship between gambling involvement and gambling problems. The overall pattern of these relationships was similar, in that students utilising less of the effective coping strategies and who reported being subject to inconsistent discipline were more likely to have gambling problems even at low levels of involvement. Conversely, those who were heavily involved in gambling were more likely to have gambling problems irrespective of their tendency to employ more adaptive strategies or be the subject of more consistent discipline. These results suggest that the level of gambling involvement has an overriding effect on the ability for adaptive coping styles or more consistent disciplinary practices to prevent the development of gambling problems.

In contrast to the study hypotheses, our findings did not reveal any moderating effects for non-productive coping or the perception of adaptive parenting (operationalised as parental involvement and positive parenting). The current findings suggest that it may be the presence of adaptive coping styles, rather than maladaptive styles, that are of more relevance to the severity of gambling problems, particularly when gambling involvement is low.

Alternatively, the current study controlled for gender, which may have masked a gender-specific moderation of the relationship between gambling involvement and problems by non-

productive coping (e.g., Bergevin et al., Nower, Derevensky, & Gupta, 2004). Future research, ideally with larger samples, and employing separate models for each gender, may be able to further explore this possibility. Similarly, given that previous research has found a protective effect for parental monitoring (e.g., Barnes et al., 1999; Magoon & Ingersoll, 2006), it may be that this construct is a more salient moderator of the relationship between gambling involvement and problems than positive reinforcement. This may be due to the potential for greater monitoring to reduce levels of participation. In addition, it may be that coping or parenting moderate the link between gambling attitudes and gambling involvement. For example, adolescent students with attitudes supportive of gambling may be more involved with gambling in the absence of adaptive coping strategies.

Findings from the current study have a number of implications for prevention and intervention. Results from the moderation analyses suggest that coping and parenting interventions may have particular utility for high school students who are at risk of developing gambling problems on the basis of a number of other risk factors (e.g., impulsivity, substance use), but who are not participating frequently in gambling activity. Conversely, for those adolescents who are involved in gambling at high levels, different intervention targets may be more helpful. In addition, the teaching of responsible gambling that includes limiting time spent participating in gambling may limit the progression from recreational gambling to problem gambling (Lostutter, Lewis, Crounce, Larimer, & Neighbors, 2014).

The results of the current study should be interpreted in light of several limitations. For instance, the cross-sectional nature of the design precludes conclusions regarding causative pathways, and all data were based on self-report in a sample limited to Australian high school students. In addition, the reliability of the coping measure was modest, which may have impacted on the findings. The current study was also unable to distinguish potential gender-specific patterns previously identified in regard to coping (e.g., Bergevin et

al., 2006; Nower et al., 2004), and future studies may benefit from utilising analytic techniques that allow for gender comparisons.

Overall, the current study contributes to the field by providing further findings regarding predictors of gambling problems among high school students. It appears that high levels of involvement are a central risk factor for the subsequent development of gambling problems, and that adaptive coping and consistent parenting may be protective against gambling problems for those students who are not heavily involved in gambling activity. In addition, attitudes supportive of gambling appear to exert an influence on gambling problems through their significant link to involvement. Given the potential harms associated with problem gambling among adolescents, future research that can articulate factors which may mitigate against the risk conferred by greater involvement in gambling activities could be of great utility in minimising these outcomes.

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Chapter 6

General Discussion

Chapter overview

This chapter presents a synopsis of the key findings of this thesis, along with a discussion of their contribution to the literature on adolescent problem gambling. Clinical implications will be discussed in light of previous research and intervention approaches. Finally, the strengths and limitations of the thesis are discussed, and directions for future research are offered.

Summary of research area

Adolescent problem gambling has emerged as a significant area of research interest (Chalmers & Willoughby, 2006; Gupta & Derevensky, 2000; Messerlian et al., 2005; Shaffer & Hall, 1996; Valentine, 2008). Initial research into this area focused generally on establishing prevalence rates, however it has been argued that for the field to mature more nuanced studies are needed (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004). Although more recently research has sought to explicate characteristics that may exacerbate or ameliorate the risk of developing such problems, it appears that there is much still to be learned about what these characteristics are, which have the strongest relationship with gambling problems, and what unique contributions these make to influence the likelihood of gambling problems in youth. In addition, characteristics that can protect against the risk of developing gambling problems remain an important but under-researched area.

Key findings

The current thesis sought to contribute to the growing literature examining the characteristics associated with adolescent problem gambling, with a particular emphasis on the adolescent high school population. Initially, a systematic review attempted to establish those characteristics for which the best evidence exists in relation to problem gambling in high school students. Then, relationships between a number of previously identified characteristics and

gambling problems in a sample of Australian high school students were tested empirically.

Characteristics associated with problem gambling among high school students

The first major aim of the current thesis was to establish those characteristics for which the best evidence exists in relation to problem gambling in high school students. Given that past reviews of the research have been characterised by a lack of quality appraisal (e.g., inclusion of studies using non-validated measures), a lack of specificity (e.g., inclusion of varying sample populations) and over-inclusiveness (e.g., inclusion of samples of diverse ages), a systematic review addressing these limitations was performed. The review identified 19 studies for inclusion, of which 12 included variables that were the subject of at least two studies.

Using a biopsychosocial model as a framework, the results of this systematic review suggested that gambling problems (as measured by standard instruments) in high school students are associated with temperament/personality (impulsivity and general risk propensity), cognitive characteristics (ineffective coping), family environment (family problems), externalising problems (symptoms of ADHD, substance use, delinquency), and internalising problems (emotional problems and anxiety). No strong and systematic evidence was found for a number of other characteristics identified in other reviews, such as low self-esteem, depression, self-discipline, or dissociation (e.g., Blinn-Pike et al., 2010).

The second major aim of the current thesis was to empirically examine the characteristics associated with problem gambling among a contemporary sample of Australian high school students. In the first study addressing this aim, perceived paternal problem gambling, perceived paternal problem alcohol use, number of gambling friends, gambling attitudes, and the number of stressful life events all emerged as unique predictors of problem gambling. In addition, female gender was found to moderate the relationship between perceived paternal problem drinking and problem gambling status, such that this relationship was only significant for

females. Finally, gender was found to moderate the relationship between two subscales of adaptive parenting (positive parenting and parental involvement) and problem gambling status, although these parenting styles were not separately predictive of gambling problems.

These findings are generally consistent with regard to past research in relation to paternal problem gambling (e.g., Oei & Raylu; Vachon et al., 2004); peer gambling (e.g., Dickson et al., 2008; Hardoon et al., 2004; Ólason et al., 2006); gambling attitudes (e.g., Delfabbro et al., 2006; Derevensky et al., 2010); and stressful life events (e.g., Bergevin et al., 2006; Dickson et al., 2008). In contrast, some of these findings were inconsistent with past research, particularly in relation to substance use (e.g., Gerdner & Svensson, 2003; Gupta & Derevensky, 1998). This was likely due to measurement differences between the current study and past studies. In addition, this study added to previous research by examining the moderating effect of gender, where a unique association between perceived paternal problem drinking and female adolescent problem gambling was found. Finally, adaptive parenting styles were also moderated by gender, with these appearing to be potentially important in relation to female, but not male, high school students.

