The Problem Gambling Research and Treatment Centre
A joint initiative of the Victorian Government, the University of Melbourne and Monash University

Children at Risk of Developing Problem Gambling

Nicki A Dowling
Alun C Jackson
Shane A Thomas
Erica Frydenberg

FINAL REPORT

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About the Research Team

Nicki Dowling, Senior Research Fellow, Problem Gambling Research and Treatment Centre, University of Melbourne. Chief Investigator responsible for literature review (Chapters 2 and 3) preparation; data analytic strategy; data analysis, reporting, and interpretation; data collection for Studies 3 and 4; project design; and manuscript preparation and review.

Alun Jackson, Professor and Director, Problem Gambling Research and Treatment centre, University of Melbourne. Chief Investigator responsible for overall project management; data collection for Studies 2 and 3; guidelines (Chapter 10) preparation; project design; and manuscript preparation.

Shane Thomas, Professor and Director, Problem Gambling Research and Treatment Centre, Monash University. Chief Investigator responsible for data collection for Study 1; guidelines (Chapter 10) preparation; project design; and manuscript preparation.

Erica Frydenberg, Associate Professor, Melbourne Graduate School of Education, University of Melbourne. Chief Investigator responsible for data collection for Study 2; project design; and manuscript preparation.

Julia Geraghty, Research Assistant, Problem Gambling Research and Treatment Centre, University of Melbourne.

Ramsay Dixon, Research Assistant, Problem Gambling Research and Treatment Centre, University of Melbourne.

Kate Francis, Research Fellow, Problem Gambling Research and Treatment Centre, University of Melbourne.

Sophia Vasiliadis, Research Assistant, Problem Gambling Research and Treatment Centre, University of Melbourne.

Azusa Umemento, Research Fellow, Problem Gambling Research and Treatment Centre, University of Melbourne.

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EXECUTIVE SUMMARY

CHILDREN AT RISK OF DEVELOPING PROBLEM GAMBLING

Gambling Research Australia commissioned the Problem Gambling Research and Treatment Centre (PGRTC) to conduct the *Children at Risk of Developing Problem Gambling* (tender number 103/06) project (**herein referred to as the *Children at Risk Project***). The focus of this research was on the risk factors for the development of gambling problems in children who have a family member with a gambling problem.

Project goals

The project tasks were to:

1. "*review the published literature on risk exposures and protective factors in relation to children in families where there is a problem gambler";*
2. *"develop an appropriate methodology to conduct an analysis of the risk exposures and their contribution towards the development of problem gambling in children",* and
3. "*using the outcomes from the risk factor analysis, develop guidelines that policy makers and program developers can use in future population level interventions and strategies targeted at children at risk of developing problem gambling".*

Project literature review

Literature review aims and methods

The aim of the literature review was to explore the familial (**parent and sibling**) transmission of problem gambling and to identify the risk exposures and protective factors related to growing up in a problem gambling family. However, the transfer of gambling problems from parents or siblings has generally been neglected in the theoretical and empirical literature. We examined the suitability of several advanced research literatures to guide the selection of potentially relevant risk and protective factors and inform the design of appropriate methodologies in investigating the familial transmission of gambling problems. The alcohol use literature was among the most advanced and there are commonalities between the two disorders. We therefore:

1. examined the literature investigating the familial transfer of alcohol use problems in order to identify potentially relevant variables and theoretical models for understanding the development of problem gambling in children raised in problem gambling families; and

2. applied a research framework employed in the alcohol use literature to explore our current empirical and theoretical understanding of the development of gambling problems in children raised in problem gambling families.

Research framework

The research framework used in the *Children at Risk Project* comprised four research questions that addressed the project goals:

1. What is the ***magnitude of risk*** associated with family member problem gambling for the development of child problem gambling?
2. What is the ***specificity of risk*** associated with family member problem gambling for the development of child problem gambling?
3. What are the mediating mechanisms underlying the relationship between familial and child problem gambling? That is, what are the ***risk factors*** that explain why children raised in problem gambling families are more likely to develop problem gambling than children raised in non-problem gambling families?
4. What are the ***protective factors*** that may buffer the risk associated with family member problem gambling?

Literature review findings

We employed this research framework to structure the review and organise the extensive literature relating to the development of alcohol use problems in children raised in alcohol use problem families. We then applied the research framework to explore our current empirical and theoretical understanding of the transmission of gambling problems from parents (intergenerational transmission) and siblings (sibling transmission). The findings derived from the application of the research framework to the familial transmission of gambling problems is summarised below.

Magnitude of risk for the intergenerational transmission of problem gambling behaviour

The literature review showed that:

- There is now substantial evidence that there is a moderate risk associated with parental gambling problems, with research findings consistently indicating that children of problem gamblers are 2 to 4 times more likely to develop gambling problems themselves than the children of non-problem gamblers.
- Paternal problem gambling raises the risk for the development of child problem gambling more than maternal problem gambling.
- The magnitude of risk associated with parental problem gambling for the development of offspring gambling problems is substantial enough to warrant clinical and policy responses.