In the second empirical study addressing this aim, a ZIP model was used to examine the relationships between gambling attitudes, gambling frequency and gambling problems, including a test of whether the relationship between gambling frequency and gambling problems was moderated by coping strategies or parenting practices. Controlling for gender, results from this study revealed that gambling frequency and a parenting style characterised by inconsistent discipline uniquely predicted gambling problems, and that gambling attitudes predicted gambling frequency. A measure of indirect effects revealed that gambling frequency fully mediated the relationship between gambling attitudes and gambling problems. Finally, two coping styles (problem focussed and reference to others) moderated the relationship between gambling

frequency and gambling problems, as did inconsistent discipline. However, all three characteristics appeared to be protective only at low levels of gambling involvement.

Results from this study were generally consistent with previous research that has found a positive association between gambling frequency and gambling problems (e.g., Boldero, Bell, & Moore, 2010; Ellenbogen, Derevensky, & Gupta, 2007; Fisher, 1999, 2000; Johansson & Gotestam; Moore & Ohtsuka, 2000); gambling attitudes and gambling frequency (e.g., Delfabbro et al., 2006; Derevensky et al., 2010), and between less effective parental disciplinary practices and gambling problems (Vachon et al., 2004). In contrast to past suggestions emphasizing the potential role of gambling as a coping mechanism (e.g., Gupta & Derevensky, 2000), less effective coping did not moderate the association between gambling frequency and gambling problems.

Clinical Implications

Findings from the current thesis have a number of implications for prevention and treatment efforts aimed at reducing the harms associated with problem gambling among high school students. Across the three studies contained within the present thesis, a number of characteristics from a variety of domains were found to have an association with problem gambling. This suggests that multi-faceted interventions are required, and this is consistent with the harm minimisation approaches recommended by Nower and Blaszczynski (2004), who argue that subtypes of youth with gambling problems may require a range of interventions comprising a number of different components. For example, programs for one subtype may include training in problem solving and coping skills, along with counselling for mood symptoms or other relevant psychological distress.

While several authors have noted the utility of incorporating coping and problem-solving

skills into prevention and intervention programs (e.g., Gupta et al., 2004), based on a systematic review, the current thesis also found that impulsivity is associated with gambling problems in high school students. Given the potential for this characteristic to not only increase the likelihood of gambling problems due to its direct effect on continuing behaviour despite negative outcomes, it has also been argued that this construct can prevent the deployment of more adaptive coping skills (Sharpe & Tarrier, 1993). Interventions may therefore benefit from including skills to manage this characteristic, such as teaching consequential thinking, 'urge surfing' or other techniques used in a variety of other presenting problems with which impulsivity is associated (e.g., personality disorders, acquired brain injury). For instance, in a 6-lesson school based program designed to prevent problem gambling, Turner and colleagues (2008) included the concepts of self-awareness and self-monitoring, which they concluded should be part of any similar prevention program. In addition, psychopharmacological interventions may be of utility in treating impulsivity, particularly for those students who are thought to fit within the anti-social impulsivist (biologically-based) pathway (Gupta et al., 2013; Nower & Blaszczynski, 2002; Nower & Blaszczynski, 2004).

Consistent with some previous research (e.g., Chalmers & Willoughby, 2006), the current thesis found that the frequency of gambling involvement may be an important feature relevant to gambling problems in high school student populations. This may be of particular importance given that the current thesis also found some evidence that parenting and coping variables were related to a lesser probability of gambling problems at low, but not high, levels of gambling involvement. It therefore appears that intervention efforts that can lessen or even prevent participation may ameliorate the risk of developing gambling problems. In addition, the finding that the link between gambling attitudes and gambling problems was fully mediated by gambling involvement suggests that attitudes to gambling may represent a potentially modifiable

characteristic that could lessen the likelihood of gambling problems by reducing gambling involvement.

The finding that perceived paternal problem drinking was significantly associated with problem gambling in female adolescents suggests that daughters of fathers with alcohol problems may be at increased risk for gambling problems. If this is the case, female adolescents who report the presence of paternal problem drinking should be asked about their gambling behaviour.

Strengths, Limitations and Future Research

Understanding the characteristics associated with problem gambling in adolescence is of research and clinical importance. The current thesis utilised a biopsychosocial model to logically group the constructs of interest in a coherent conceptual framework. Such an approach is of utility given the broad range of variables examined in the literature to date. However, although the model includes interactions between the various predictor variables, the current thesis did not include interactions across domains, but rather focussed on the influence of particular characteristics on gambling frequency and gambling problems. The exception to this was the test of gender as a moderating variable. Studies could benefit from adopting a theoretical or conceptual model and testing it more fully, in order to better understand the shared influence of multiple characteristics on gambling.

The field of adolescent problem gambling has traditionally struggled with definitional, conceptual and measurement issues, as articulately described by Poulin (2002). The current thesis was not immune to these issues. Although a standard problem gambling measure was used, the DSM-IV-MR-J variable was significantly negatively skewed, thereby violating the assumption of normality. Transformations did not significantly change the skewness of this data.

This issue was overcome in the second study by dichotomising the DSM-IV-J variable and employing logistic regression analyses which do not require normally distributed dependent data (Tabachnick & Fidell, 2007). However, this required the combination of the at-risk (scores of 2 or 3) and problem gambling groups (scores of 4 or more) due to the small number of participants with scores of four or more. Several researchers have encountered a similar difficulty, and it appears that larger sample sizes will be needed to overcome the need to merge groups. The skewness of the DSM-IV-MR-J data was overcome in the second empirical manuscript by employing advanced statistical procedures that took the zero-inflation of the DSM-IV-MR-J distribution into consideration. However, even where the merging of groups is necessary for practical reasons, future comparisons may be more readily made where standard instruments using consistent scoring are used. Perhaps even more importantly, the development of a 'gold standard' measure that is valid and reliable and which can be used across populations represents an important aim for the field. It is important to note, however, that although such a measure may improve the ability to compare valid groups across studies, the problem of data skewness is likely to remain due to the relatively low prevalence of problem gambling.

In an attempt to address previous limitations to reviews of the field, the current thesis applied rigorous methodology to a defined population to try to discover what characteristics are supported by the strongest evidence. In doing so, the current thesis also found a lack of robust measurement of characteristics associated with gambling problems for this population, and a lack of replication across studies. However, while the review was able to find some evidence for a number of characteristics, the small amount of included studies somewhat limited the strength of the conclusions. In addition, causal, temporal and theoretical mechanisms remain unclear as there is only a limited longitudinal research, and much of the research is atheoretical (Ariyabuddhiphongs, 2012; Blinn-Pike et al., 2010). In order for the field to mature, the present

thesis found that more studies that attempt to replicate previous findings using standard measures would help to identify the best targets for intervention and prevention efforts.

The current thesis also illuminated the importance of going beyond bivariate associations in order to better understand which characteristics are uniquely associated with problem gambling in adolescents. This suggestion has been identified by previous authors (e.g., Ariyabuddhiphongs, 2012; Blinn-Pike et al., 2010) and is reflected in the biopsychosocial model of Casey and colleagues (2011). The systematic review in the current thesis found that a number of relationships failed to remain significant when controlling for the influence of other factors, illustrating the utility of using multivariate statistical techniques to better understand the unique influence of psychosocial characteristics on gambling problems in high school students. In addition, similar findings emerged from the empirical studies presented in Chapters 4 and 5, where bivariate associations were washed out when other factors were considered simultaneously.

As well as taking into account the shared variance of a number of characteristics when considering predictors of gambling problems, the current thesis also addressed the potential moderating effects of a number of variables. Given the multidimensional nature of the influences on youth gambling problems, this analytical approach provides a way to further understand the differing influences of biopsychosocial characteristics on gambling problems. While some previous research has only examined these relationships where a significant predictive bivariate relationship exists (e.g. Scholes-Balog et al., 2014), the current thesis included an examination of all predictors to ensure all potential moderating effects were captured. In particular, previous findings in regard to gender differences suggest that studies including male and female high school students may benefit from tests of moderation to better understand how gender may interact with certain characteristics that are associated with problem gambling. As noted earlier,

research that not only examines the relations between characteristics and gambling status, but also interactions between predictor variables could uncover important relationships.

An important limitation to the current thesis was that the variables included for the empirical studies did not include all of those identified in the systematic review. While it was not possible to include all potentially relevant variables, it would have been advantageous to include all of those found to be consistently related to adolescent problem gambling. In particular, a measure of impulsivity would have been a useful inclusion given the potential for this construct to influence the relationship between other variables and gambling problems. However, because the empirical studies involved a secondary analysis of data from a larger study, only those variables which were included in that larger study were able to be incorporated into the current thesis.

While the opportunity to use this data was advantageous given the sample size and large amount of variables included, future research that targets characteristics with the most robust evidence of association would be of utility, particularly for identifying potential targets for intervention.

As with the majority of past research related to adolescent problem gambling, the current thesis employed a cross-sectional design for the empirical studies in Chapters four and five. As with all such designs, these studies were therefore unable to establish temporal relationships or causal directions among the variables of interest and gambling problems. For example, it remains unclear whether peer gambling involvement reflects a transition from non-gambling friends to gambling friends once gambling problems increase, or if having gambling friends increase the risk of subsequent developing these problems. This limitation may also have implications for intervention; as noted in Chapter 4, targeting parental drinking as a risk factor for adolescent problem gambling may be ineffective if this behaviour is a response to child

gambling problems rather than a pre-existing risk factor. Future research using longitudinal designs is therefore indicated to better understand the explanatory mechanisms that may underlie the relationships that exist at a cross-sectional level.

Conclusion

Adolescent problem gambling is associated with a number of potential harms, and the identification of psychosocial characteristics associated with it represents an important area of research with implications for intervention. The current thesis added to this endeavour, finding evidence for a number of relationships between high school students with gambling problems and a variety of psychosocial characteristics across various biopsychosocial domains. To better understand those factors most relevant to prevention and intervention, a future meta-analysis would be of great utility. In addition, an examination of the extent to which existing school-based programs target specific empirically identified factors would be helpful in order to ensure that research findings are translated into ‘real world’ applications that are evidence-based and effective. The current thesis also indicates the utility of drawing on explicit, testable theoretical frameworks in order to make logical connections between constructs. However, without prospective designs, the lack of explanatory power such models can provide is limited. Finally, the current thesis found evidence for gender-based differences in risk and protective factors for gambling in high school students. Such differences should not only be taken into account when conducting research in this area, but actively explored as part of the design. Overall, improved understanding of how psychosocial characteristics influence each other and gambling behavior is required to identify those which represent the most effective potential targets for treatment.

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Appendices

Appendix A Information flyer for schools



THE UNIVERSITY OF
MELBOURNE



MONASH University

A Victorian
Government
initiative



Problem Gambling Research and Treatment Centre

A joint initiative of the University of Melbourne, Monash University and the Victorian Government

"Risk and protective factors for adolescent gambling participation"

Aims of the study

This important study funded by the Commonwealth Government through Gambling Research Australia is part of a national research study which is seeking to identify a range of risk and protective factors that may influence adolescent gambling.

We know that adult problem gambling is associated with being introduced to gambling at an early age often in family settings where adult members may have gambling problems. Underage gambling and gambling in young adulthood are also associated with a range of other risk taking activities such as drug and alcohol use and a range of health and mental health problems.

Less is known about the factors that can protect young people exposed at an early age to gambling from developing subsequent problems themselves in this area. This study is an attempt to identify such protective factors. For this reason we are interested in the relationship between exposure to gambling and adolescent's coping capacity and personal and familial resources.

The information obtained through this study will help to identify the characteristics of young people at risk of developing gambling problems, and will help to inform the design of effective prevention, early intervention, and treatment programs.

Who is conducting the study?

This study is being undertaken by the Problem Gambling Research and Treatment Centre, a joint initiative of the University of Melbourne, Monash University and the Victoria Department of Justice.

The centre is located in the Melbourne Graduate School of Education at the University of Melbourne, and the Faculty of Medicine, Nursing and Health

Sciences at Monash University. This study is under the direction of Professor Alun Jackson, Director of the Centre at Melbourne University and a Professorial Fellow in the Melbourne Graduate School of Education, and Associate Professor Erica Frydenburg, a specialist in Educational Psychology and Adolescent Coping from the Melbourne Graduate School of Education.

The centre brings a high level of relevant expertise to this project. The centre developed "Problem Gambling: A guide for Victorian Schools" and has undertaken previous research on the impacts on gambling on children and adolescents.



Conducting the study

We recognize that school participation in research represents a real commitment of resources, but we hope to conduct the study in such a way that there is a clear net benefit for participating schools. We believe that the topic of the research would be of interest to those teaching Psychology and Health Studies and students from these classes could subsequently use this experience to further their knowledge in these areas using this as trigger or case study material. Centre research staff would be pleased to assist in classroom presentation of the study and subsequent discussion.

This educational benefit is in addition to the tangible benefits offered to participating school in the form of a \$100 book voucher for your school library as reimbursement for the use of the school's resources (e.g. computer lab). Additionally, once the findings arising from this research have been published, a brief summary of the findings will be available to your school, and if your school has more than 20 student participants, the summary will also provide school-specific information relative to the data collated for all schools. Also each student participant will be offered a numbered ticket as eligibility to receive one of ten double movie tickets.

The University of Melbourne
Old Geology Building
VIC 3010 Australia
T: +61 3 8344 8220 F: +61 3 9347 2484

Monash University
Building 1, 270 Ferntree Gully Rd
Notting Hill VIC 3168
T: +61 3 8575 2245 F: +61 3 8575 2233

Appendix B Plain language explanatory statement for parents



THE UNIVERSITY OF
MELBOURNE



MONASH University

A Victorian
Government
initiative



The Problem Gambling Research and Treatment Centre

A joint initiative of the University of Melbourne, Monash University and the Victorian Government

Alice Hoy Building
University of Melbourne
Victoria, 3010
Australia

"Risk and protective factors for adolescent gambling participation"

Your child is invited to participate in the above research project, which is being conducted by Professor Alun Jackson (Responsible Researcher), Professor Shane Thomas, A/Professor Erica Frydenberg, Dr. Nicki Dowling, Dr. Jane Tomnay, Mr. Ramsay Dixon, and Ms. Julia Geraghty (Co Researchers) of the Problem Gambling Research and Treatment Centre at The University of Melbourne and Monash University. Your child's school contact details have been drawn at random from the Department of Education and Early Childhood Development, The Catholic Education Office Melbourne, or the Independent Schools Association. This has been done with the permission of the General Manager of the Melbourne Research Office. This project has been approved by the Human Research Ethics Committee of the University of Melbourne and is funded by Gambling Research Australia.