Specificity of risk for the intergenerational transmission of problem gambling behaviour

The literature review showed that:

- There is almost no literature that investigates whether the risk for problem gambling is specifically related to problem gambling or other issues associated with parental problem gambling.
- Further research is required to determine the degree to which the effects of parental problem gambling impact on offspring problem gambling above and beyond those of co-occurring parental psychiatric disorders such as affective disorders, anxiety disorders, alcohol and substance use problems, and personality disorders.

Risk factors for the intergenerational transmission of problem gambling behaviour

The literature review showed that:

- There is general agreement that both genetic and environmental factors are influential in the intergenerational transmission of problem gambling behaviour. Empirical research suggests that genetics have a relatively weak but significant impact on the risk of developing problem gambling, particularly for males. There is also evidence that child and adolescent gambling is promoted by family members and friends acting as significant models for gambling.
- The variation in problem gambling outcomes for the children of problem gamblers implies that there are risk factors that mediate or explain problem gambling outcomes.
- There may be multiple interpretations of risk exposures in the context of the familial transmission of problem gambling. In the *Children at Risk Project*, we have defined a "risk exposure" as a mediating factor as this type of risk factor can potentially explain how or why the familial transmission of problem gambling behaviour occurs.
- Little is known about the risk mechanisms by which parental problem gambling may result in elevations in offspring problem gambling. In order to identify risk factors that explain how or why the relationship between family member and child problem gambling occurs, studies need to employ statistical analyses that simultaneously test all the requisite relationships between parental problem gambling, possible risk factors, and offspring problem gambling. The few studies that appropriately test all of these relationships suggest that offspring gambling cognitions and parenting practices may explain part of the relationship between parental and offspring problem gambling.
- Potentially relevant variables for study in explaining the intergenerational transmission of problem gambling may also be derived from:

    1. Studies that have identified the environmental characteristics of problem gambling families. The findings from these studies suggest that risk factors for the intergenerational transmission of gambling problems may include family dysfunction, ineffective parenting practices and styles, dyadic relationship dysfunction, co-occurring parental psychopathology, impaired family coping, family violence, and gambling-related financial consequences. However, the failure of these studies to measure offspring problem gambling precludes the conclusion that such conditions are related to the development of offspring problem gambling.
    2. Studies that have examined the correlates of youth problem gambling. The findings of these studies suggest that risk factors for the intergenerational transmission of gambling problems may include personality factors (e.g., sensation seeking and impulsivity), emotional distress, impaired coping, alcohol and substance use, risk-taking behaviours, gambling attitudes and beliefs, gambling expectancies, and family problems. However, the failure of these studies to measure parental problem gambling precludes the interpretation that these correlates explain the intergenerational transmission of problem gambling.

3. Studies that have examined the risk factors for the intergenerational transfer of alcohol use problems and models attempting to explain the etiologic mechanisms underlying the intergenerational transfer of alcohol use problems. Although yet to be tested as relevant to the study of the intergenerational transmission of gambling problems, the findings from these studies suggest that risk factors for the intergenerational transmission of gambling problems may include:
   - psychological factors (e.g., difficult temperament, aggression, attributional style, expectancies, cognitive dysfunction, coping styles, perceived competencies, behavioural undercontrol, negative mood states/emotional distress, sensation seeking, impulsivity, impaired coping)
   - family factors (e.g., parenting behaviours and deficits, parent-child interaction, marital conflict, financial strain, family ritual disruption, difficult sibling relations, family instability, family disorganisation, parental loss and family breakdowns, family conflict and violence), and
   - social factors (e.g., peer rejection/isolation, aggressive social style, limited friend selection, prosocial skills, education, school failure, social rejection, deviant behaviours, exposure, peer influence)

Protective factors for the intergenerational transmission of problem gambling behaviour

The literature review showed that:

- The variability in problem gambling outcomes among the children of problem gamblers can also be explained by differential exposure to factors that protect against the effects of parental gambling problems.
- There may be multiple interpretations of protective factors in the context of the familial transmission of problem gambling. In the *Children at Risk Project*, we have defined a "protective factor" as any potentially moderating factor that serves to weaken or buffer intergenerational transmission of gambling problems.
- There are few empirical studies examining the factors that serve to mitigate the transmission of parental gambling problems to children.
- Studies that have explored protective factors for the development of adolescent problem gambling suggest that protective factors for the intergenerational transmission of problem gambling may include female gender, family cohesion, and school connectedness.
- Findings from the alcohol use literature can also serve to inform the identification of potentially relevant variables for study in protecting against the intergenerational transmission of problem gambling. Potential protective factors identified from the alcohol use literature include coping, perceived control, social class, family rituals, mother's esteem for the alcohol dependent father, amount of attention from primary caregivers, low family conflict, birth of another sibling, child social support, personality, higher self-awareness, higher intellectual functioning, the psychiatric status of the non-dependent parent, parental monitoring, consistent discipline, social support and resources, child gender, child age, parental gender, duration and intensity of exposure, treatment experience, peer influences, and expectancies.

Sibling transmission of problem gambling behaviour

The literature review showed that:

- There does not seem to be any research that has specifically investigated sibling influence in the development of gambling problems.
- The influence of siblings in the development of gambling problems will be an important future area of research given findings that a significant proportion of adolescent gamblers report that they were introduced to gambling by their siblings and regularly gamble with their siblings, and that adult problem gamblers report high rates of gambling problems for their siblings.