The aim of this study is to identify risk and protective factors for children aged 12 – 18 years. It also aims to identify factors which may serve to protect children from developing risk taking behaviours including problem gambling behaviour. Furthermore, the project aims to develop guidelines that will help policy makers and program developers find ways to help children in the whole community who may be at risk of developing problem gambling. By doing this, we may be able to reduce the harm associated with problem gambling for individuals, their significant others, and the community. This project will try to develop specific and practical ways to reduce the risk of problem gambling among at-risk children.

Should you agree for your child to participate, we would ask you to sign the attached consent form and return it to your child's school in the envelope supplied. Your child will then be asked if he/she would like to take part in this research. If your child agrees, he or she will be asked to participate by completing a questionnaire, either on paper or online during their class time at school. This questionnaire will ask your child about their demographics, family structure, ways of coping and attitudes and experiences related to risk taking behaviours, particularly gambling. We estimate that the time commitment required of your child would not exceed a normal class period. If any child

experiences any feelings of emotional distress when completing the questionnaire they will be asked to stop immediately and will be referred to the school welfare officer or student counselor in the first instance.

We intend to protect your child's anonymity and the confidentiality of his/her responses to the fullest possible extent, within the limits of the law. Your child will **NOT** be asked to put his/her name and or any other identifying details on the questionnaire. Both the online and paper copy questionnaires will be completely anonymous. We will remove any references to your child's school that might allow someone to guess the school's identity.

Once the findings arising from this research have been published, a brief summary of the findings will be available to your child's school and to you on application at the Problem Gambling Research and Treatment Centre. It is also possible that the results will be presented at academic conferences. The data will be kept securely in the Problem Gambling Research and Treatment Centre for at least five years from the date of publication, until it is no longer required, when it will be destroyed.

Please be advised that your child's participation in this study is completely voluntary. Should he/she wish to withdraw at any stage, he/she is free to do so without prejudice. The researchers will not inform the school of the children that either did or did not participate and are not involved in the ethics application process. Your decision to allow your child to participate or not, or to withdraw, will be completely independent of your dealings with the school, and we would like to assure you that it will have no effect on future dealings you may have with the school.

If you agree for your child to participate, please indicate that you have read and understood this information by signing the accompanying consent form and returning it in the envelope provided. The researchers will then contact your child's school to arrange a mutually convenient time for him/her to fill in the questionnaire. This will be done during a normal school day.

Should you require any further information, or have any concerns, please do not hesitate to contact any of the researchers; Professor Alun Jackson (Responsible Researcher) on [REDACTED], Professor Shane Thomas, [REDACTED] A/Professor Erica Frydenberg, [REDACTED] Dr. Nicki Dowling, [REDACTED] Dr. Jane Tomnay [REDACTED] Mr Ramsay Dixon [REDACTED] and Ms Julia Geraghty [REDACTED]. Should you have any concerns about the conduct of the project, you are welcome to contact the Executive Officer, Human Research Ethics, The University of Melbourne, on [REDACTED].

Appendix C Plain language explanatory statement for adolescents



THE UNIVERSITY OF
MELBOURNE



MONASH University

A Victorian
Government
initiative



The Problem Gambling Research and Treatment Centre

A joint initiative of the University of Melbourne, Monash University and the Victorian Government

Alice Hoy Building
University of Melbourne
Victoria, 3010
Australia

Plain language Statement for Students

"Risk and protective factors for adolescent gambling participation"

Hello! My name is *[insert name of the Research Assistant]*. I am a research assistant and am doing a project to find out what people your age know about gambling. The other people working with me on this project are Professor Alun Jackson (Responsible Researcher), Professor Shane Thomas, A/Professor Erica Frydenberg, Dr. Nicki Dowling, Dr. Jane Tomnay, Mr. Ramsay Dixon, and Ms Julia Geraghty (Co Researchers). We all work at the Problem Gambling Research and Treatment Centre at The University of Melbourne and Monash University.

Your school principal and your teacher have given me permission to give you this letter to tell you a bit about this project. Once you have read the letter you can decide if you would like to take part. Your parents have also been given a similar letter to tell them about the project.

If you want to be part of the project, I would ask you to read and answer some questions about yourself, your family and gambling. The questions will either be on a paper questionnaire or online. You and all the other people from your class who are taking part would go into a spare room for about 30 minutes to read the questions and provide answers. I will be there to explain about the questions and collect the answers at the end. If you want to stop doing the questions, you can tell me and stop any time you like. If you don't know an answer, or you don't want to answer a question, that's fine too.

Only my co-workers who I have named above and I will see your answers, so please don't worry that your teacher might look at them. The project will have nothing to do with your school report or your grades. We are asking you NOT to write your name on the questionnaire, so no one will be able to tell which answers are yours. We will write the name of your school on the questionnaire after you have returned it to me.

After the project is over, I will lock all the questionnaires away safely in the Problem Gambling Research and Treatment Centre for 5 years. I have to do this because it is a University rule. After that we will destroy all of them.

Remember, you don't have to take part unless you want to. If you have any questions you should talk to your teacher or a parent. If they don't know the answer to your question, they can contact me, or one of my co-workers, or the Research Ethics Office at the University for you. If you want to be part of this project, and your parent/s agree, please sign your name on the next page where it says signature with the word "student" underneath.

If you want any more information, or have any concerns, please feel free to call any of the researchers; Professor Alun Jackson (Responsible Researcher) on [REDACTED] Professor Shane Thomas, [REDACTED] A/Professor Erica Frydenberg, [REDACTED] Dr. Nicki Dowling, [REDACTED] Dr. Jane Tomnay [REDACTED] Mr Ramsay Dixon [REDACTED] [REDACTED] and Ms Julia Geraghty [REDACTED] If you have any concerns about the conduct of the project, you can call the Executive Officer of Human Research Ethics, The University of Melbourne, on [REDACTED]

Appendix D Parental consent form



THE UNIVERSITY OF
MELBOURNE



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A Victorian
Government
initiative



The Problem Gambling Research and Treatment Centre

A joint initiative of the University of Melbourne, Monash University and the Victorian Government

Alice Hoy Building
University of Melbourne
Victoria, 3010
Australia

Consent form

PROJECT TITLE: RISK AND PROTECTIVE FACTORS FOR ADOLESCENT GAMBLING PARTICIPATION

Name of Parent:

Name of investigator(s): Professor Alun Jackson (Responsible Researcher), Professor Shane Thomas,
A/Professor Erica Frydenberg, Dr. Nicki Dowling, Dr. Jane Tomnay, Mr. Ramsay Dixon, and Ms. Julia
Geraghty (Co Researchers).

1. I consent for my child to participate in the project named above, the particulars of which - including details of the questionnaire - have been explained to me. A written copy of the information has been given to me to keep.
2. I authorise the researcher or assistant to use for this purpose the questionnaire referred to under (1) above.
3. I acknowledge that:
 - (a) the possible effects of the questionnaire have been explained to me to my satisfaction;
 - (b) I have been informed that my child is free to withdraw from the project at any time without explanation or prejudice and to withdraw any unprocessed data previously supplied;

- (c) The project is for the purpose of research
 - (d) I have been informed that the questionnaire will be anonymous and as such confidentiality of the information my child will provide will be safeguarded subject to any legal requirements.
- (3) I have been informed that my child's participation in this study is completely voluntary and if he/she wishes to withdraw at any stage, he/she is free to do so without prejudice. My decision to allow my child to participate or not, or to withdraw, will be completely independent of my dealings with the school, and will have no effect on future dealings I may have with the school. My child's grades will not be affected in any way.
- (4) The researchers will retain this copy of my signed consent.

Signature

Date

(Parent/Guardian)

Appendix E Student consent form



THE UNIVERSITY OF
MELBOURNE



MONASH University

A Victorian
Government
initiative



The Problem Gambling Research and Treatment Centre

A joint initiative of the University of Melbourne, Monash University and the Victorian Government

Alice Hoy Building
University of Melbourne
Victoria, 3010
Australia

"Risk and protective factors for adolescent gambling participation"

Student Consent Form

Name of Student: _____

Name of investigator(s): Professor Alun Jackson (Responsible Researcher), Professor Shane Thomas,
A/Professor Erica Frydenberg, Dr. Nicki Dowling, Dr. Jane Tomnay, Mr. Ramsay Dixon, and Ms Julia
Geraghty (Co Researchers). _____

1. I consent to participate in this project, the details of which have been explained to me, and I have been provided with a written plain language statement to keep.
2. I understand that my participation will involve filling in a questionnaire and I agree that the researcher may use the results as described in the plain language statement.
3. I acknowledge that:
 - (a) the possible effects of participating in the questionnaire have been explained to my satisfaction;
 - (b) I have been informed that I am free to withdraw from the project at any time I want to;
 - (c) the project is for the purpose of research;
 - (d) I have been informed that I don't need to put my name on the questionnaire and all my answers are anonymous;
 - (e) I have been informed that with my consent the questionnaire will be stored at the University of Melbourne and will be destroyed after five years;

Signature _____

Date _____

Appendix F Information for inclusion in school newsletter

Information for school newsletter

Over the next few weeks the school will be involved with some research that is being conducted by researchers from the Problem Gambling Research and Treatment Centre at The University of Melbourne and Monash University. The aim of the study is to identify risk and protective factors for children aged 12 – 18 years which may help protect some children from developing risk taking behaviours including problem gambling.

Shortly, you will receive a letter from the researchers which explains the entire project. If you agree for your child to participate, you will be asked to sign a consent form and return it to the school. Your child will then be asked if he/she would like to take part in this research. If your child agrees, he or she will be asked to participate by completing a questionnaire, either on paper or online during normal school time. Your child will **NOT** be asked to put his or her name and or any other identifying details on the questionnaire. All participation in this study is completely voluntary and the researchers will not inform the school of the children that either did or did not participate.

Appendix G Department of Education ethics approval



Department of Education and Early Childhood Development

Office for Policy, Research and Innovation

2 Treasury Place
East Melbourne Victoria 3002
Telephone: +61 3 9637 2000
DX 210083

GPO Box 4367
Melbourne, Victoria 3001

505003985

Prof Alun Jackson, et al
Problem Gambling Research and Treatment Centre
Melbourne Graduate School of Education
Old Geology Building
PARKVILLE 3010

Dear Prof Jackson, et al

Thank you for your application of 13 August 2008 in which you request permission to conduct a research study in government schools titled: *Risk and protective factors for adolescent gambling participation*.

I am pleased to advise that on the basis of the information you have provided your research proposal is approved in principle subject to the conditions detailed below.

1. Should your institution's ethics committee require changes or you decide to make changes, these changes must be submitted to the Department of Education and Early Childhood Development for consideration before you proceed.
2. You obtain approval for the research to be conducted in each school directly from the principal. Details of your research, copies of this letter of approval and the letter of approval from the relevant ethics committee are to be provided to the principal. The final decision as to whether or not your research can proceed in a school rests with the principal.
3. No student is to participate in this research study unless they are willing to do so and parental permission is received. Sufficient information must be provided to enable parents to make an informed decision and their consent must be obtained in writing.
4. As a matter of courtesy, you should advise the relevant Regional Director of the schools you intend to approach. An outline of your research and a copy of this letter should be provided to the Regional Director.
5. Any extensions or variations to the research proposal, additional research involving use of the data collected, or publication of the data beyond that normally associated with academic studies will require a further research approval submission.
6. At the conclusion of your study, a copy or summary of the research findings should be forwarded to Education Policy and Research Division, Department of Education and Early Childhood Development, Level 2, 33 St Andrews Place, GPO Box 4367, Melbourne, 3001.

<warne.christine.p@edumail.vic.gov.au>

Group Manager
Education Policy and Research

22/10/2008

enc

Appendix H Standing Committee on Ethics Research Involving Humans (SCERH) ethics approval



Standing Committee on Ethics in Research Involving Humans (SCERH)
Research Office

Dr Nicki Dowling
School of Psychology, Psychiatry and Psychological Medicine
Faculty of Medicine, Nursing and Health Sciences
Clayton Campus

11 July 2007

CF07/1346 - 2007/0363 : Children at risk of developing problem gambling

Dear Researchers,

Thank you for the information provided in relation to the above project. The items requiring attention have been resolved to the satisfaction of the Standing Committee on Ethics in Research Involving Humans (SCERH). Accordingly, this research project is approved to proceed.

Terms of approval

1. This project is approved for five years from the date of this letter and this approval is only valid whilst you hold a position at Monash University.
2. It is the responsibility of the Chief Investigator to ensure that all information that is pending (such as permission letters from organisations) is forwarded to SCERH, if not done already. Research cannot begin at any organisation until SCERH receives a letter of permission from that organisation. You will then receive a letter from SCERH confirming that we have received a letter from each organisation.
3. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by SCERH.
4. You should notify SCERH immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaint clause must contain your project number.
6. Amendments to the approved project: Changes to any aspect of the project require the submission of a Request for Amendment form to SCERH and must not begin without written approval from SCERH. Substantial variations may require a new application.
7. Future correspondence: Please quote the project number and project title above in any further correspondence.
8. Annual reports: Continued approval of this project is dependent on the submission of an Annual Report. Please provide the Committee with an Annual Report determined by the date of your letter of approval.
9. Final report: A Final Report should be provided at the conclusion of the project. SCERH should be notified if the project is discontinued before the expected date of completion.
10. Monitoring: Projects may be subject to an audit or any other form of monitoring by SCERH at any time.
11. Retention and storage of data: The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

All forms can be accessed at our website www.monash.edu.au/research/ethics/human/index.html

We wish you well with your research.