Literature review conclusions

- Using the research agenda as a framework, the literature review concluded that there are significant gaps in our theoretical and empirical understanding of problem gambling outcomes for individuals (children, adolescents, adults) raised in problem gambling families.
- Identifying potentially modifiable risk and protective factors in the development of problem gambling in individuals raised in problem gambling families is important in the design of targeted prevention and intervention strategies necessary to reduce the intergenerational cycle of transmission of problem gambling from one generation to the next.

Studies of the *Children at Risk Project*

The *Children at Risk Project* aimed to develop an appropriate methodology to conduct an analysis of the contribution of risk exposures towards the development of problem gambling in individuals raised in problem gambling families. Four studies were conducted:

1. **Study 1**: A large scale national community telephone survey of 3953 adults retrospectively reporting on the gambling behaviour of family members during their childhoods (Chapter 5)
2. **Study 2**: A survey of 612 adolescents aged 12 to 18 years sampled from secondary schools (Chapter 6)
3. **Study 3**: A survey of 823 young adults sampled from tertiary institutions (Chapter 7), and
4. **Study 4**: A survey of 98 individuals seeking problem gambling counselling (Chapter 8). Participants retrospectively reported on the gambling behaviour of their family members during their childhoods and prospectively reported on the gambling behaviour of their children. Study 4 also provided some qualitative analyses that explored the beliefs of problem gamblers about the nature of the familial transmission of problem gambling behaviour according to their own personal experiences.

We applied the research agenda from the alcohol use literature to formulate the aims and hypotheses of the *Children at Risk Project*. These aims were primarily answered using quantitative data derived from Studies 1, 2, and 3. Table 1 displays a full list of control factors, risk factors, and protective factors that were evaluated in these studies.

Table 1
Control variables, risk factors, and protective factors assessed in the four Children at Risk Project studies

Tested control variables	Tested risk factors	Tested protective factors
Socio-demographic	***Psychological factors***	***Psychological factors***
• Gender	• Gambling attitudes	• Coping (*Productive coping, Reference to Others*)
• Age	• Non-productive coping	• Coping resources
• Metro/rural	• Life dissatisfaction	• Negative gambling expectancies (*Overinvolvement, Emotional Impact*)
• Relationship status	• Substance use (alcohol, marijuana, other drug)	
• Living alone	• Positive gambling expectancies (*Enjoyment/Arousal, Self-Enhancement, Money*)	***Family factors***
• Employment status	• Gambling motives (*Enhancement, Coping, Social*)	• Two-parent family
• Educational qualifications	• Sensation seeking	• Greater number of siblings
• Country of birth	• Depression/psychological distress	• Parental employment (paternal, maternal)
• Aboriginal and Torres Straight Islander (ATSI) status	• Antisocial behaviours	• Parenting practices (*Positive parenting, Parental involvement*)
• Gross personal weekly income	***Family factors***	• Family functioning
• Gross household weekly income	• Family member problem drinking	• Parenting style (*Paternal/maternal authoritative*)
Family member psychopathology	• Family member drug problems	***Social factors***
• Family member problem drinking	• Family member mental health issues	• Female gender
• Family member drug problems	• Parenting practices (*Inconsistent discipline*)	• Child age
• Family member mental health issues	• Parental separation/divorce	• Australian born status
Concurrent family stressors	• Family financial problems/debts	• Younger age left home
• Parental unemployment	• Family dissatisfaction	• Raised in a metropolitan region
• Parental separation/divorce	• Living situation dissatisfaction	• Social capital when growing up
• Family member physical illness	• Money dissatisfaction	• Physical health
• Financial debts	• Family conflict	
• Family member imprisonment	• Parenting style (*Paternal/maternal authoritarian, Paternal/maternal permissive*)	
	• Parental unemployment	
	Social factors	
	• Age of first gamble	
	• Number of gambling friends	
	• Gambling with parents, siblings, and friends	
	• Gambling at home and friends' homes	