Dr Souheir Houssami
Executive Officer, Human Research Ethics (on behalf of SCERH)

Cc: Mr Ramsay Dixon, Prof Alun Jackson, Prof Shane Thomas, Assoc Prof Erica Frydenberg

Postal - Monash University, Vic 3800, Australia
Building 3E, Room 111, Clayton Campus, Wellington Road, Clayton

www.monash.edu/research/ethics/human/index/html
ABN 12 377 614 012 CRCOS Provider #00008C

Appendix I Catholic Education Office ethics approval



Catholic Education Office
Archdiocese of Melbourne

In reply please quote:

GE08/0009
1440

27 August 2008

Ms J Geraghty
Problem Gambling Research and Treatment Centre
Melbourne Graduate School of Education
Old Geology Building
UNIVERSITY OF MELBOURNE VIC 3010

Dear Ms Geraghty

I am writing with regard to your research application of 14 August 2008 concerning your forthcoming project titled *Risk and protective factors for adolescent gambling participation*. You have asked approval to approach Catholic schools in the Archdiocese of Melbourne, as you wish to survey secondary students.

I am pleased to advise that your research proposal is approved in principle subject to the following standard conditions.

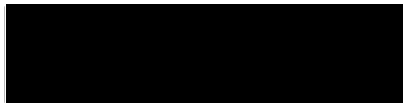
1. The decision as to whether or not research can proceed in a school rests with the school's principal. So you will need to obtain approval directly from the principal of each school that you wish to involve.
2. You should provide each principal with an outline of your research proposal and indicate what will be asked of the school. A copy of this letter of approval, and a copy of notification of approval from the university's Ethics Committee, should also be provided.
3. A *Working with Children* (WWC) check – or registration with the Victorian Institute of Teaching (VIT) – is necessary for all researchers visiting schools. Appropriate documentation must be shown to the principal before starting the research in each school.
4. No student is to participate in the research study unless s/he is willing to do so and informed consent is given in writing by a parent/guardian.
5. You should provide the names of schools which agree to participate in the research project to the Knowledge Management Unit of this Office.
6. Any substantial modifications to the research proposal, or additional research involving use of the data collected, will require a further research approval submission to this Office.

7. Data relating to individuals or schools are to remain confidential.
8. Since participating schools have an interest in research findings, you should consider ways in which the results of the study could be made available for the benefit of the school communities.
9. At the conclusion of the study, a copy or summary of the research findings should be forwarded to this Office. It would be appreciated if you could submit your report in an **electronic format** using the email address provided below.

I wish you well with your research study. If you have any queries concerning this matter, please contact Mr Mark McCarthy of this Office.

The email address is <km@ceo.melb.catholic.edu.au>.

Yours sincerely



Terri Hopkins
ACTING ASSISTANT DIRECTOR
POLICY AND GOVERNANCE

Appendix J Student questionnaire

This questionnaire contains copyright material and is attached for information only. It may not be copied or used for any other purpose.

N.B. Online version will have 10 items per screen and is identical in content and layout with the following.

Risk and protective factors for adolescent gambling participation

**THIS QUESTIONNAIRE IS
ANONYMOUS.**

**PLEASE DO NOT WRITE YOUR NAME
ANYWHERE ON THIS QUESTIONNAIRE.**

In this study, we are interested in hearing the views and experiences from a wide variety of young people from different cultural, social and family backgrounds. To make sure that we have been successful in selecting a wide range of people, we need to ask you a few questions about you and your family. Again accept our assurance that all this information will be kept strictly confidential and that you will not be identified by name.

QUESTIONS ABOUT YOU

Please tick the boxes ☐

1 Are you:

☐ Female

☐ Male

2 Were you born in Australia?

☐ Yes

☐ No

3 How old are you?

☐ 12

☐ 13

☐ 14

☐ 15

☐ 16

☐ 17

☐ 18

4

☐ 8

☐ 9

☐ 10

☐ 11

☐ 12

5 What school do you attend?

(please write the answer on the line below)

6 What suburb do you live in?

(please write the answer on the line below)

7 What language do you speak at home? (tick one answer)

☐ English

☐ Another Language

☐ English and another language

8 Do you identify yourself as being of Aboriginal or Torres Strait Islander descent?

- ☐ Yes ☐ No

9 Are your parents...?

- ☐ Living together
☐ Separated or divorced
☐ One or both of my parents have died
☐ Have never lived together
☐ Something else

10 Think about where you live MOST of the time. Which people live there with you? (tick all that apply to you)

- | | | |
|--|--|--|
| ☐ Mother | ☐ Father | ☐ Other Adults |
| ☐ Stepmother | ☐ Stepfather | ☐ Brother(s) |
| ☐ Foster mother | ☐ Foster father | ☐ Sister(s) |
| ☐ Grandmother | ☐ Grandfather | ☐ Stepbrother/sister(s) |
| ☐ Aunt | ☐ Uncle | ☐ Other children |
| ☐ Guardians | ☐ I live alone | |

11 How many brother s/sisters do you have living with you?

- | | | |
|----------------------------|----------------------------|-----------------------------|
| ☐ 0 | ☐ 1 | ☐ 2 |
| ☐ 3 | ☐ 4 | ☐ 5+ |

12 Does your mother/stepmother do paid work?

- ☐ Yes, full time ☐ No, not working

- ☐ Yes, part time ☐ No, retired

13 Does your father/stepfather do paid work?

- ☐ Yes, full time ☐ No, not working
☐ Yes, part time ☐ No, retired

14 How have you been getting on with your family recently?

- ☐ I'm happy about how we get on
☐ Overall, neither good nor bad
☐ Getting on with my family is causing me problems

15 How happy are you with the place you are living in at the moment?

- ☐ The house where I'm living is good
☐ Overall, neither good nor bad
☐ It causes me problems

16 How happy have you been with things at school recently?

- ☐ School is a very good part of my life
☐ Overall, neither good nor bad
☐ School is causing me problems and worry

17 How has your money situation been recently?

- ☐ I have enough money for what I need
☐ Overall, neither good nor bad
☐ Not having enough money causes me problems

18 How has your social life with friends been recently?

- ☐ I enjoy my social life with friends
- ☐ Overall, neither good nor bad
- ☐ My social life is causing me problems

19 How happy have you been about your situation with your girlfriend or boyfriend recently? (as in going out with someone)

- ☐ I'm happy about how things are
- ☐ Overall, neither good nor bad
- ☐ This part of my life is causing me problems
- ☐ This does not apply to me

20 How have you felt physically recently?

- ☐ I have felt physically well
- ☐ Overall, neither good nor bad
- ☐ I have felt physically unwell

21 How often do you have a drink containing alcohol?

- ☐ Don't drink
- ☐ Less than once per week
- ☐ 1-2 days per week
- ☐ 3-4 days per week
- ☐ 5-6 days per week
- ☐ every day

22 Have you ever used any of the following drugs? (tick all that apply to you)

☐ Cigarettes

☐ Marijuana

☐ Other drugs (not prescribed)

23 How satisfied with your life have you been overall

- ☐ I am satisfied with my life
- ☐ Overall neither satisfied nor unsatisfied
- ☐ I am unsatisfied with my life

24 How many of your friends gamble?

- ☐ none of my friends
- ☐ some of my friends
- ☐ most of my friends
- ☐ don't know

Please tick how much of each of these you have available to you;

None = 1 A Little = 2 Some = 3 A good amount = 4 A lot = 5

	1	2	3	4	5
25 Having Friends	☐	☐	☐	☐	☐
26 Being close with at least one friend	☐	☐	☐	☐	☐
27 Having support from parents	☐	☐	☐	☐	☐
28 Having adequate home	☐	☐	☐	☐	☐
29 Having adequate food	☐	☐	☐	☐	☐
30 Being able to speak up for yourself	☐	☐	☐	☐	☐
31 Having a stable family life	☐	☐	☐	☐	☐

- | | | | | | | |
|----|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 32 | Feeling independent | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33 | Having money for my needs | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34 | Having a sense of humour | ☐ | ☐ | ☐ | ☐ | ☐ |

The following questions relate to YOUR gambling behaviour.

How often have you gambled on any of the following during the last 12 months?

- | | | | | | | | |
|-----------|---|---------------------------------------|----------------------------|-----------------------------|--------------------------|--------------------------|--------------------------|
| 1 = Never | 2 = 1-2 times
per year | 3 = 3 times per year
up to monthly | 4 = 2-3 times
per month | 5 = Weekly or
more often | | | |
| | | | 1 | 2 | 3 | 4 | 5 |
| 35 | Scratchies | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36 | Sports (not including horse or
dog racing) | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 37 | Horse or dog racing at the TAB | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 38 | Horse or dog racing at the racetrack | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 39 | Internet Gambling | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 40 | Table games at the Casino | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 41 | Bingo | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 42 | Lottery | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 43 | Poker machines at the casino | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 44 | Poker machines at Hotels | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 45 | Card games at home or school | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 46 | Keno | | ☐ | ☐ | ☐ | ☐ | ☐ |
| 47 | Other (please specify): _____ | | ☐ | ☐ | ☐ | ☐ | ☐ |

For each of the activities you ticked above, with whom do you usually gamble? (the number above the box corresponds to the person you gamble with)

- 1= No-one, I do it alone
 2= With parents
 3= With brother or sister
 4 =With other relatives
 5 = With friends

	1	2	3	4	5
48 Scratchies	☐	☐	☐	☐	☐
49 Sports (not including horse or dog racing)	☐	☐	☐	☐	☐
50 Horse or dog racing at the TAB	☐	☐	☐	☐	☐
51 Horse or dog racing at the racetrack	☐	☐	☐	☐	☐
52 Internet Gambling	☐	☐	☐	☐	☐
53 Table games at the Casino	☐	☐	☐	☐	☐
54 Bingo	☐	☐	☐	☐	☐
55 Lottery	☐	☐	☐	☐	☐
56 Poker machines at the casino	☐	☐	☐	☐	☐
57 Poker machines at Hotels	☐	☐	☐	☐	☐
58 Card games at home or school	☐	☐	☐	☐	☐
59 Keno	☐	☐	☐	☐	☐
60 Other(please specify):_____	☐	☐	☐	☐	☐

61 At what age did you first gamble on any of these activities with money or possessions? _____

62 In the past year, how often have you found yourself thinking about gambling or planning to gamble?

- ☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

63 During the course of the past year have you needed to gamble with more and more money to get the amount of excitement you want?

- ☐ Yes ☐ No

64 In the past year have you ever spent *much* more than you planned to on gambling?

- ☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

65 In the past year have you felt bad or fed up when trying to cut down or stop gambling?

- ☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

66 In the past year how often have you gambled to help you to escape from problems or when you were feeling bad?

- ☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

67 In the past year, after losing money gambling, have you returned another day to try and win back money you lost?

- ☐ Never ☐ Less than half the time
☐ More than half the time ☐ Every time

68 In the past year has your gambling ever led to lies to your family?

- ☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

In the past year have you ever taken money from the following *without permission* to spend on gambling:

69 School lunch money or fare money?

☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

70 Money from your family?

☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

71 Money from outside the family?

☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

In the past year has your gambling ever led to:

72 Arguments with family/friends or others?

☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

73 Missing school?

☐ Never ☐ once or Twice ☐ Sometimes ☐ Often

Please indicate your attitude towards the following statements about gambling

74 Gambling is a fun activity

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

75 Moderate gambling is harmless

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

76 Gamblers need counselling

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

77 Gambling should be illegal

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

78 There is too much gambling today

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

79 Gambling destroys families

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

80 Gambling is just another hobby

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

81 Most people can control their gambling

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

82 Gambling is a social evil

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

83 I approve of some gambling being legal

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

84 Gambling should be controlled by law so people don't overdo it

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

85 Basically I approve of gambling

☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

QUESTIONS ABOUT YOUR FAMILY...

Please tick the boxes ☐

86 Your parents reward or give something extra to you for behaving well

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

87 Your parents tell you that you are doing a good job

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

88 Your parents hug or kiss you when you have done something well

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

89 Your parents praise you for behaving well

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

90 Your parents compliment you when you have done something well

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

91 Your parents tell you that they like it when you help out around the house

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

92 Your parents ask you about your day in school

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

93 Your parents ask you what your plans are for the coming day

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

94 Your parents drive you to a special activity

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

95 Your parents play games or do other fun things with you

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

96 Your parents talk to you about your friends

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

97 Your parents help with some of your special activities (such as sports, boy/girl scouts, church youth groups)

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

98 Your parents help you with your homework

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

99 Your parents go to a meeting at school, like parent/teacher conferences

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

100 Your parents plan family activities

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

101 Your parents have a friendly talk with you

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

102 You talk your parents out of punishing you after you have done something wrong

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

103 The punishment your parents give depends on their mood

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

104 Your parents let you out of a punishment early (like lift restrictions earlier than they originally said)

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

105 Your parents threaten to punish you then don't actually punish you

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

106 Your parents don't punish you if you have done something wrong

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

107 Your parents feel that getting you to obey them is more trouble than it's worth

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

Please read each family life change and decide whether it happened to any member of your family - *including you*.

First, decide if it happened any time *during* the last 12 months and tick YES or NO.

Second, decide if it happened any time *before* the last 12 months and tick YES or NO. It is okay to tick twice if it happened both times - before last year and during the past year.

DID THE CHANGE
HAPPEN IN YOUR
FAMILY?

Family Life Changes	During last 12 months		Before last 12 months	
	Yes	No	Yes	No
108 Family Member started new business (farm, Store, etc).	☐	☐	☐	☐
109 Parent quit or lost a job	☐	☐	☐	☐
110 Parents separated or divorced	☐	☐	☐	☐
111 Parent remarried	☐	☐	☐	☐

112	Family member was found to have a learning disorder.	☐	☐	☐	☐
113	Family went on welfare	☐	☐	☐	☐
114	Damage to or loss of family property due to fire, burglary, or other disaster	☐	☐	☐	☐
115	Brother or sister died	☐	☐	☐	☐
116	Parent died	☐	☐	☐	☐
117	Close family relative died	☐	☐	☐	☐

DID THE CHANGE
HAPPEN IN YOUR
FAMILY?