Findings from the project studies

Magnitude of risk for the familial transmission of problem gambling behaviour

- ***Family member problem gambling*.** The findings of the *Children at Risk Project* revealed that 7.3% to 10.0% of participants reported that they were raised in families with a problem gambling family member (parents or siblings). Studies 1, 2, and 3 found that having any family member with a gambling problem (i.e., parents or siblings) was positively associated with child/adult child problem gambling outcomes. In these studies, participants with a family history of problem gambling were 2.3 to 9.6 times more likely display problem gambling behaviour and 1.3 to 3.5 times more likely to display at-risk or moderate risk gambling than their peers.
- ***Paternal problem gambling*.** The findings of the *Children at Risk Project* revealed that between 4.0% and 6.4% of participants reported that they were raised in families with a problem gambling male parent. There was a statistically significant relationship between paternal problem gambling and child/adult child problem gambling in Studies 1 and 2. In these studies, participants with problem gambling fathers were 10.7 to 13.5 times more likely display problem gambling behaviour and 3.6 to 5.1 times more likely to display at-risk or moderate risk gambling than their peers.
- ***Maternal problem gambling***. In the *Children at Risk Project*, between 1.1% and 4.1% of participants reported that they were raised in families with a problem gambling female parent. There was a statistically significant relationship between maternal problem gambling and child/adult child problem gambling in Studies 1 and 3. In these studies, participants with problem gambling mothers were 6.7 to 10.6 times more likely display problem gambling behaviour and 1.1 to 1.7 times more likely to display at-risk or moderate risk gambling than their peers.
- ***Sibling problem gambling***. Only 1.2% to 2.6% of participants indicated that they were raised in families with a problem gambling sibling and only Study 2 found a statistically significant relationship between sibling and participant problem gambling. This finding is in contrast with emerging evidence from the alcohol use literature that adolescent alcohol use problems are significantly associated with sibling alcohol use problems. In Study 2, participants with problem gambling siblings were no more likely to display problem gambling but 11.0 times more likely to display at-risk gambling than their peers.
- ***Density of family history***. Of the participants reporting a family history of problem gambling, most reported problem gambling in only one family member. However, a small proportion of participants (10 to 14%) reported gambling problems in more than one family member. There was no association between family density of problem gambling and child/adult child problem gambling in any of the studies.
- We concluded from these results that the magnitude of risk associated with family member problem gambling for the development of child gambling problems is substantial enough to warrant clinical and policy responses.

Specificity of risk for the familial transmission of problem gambling behaviour

- Studies 1 to 3 of the *Children at Risk Project* aimed to determine the specificity of risk associated with family member problem gambling for the development of child/adult child problem gambling independent of variables typically associated with parental problem gambling. In all of these studies, family member problem gambling remained positively associated with child/adult child problem gambling after controlling for a range of relevant socio-demographic factors, family member psychopathology, and concurrent family stressors. These findings suggest that the problem gambling behaviour of family members has an effect on the development of problem gambling in the children or adult children independent of these factors.

Risk factors for the familial transmission of problem gambling behaviour

- In Studies 1 to 3 of the *Children at Risk Project*, we assessed a wide range of variables thought to be potentially etiologically relevant in the familial (parents and sibling) transmission of gambling problems.
- These studies identified a range of factors that were associated with problem gambling families (see Table 2). Although many of these factors were not related to the development of child/adult child problem gambling, they may be related to child/adult child outcomes other than problem gambling (e.g., behavioural or psychological outcomes). The variables associated with problem gambling families are worthy of further study as explanatory risk mechanisms underlying the relationship between family member problem gambling and these other outcomes.
- These studies also identified a range of factors that were associated with participant (predominantly youth) problem gambling (see Table 2). Although many of these factors were not related to the familial transmission of problem gambling, they have important implications for the development of prevention, early intervention, and treatment programs for youth problem gambling.
- Although the factors associated with problem gambling families and youth problem gambling are interesting, stringent statistical tests were employed in Studies 1 to 3 of the *Children at Risk Project* to identify the factors *explaining how or why* children raised in problem gambling families are more likely to develop problem gambling than children raised in non-problem gambling families. The risk factors identified in each study are listed, in order of relative importance, in Table 3.

Protective factors for the familial transmission of problem gambling behaviour

- In Studies 1 to 3 of the *Children at Risk Project*, we also assessed a wide range of variables thought to buffer the familial (parents and sibling) transmission of gambling problems.
- These studies identified the protective factors that may buffer the risk associated with family member problem gambling. The protective factors identified in each study are listed, in order of relative importance, in Table 3.

Table 2
A summary of the factors associated with problem gambling families and child problem gambling in the Children at Risk Project

Factors associated with problem gambling families	Factors associated with child/adult child problem gambling
Psychological factors	
• gambling attitudes • life dissatisfaction • marijuana use • alcohol use • other drug use • non-productive coping • self-enhancement expectancies • money expectancies • enhancement motives • coping motives • social motives • depression	• gambling attitudes • non-productive coping • alcohol use • marijuana use • other drug use • enjoyment/arousal expectancies • self-enhancement expectancies • money expectancies • enhancement motives • coping motives • social motives • sensation-seeking • depression • antisocial behaviours
Family factors	
• paternal problem drinking • maternal problem drinking • sibling problem drinking • paternal drug problems • maternal drug problems • sibling drug problems • paternal mental health issues • maternal mental health issues • sibling mental health issues • family member emotional problems • parental separation/divorce • financial debts • family dissatisfaction • living situation dissatisfaction	• paternal problem drinking • maternal problem drinking • maternal drug problems • paternal mental health issues • inconsistent discipline • parental separation/divorce • financial debts • family dissatisfaction • living situation dissatisfaction • money dissatisfaction
Social factors	
• age of first gamble • gambling at home • gambling with parents	• number of gambling friends • age of first gamble • gambling with friends • gambling with siblings • gambling at home on the internet

Table 3
A summary of the risk and protective factors identified in the Children at Risk Project