Family Life Changes		<i>During last 12 months</i>		<i>Before last 12 months</i>	
		Yes	No	Yes	No
118	Death of a close friend or family member	☐	☐	☐	☐
119	Family member or close family friend attempted or committed suicide	☐	☐	☐	☐
120	Family member became seriously ill or injured (NOT hospitalized)	☐	☐	☐	☐
121	Family member was hospitalized	☐	☐	☐	☐
122	Family member became physically disabled or was found to have long-term health problem (allergies, asthma, diabetes, etc.).	☐	☐	☐	☐
123	Family member has emotional problems	☐	☐	☐	☐

- | | | | | | |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 124 | Grandparent(s) became seriously ill | ☐ | ☐ | ☐ | ☐ |
| 125 | Parent(s) have more responsibility to take care of grandparent(s) | ☐ | ☐ | ☐ | ☐ |
| 126 | Family member ran away | ☐ | ☐ | ☐ | ☐ |
| 127 | More financial debts due to credit cards or charges | ☐ | ☐ | ☐ | ☐ |
| 128 | Family member uses drugs (not given by doctor) | ☐ | ☐ | ☐ | ☐ |
| 129 | Family member drinks too much alcohol | ☐ | ☐ | ☐ | ☐ |
| 130 | Child or teenage member was suspended from school or dropped out of school | ☐ | ☐ | ☐ | ☐ |
| 131 | Family member went to jail, juvenile detention or was placed on court probation | ☐ | ☐ | ☐ | ☐ |

The following questions ask about problem gambling. This means someone spending too much money or time on gambling which causes problems for themselves or other people.

Think about the people you live with most of the time.....

FATHER/STEPFATHER

132 What does your father/stepfather gamble most on?

☐ Card Games at home

☐ Sports betting

- ☐ Horse/Dog race betting at the TAB
- ☐ Horse/Dog race betting at the Track
- Online/Internet gambling
- ☐ Poker Machines
- ☐ Other (Please specify): _____
- ☐ Don't know
- ☐ My father/step father doesn't gamble
- ☐ Bingo
- ☐ Casino tables
- ☐ Games
- ☐ Lotteries
- ☐ Scratchies

133 Have you ever thought that your father/step father had a gambling problem?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My father/step father doesn't gamble

134 Did you ever encourage your father/step father to quit gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My father/step father doesn't gamble

135 Did you ever argue or fight with your father/step father about his gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My father/step father doesn't gamble

136 Have you ever heard your father/step father fight with others about his gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My father/step father doesn't gamble

137 Did you ever wish that your father/step father would stop gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My father/step father doesn't gamble

MOTHER/STEPMOTHER

138 What does your mother/stepmother gamble most on?

- ☐ Card Games at home
- ☐ Horse/Dog race betting at the TAB
- ☐ Horse/Dog race betting at the Track
- Online/Internet gambling
- ☐ Poker Machines
- ☐ Other (Please specify): _____
- ☐ Don't know
- ☐ My mother/stepmother doesn't gamble
- ☐ Sports betting
- ☐ Bingo
- ☐ Casino tables
- ☐ Games
- ☐ Lotteries
- ☐ Scratchies

139 Have you ever thought that your mother/stepmother had a gambling problem?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My mother/step mother doesn't gamble

140 Did you ever encourage your mother/stepmother to quit gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My mother/step mother doesn't gamble

141 Did you ever argue or fight with your mother/stepmother about her gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My mother/step mother doesn't gamble

142 Have you ever heard your mother/stepmother fight with others about her gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My mother/step mother doesn't gamble

143 Did you ever wish that your mother/stepmother would stop gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My mother/step mother doesn't gamble

SIBLING/STEPSIBLING

144 What does your sibling/step sibling gamble most on?

- ☐ Card Games at home
- ☐ Sports betting
- ☐ Horse/Dog race betting at the TAB
- ☐ Bingo
- ☐ Horse/Dog race betting at the Track
- ☐ Casino tables
- ☐ Games
- Online/Internet gambling
- ☐ Lotteries
- ☐ Poker Machines
- ☐ Scratchies
- ☐ Other (Please specify): _____

☐ Don't know

☐ My sibling/step sibling doesn't gamble

145 Have you ever thought that your sibling/step sibling had a gambling problem?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No

- ☐ Don't Know
- ☐ My sibling/step sibling doesn't gamble

146 Did you ever encourage your sibling/step sibling to quit gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My sibling/step sibling doesn't gamble

147 Did you ever argue or fight with your sibling/step sibling about their gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My sibling/step sibling doesn't gamble

148 Have you ever heard your sibling/step sibling fight with others about their gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now

- ☐ No
- ☐ Don't Know
- ☐ My sibling/step sibling doesn't gamble

149 Did you ever wish that your sibling/step sibling would stop gambling?

- ☐ Yes, in the past (over 12 months ago)
- ☐ Yes, now
- ☐ No
- ☐ Don't Know
- ☐ My sibling/step sibling doesn't gamble

Below is a list of ways in which people your age cope with a wide variety of concerns or problems. Please indicate the things you do to deal with living in your family by ticking the box under the appropriate number. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which best describes how you feel.

REMEMBER: YOU ARE THINKING ABOUT LIVING IN YOUR FAMILY

- 1= Doesn't apply or don't do it
- 2= Used very little
- 3= Used sometimes
- 4= Used often
- 5= Used a great deal

	1	2	3	4	5
150 Talk to other people about my concern to help me sort it out	☐	☐	☐	☐	☐
151 Work at solving the problem to the best of my ability	☐	☐	☐	☐	☐

152	Work hard	☐	☐	☐	☐	☐
153	Worry about what will happen to me	☐	☐	☐	☐	☐
154	Spend more time with my boy/girl friend	☐	☐	☐	☐	☐
155	Improve my relationship with others	☐	☐	☐	☐	☐
156	Wish a miracle would happen	☐	☐	☐	☐	☐
157	I have no way of dealing with the situation	☐	☐	☐	☐	☐
158	Find a way to let off steam; for example cry, scream, drink, take drugs	☐	☐	☐	☐	☐
159	Join with people who have the same concern	☐	☐	☐	☐	☐
160	Shut myself off from the problem so that I can avoid it	☐	☐	☐	☐	☐
161	See myself as being at fault	☐	☐	☐	☐	☐
	1= Doesn't apply or don't do it					
	2= Used very little					
	3= Used sometimes					
	4= Used often					
	5= Used a great deal					
		1	2	3	4	5
162	Don't let others know how I am feeling	☐	☐	☐	☐	☐
163	Pray for help and guidance so that everything will be alright	☐	☐	☐	☐	☐
164	Look on the bright side of things and think of all that is good	☐	☐	☐	☐	☐
165	Ask a professional person for help	☐	☐	☐	☐	☐
166	Make time for leisure activities	☐	☐	☐	☐	☐

167 Keep fit and healthy

☐ ☐ ☐ ☐ ☐

168 Is there anything else you would like to tell us about living in your family?

THANK YOU