		Risk factors	Protective factors
Any family member	**Study 1**	1. Lower age of first gamble 2. Maternal drug problem 3. Paternal mental health issues [a]	1. Female gender 2. Social capital (feeling safe walking alone) 3. Social capital (help from friends, family or neighbours) 4. Single-parent family 5. Higher number of siblings 6. Australian born status 7. Younger age of leaving home
	Study 2	1. Marijuana use 2. Other drug use 3. Financial debts	1. Higher number of siblings 2. Reference to others coping style
	Study 3	1. Coping motives 2. Enhancement motives 3. Money expectancies 4. Self-enhancement expectancies 5. Social motives 6. Depression [a]	1. Emotional impact expectancies 2. Female gender 3. Overinvolvement expectancies
Paternal	**Study 1**	1. Maternal drug problem 2. Lower age of first gamble	1. Social capital (help from friends, family or neighbours) 2. Female gender 3. Single-parent family 4. Younger age of leaving home 5. Australian born status 6. Social capital (feeling safe walking alone)
	Study 2	1. Financial debts 2. Non-productive coping 3. Marijuana use 4. Parental separation/divorce	1. Higher number of siblings 2. Male gender 3. Productive coping
Maternal	**Study 1**	1. Paternal problem drinking 2. Paternal mental health issues [a]	1. Female gender 2. Higher number of siblings 3. Australian born status 4. Single-parent family
	Study 3	1. Depression 2. Enhancement motives	1. Female gender 2. Older age 3. Emotional impact expectancies 4. Overinvolvement expectancies 5. Australian born status
Sibling	**Study 2**	1. Other drug use [a] 2. Family dissatisfaction [a]	1. Low parental involvement 2. Productive coping 3. Low positive parenting 4. Female gender

[a] Risk factor but reduction in strength of association not significant

Consideration of the potential sources of heterogeneity

- Issues relating to the heterogeneity of transmission were explored in Study 4 using the larger sample of problem gamblers surveyed in this study. The findings revealed that problem gamblers reported that most of their problem gambling family members were biological relatives who lived with them on a full-time basis; that problem gamblers reported that they were very young when their parents started having gambling problems but that they were older when their siblings started having problems; that problem gamblers reported that their problem gambling family members generally experienced long-term difficulties; and that about half of the problem gamblers gambled on the same activities as their problem gambling family members.

Guidelines for the development of intervention strategies or programs for children at risk of developing problem gambling

- The magnitude of the risk associated with familial transmission in the *Children at Risk Project* appears substantial enough to warrant clinical and policy responses. The identification of risk and protective factors has implications for the development of policy and practice responses utilising a public health approach incorporating primary, secondary, and tertiary prevention.

- To date, there are few documented prevention and intervention programs in Australia or internationally for individuals raised in problem gambling families.

Primary prevention

- Primary prevention programs for individuals raised in problem gambling families target all individuals regardless of risk or need. The distribution of consumption model suggests that reductions in the number of children affected by family member problem gambling are produced through societal control of gambling availability using strategies such as setting a minimum gambling age, reducing the hours of venue opening, and caps on electronic gaming machine numbers. The sociocultural model emphasises education and increasing resilience through information, values clarification, and skill-building strategies. The results of the *Children at Risk Project* suggest that mothers and fathers are the most appropriate targets of primary prevention for the familial transmission of gambling problems.

- ***Community-based prevention***. Community-based primary prevention approaches include mass media campaigns, adult education, youth education, health professional education, and mass screening of health medical services. Appropriate targets for strategies in community-based prevention initiatives for individuals raised in problem gambling families include the social normalisation of gambling and gambling expectancies. The empirically-supported *Kids Absorb Your Drinking* campaign provides a model for the development of mass media campaigns to prevent the intergenerational transmission of gambling problems.

- ***School settings.*** School-based prevention programs often comprise both a primary prevention and secondary prevention component. The findings of the *Children at Risk Project* suggest that appropriate targets for strategies in school-based programs include gambling expectancies, coping, social normalisation of

gambling, and comorbid depression and drug use. These efforts could benefit from the development of resources to assist teachers and school welfare staff.

Secondary prevention

- Secondary prevention specifically targets individuals raised in problem gambling families for identification and intervention. Secondary prevention initiatives require identification of a family history of gambling problems using valid screening instruments and an appropriate service response. Secondary prevention programs for other issues often incorporate social support, information, skills training, and coping with emotional problems.

- ***Community service settings.*** Routine screening and a service response for a family history of problem gambling seems to be justified in community services.

- ***Schools settings.*** School-based secondary prevention initiatives could involve referring children living in a problem gambling family to support groups with peer leaders and/or personal coaches.

Tertiary prevention

- The most obvious way to prevent the development of gambling problems in children and adolescents living in problem gambling families is to successfully treat the problem gambling family member. Other tertiary prevention programs could include interventions for individuals raised in problem gambling families and family-focused interventions for problem gambling.

- ***Interventions for individuals raised in problem gambling families***. The development of interventions specifically designed for individuals raised in problem gambling families is needed. Possible interventions include individual counselling, group interventions, 12-step programs, and website support. The findings of the *Children at Risk Project* suggest that gambling expectancies, coping, social normalisation of gambling, comorbid depression, and comorbid drug use would be appropriate targets of such interventions.

- ***Family-oriented interventions for problem gambling***. The range of issues associated with problem gambling families implies that family-oriented interventions for problem gambling are required. The *Strengthening Families* program for problem drinking and drug using families provides an empirically-supported model combining the traditional treatment of problem gambling parents with preventative services for children.

- ***Treatment programs and services for adolescent gambling***. Another approach to preventing problems in the children of problem gamblers is to prevent future parents from becoming problem gamblers. However, age-specific approaches for the treatment of adolescent problem gambling remain to be adequately evaluated.

- ***Protocols requiring coordinated service response***. The children of parents who present to gambling services should receive the same treatment response as those of parents presenting to mental health or drug and alcohol services. A high level of service integration could serve to promote good outcomes for children living in problem gambling families.

CHAPTER 1
BACKGROUND

This report describes the conduct and outcomes of a series of linked studies performed by the Problem Gambling Research and Treatment Centre (PGRTC) for Gambling Research Australia (GRA) in the *Children at Risk of Developing Problem Gambling* project.

The PGRTC is a partnership between the Victorian Government, the University of Melbourne, and Monash University. The PGRTC is funded under the Victorian Government's Problem Gambling Strategy, *Taking Action on Problem Gambling*.

GRA, formerly known as the National Gambling Research Program Working Party (NGRWP), commenced active operation in 2003. GRA is responsible for managing and implementing the national research agenda on behalf of the Ministerial Council on Gambling. GRA commissioned a 12-month national project, *Children at Risk of Developing Problem Gambling* (tender number 103/06) (**herein referred to as the *Children at Risk Project***). This project falls within the fourth research priority area nominated by the Ministerial Council on Gambling: *Major study of problem gamblers, including their profile, attitudes, gambling behaviour and the impact of proposed policy measures on them.*

The focus of this research is on the risk factors for the development of gambling problems in children who have a family member with a gambling problem.

1.1 Key Outcomes

There are two key outcomes for this study:

1. the identification of which risk exposures to the children of problem gamblers are most likely to result in the development of problematic gambling behaviour if not addressed; and

2. the development of guidelines (using a public health framework) from the analysis and outcomes of (1) above, for policy makers and program developers to help them ensure interventions are designed to ameliorate those identified risks.

1.2 Project Considerations

For the purposes of this study, GRA required the contractor to:

- consider a wide range of meanings of 'family';

- consider children to include all young people under the age of eighteen, who are members of the family;

- use the following definition of problem gambling:

> "Problem gambling is characterised by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others or for the community" [1, p. 3].

1.3 Project Tasks

GRA sought to have the following tasks undertaken by the contractors:

1. Review the published literature on risk exposures and protective factors that inhibit or enhance the likelihood that children, in families where there is problem gambling, will develop problem gambling;

2. Develop an appropriate methodology to conduct an analysis of the risk exposures and their contribution towards the development of problem gambling in children; and prioritise these according to which risks most contribute to the development of future problem gambling in children (either as children or later into adulthood);

3. Using the outcomes from the risk factor analysis, develop guidelines for the development of intervention strategies/programs for children at risk of developing problem gambling. These guidelines are intended for use at a targeted population level, not on an individual therapeutic level. It is anticipated that policy makers and program developers can use these guidelines in future population level interventions and strategies targeted at children at risk of developing problem gambling.

CHAPTER 2
RISK AND PROTECTIVE FACTORS FOR THE FAMILIAL TRANSMISSION OF PROBLEM GAMBLING BEHAVIOUR: LITERATURE REVIEW

2.1 Introduction

The prevalence of problem gambling has now been studied in many countries, including Australia, Canada, North America, Great Britain, New Zealand, Norway, Singapore, Spain, Sweden, and Switzerland. Using a variety of measurement instruments, definitions, and methodologies, national studies of gambling behaviour in these countries have derived current prevalence rates of problem and at-risk gambling of up to 5.5% [2-11]. In the only national prevalence survey conducted in Australia, the prevalence of problem gambling approximated to 2.1% of the Australian adult population [8]. With varying methodologies, more recent Australian state-wide community surveys reveal current prevalence rates of problem and at-risk gambling of up to 4.2% [12-19]. Taken together, these rates suggest that a significant proportion of individuals in many jurisdictions are affected by problem gambling.

There is substantial evidence that problem gambling can result in many adverse personal consequences, including impaired mental and physical health, financial problems, and employment difficulties [e.g., 8]. However, there is now an accumulation of evidence that problem gambling does not only affect the individual with the gambling problem, but also results in a high degree of societal and familial harm. It has been argued that the gambling problem of one individual has direct negative effects on many others, including family members and co-workers [8]. International empirical evidence suggests that problem gambling significantly disrupts dyadic relationships and family environments, and adversely affects the emotional and physical health of partners and children (refer to Section 2.3.6.1). Extended family members of problem gamblers, such as parents, are also affected, although generally to a lesser extent [20-24]. A literature review on problem gambling and its impacts on families summarised the most common problems reported by the family members of problem gamblers: "the loss of household or personal money; arguments, anger and violence; lies and deception; neglect of family; negatively affected relationships; poor communication; confusion of family roles and responsibilities; and the development of gambling problems or other addictions within the family" [20, p. 36].

Although several studies have now focused on the effect of problem gambling on the family, there remains a dearth of methodologically sound empirical literature investigating the impact of parental problem gambling on children. The limited available literature specifically examining the impact of parental problem gambling on children is characterised by descriptive information and clinical impressions derived from observations of problem gambling families and non-standardised survey questionnaires of family members. Several reports document the typical course for the effect of problem gambling on children based on clinical impressions and observations [24-28]. This anecdotal information is generally supported by qualitative surveys of children of problem gamblers [29], and quantitative studies surveying female Gam-Anon members [30, 31], the children of Gamblers Anonymous members

[32], the children of female problem gamblers [33], and children identifying themselves as children of problem gamblers [34, 35].

Clinical and survey evidence generally indicates that the children of problem gamblers experience a range of psychological and behavioural problems and are more likely than their peers to report generally unhappy early childhoods [34, 35]. The children of male pathological gamblers report experiencing a range of emotional reactions and emotionally-related physical complaints (refer to Table 2.1) [24, 26, 27, 30-32, 34-36]. Children of problem gamblers also tend to report that they sleep worse than most people, experience a poor mental state, and need success, acceptance and approval more than most people [32, 35]. Children of male problem gamblers also display high rates of behavioural problems (refer to Table 2.1) [24-27, 30, 32, 34, 35, 37].

Table 2.1
Examples of problems experienced by children of problem gamblers

Emotional reactions	*Physical complaints*	*Behavioural problems*
▪ hopelessness ▪ anxiety ▪ depression ▪ confusion ▪ hurt ▪ guilt ▪ loneliness, ▪ insecurity ▪ inadequacy ▪ anger	▪ asthma ▪ allergies ▪ chronic headaches ▪ chronic gastrointestinal problems	▪ running away ▪ alcohol and tobacco abuse ▪ overeating ▪ lower academic and employment performance ▪ legal problems ▪ attempted suicide

The findings reported by the limited number of studies that have evaluated the psychological and behavioural adjustment of the children of problem gamblers using standardised measures are mixed [33, 38, 39]. In a study sampling 150 Native American mothers of children aged 6 to 15 years visiting a tribal casino, Momper and Jackson [33] found that maternal problem gambling was significantly correlated with child behaviour problems, but failed to be a significant predictor of child behaviour problems when other variables were included in the analyses. Using secondary data derived from a treatment outcome study in Australia, Dowling, Smith, and Thomas [33] found that 40 children of 21 treatment-seeking female pathological gamblers did not report elevated rates of depression, anxiety, internalising problems, or externalising problems on a combination of self- and maternal-report measures in comparison to normative standardisation samples. In contrast, however, a longitudinal Canadian study conducted by Vitaro and colleagues [39] comparing 42 offspring of problem gamblers and 100 offspring of non-problem gamblers found that, after controlling for possible confounding factors (child gender, SES, parent mental health problems), parental problem gambling significantly predicted offspring's depressive symptoms and conduct problems during both mid-adolescence (at age 16 years) and early adulthood (at age 23 years).

In addition to being at risk for developing a range of internalising and externalising difficulties, there is now substantial evidence that parental problem gambling is associated with greater gambling frequency [34, 40-42], earlier onset of gambling behaviour [35, 43], and elevated incidence of problem gambling in children

and adolescents [35, 37, 39-41, 43-48]. In fact, the rate of problem gambling is higher for adolescents whose parents gamble at any level compared to adolescents whose parents do not gamble [43, 45, 49-51]. Moreover, a significant proportion of adult problem gamblers report being raised in problem gambling families. A family history of gambling in first-degree relatives of problem gamblers appears common, particularly in male problem gamblers [52-62].

The aim of the *Children at Risk Project* and literature review was to explore the familial (parent and sibling) transmission of problem gambling and to identify the risk and protective factors related to growing up in problem gambling family. To identify studies to be included in this review, major bibliographical databases (Pubmed, Psycinfo) were searched, using key words and text words combining terms indicative of gambling and alcohol, problem gambling and alcohol use problems, problem gambling families and problem drinking families, family members of problem gamblers and family members of problem drinkers, children of problem gamblers and "children of alcoholics" (COAs), familial transmission of gambling problems and alcohol use problems, risk and protective factors, mediation and moderation, genetic factors, social learning, prevention, and intervention. Although there was an emphasis on current literature, no time restrictions were placed on these searches. Reference lists of the retrieved studies were searched for identification of additional studies.

The aim of this literature review was to explore the familial (parent and sibling) transmission of problem gambling and to identify the risk and protective factors related to growing up in a problem gambling family

2.1.1 Definitions of risk and protective factors in the *Children at Risk Project*

The tasks of the *Children at Risk Project* were to:

1. "*review the published literature on risk exposures and protective factors in relation to children in families where there is a problem gambler";*
2. *"develop an appropriate methodology to conduct an analysis of the risk exposures and their contribution towards the development of problem gambling in children",* and
3. "*using the outcomes from the risk factor analysis, develop guidelines that policy makers and program developers can use in future population level interventions and strategies targeted at children at risk of developing problem gambling".*

Before proceeding further, it is important that we define the terms risk and protection. Using broad definitions, risk factors are those that increase the probability of a negative outcome and protective factors are those that decrease the probability of a negative outcome [63]. However, in the *Children at Risk Project* and literature review, we are attempting to understand the development of an outcome (e.g., offspring gambling problems) in the presence of an established risk factor (e.g., exposure to parental gambling problems). We are therefore interested in the effects of factors that are demonstrable in the presence of risk and do not provide any

disadvantage or advantage in low risk conditions [64, 65]. A framework elucidating mediators and moderators is appropriate for use in the *Children at Risk Project* given that the presence of parental gambling problems is, in and of itself, an established risk factor for offspring gambling problems [63-68].

2.1.1.1 Definition of mediation

A mediator is one that accounts for the relationship between a predictor and an outcome variable by explaining the process of "why" or "how" the relationship occurs [69, 70]. Applied to the intergenerational transmission of gambling problems, a mediating factor attempts to explain or account for the relationship between parental gambling problems use problems and the development of gambling problems in offspring [66].

A mediating factor explains "why" or "how" the relationship between a predictor (e.g., parental gambling problems) and an outcome (e.g., offspring gambling problems) occurs

Figure 2.1 illustrates a risk factor mediation model using a diagram. Applied to the intergenerational transmission of gambling problems, the formal testing of mediation requires three conditions to be met:

1) parental gambling problems must be significantly related to offspring gambling problems **(*path c*);**
2) parental gambling problems must be significantly related to the potential mediating factor **(*path a*);** and
3) the potential mediating factor must be significantly related to offspring gambling problems **(*path b*)** [66, 69-71].

Mediation occurs when the relationship between parental and offspring gambling problems remains after statistically accounting for the indirect relationship provided by the mediating factor [66, 69, 70]. In this situation, the tested mediator is one of multiple mediators and accounts for part of the relationship between parental and offspring gambling problems [66, 69].

2.1.1.2 Definition of moderation

In the context of the *Children at Risk Project*, a moderator variable is one that attenuates or magnifies the strength of the relationship between parental and offspring gambling problems [66, 67, 69,70]. Moderating variables posit "when" or "for whom" the relationship between parental and offspring gambling problems occurs [70]. A moderator variable therefore typically illustrates that the relationship between parental and offspring gambling problems holds in one setting but not in another, or for one subpopulation of children of problem gamblers, but not for another [69].

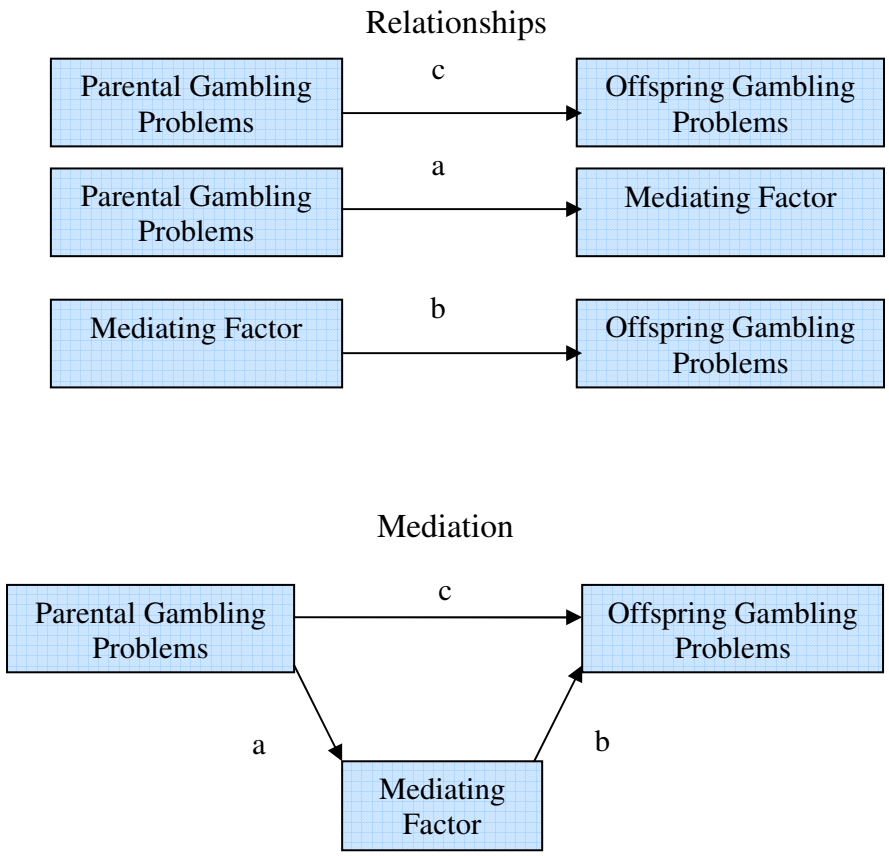

Figure 2.1
Illustration of the necessary conditions for demonstrating mediation

A moderating variable explains "when" or "for whom" the relationship between a predictor (e.g., parental gambling problems) and an outcome (e.g., offspring gambling problems) occurs

A model of moderation is outlined in Figure 2.2. Examination of this figure reveals three causal paths:

1) the impact of parental gambling problems on offspring gambling problems **(*path a*);**
2) the impact of the proposed moderating factor on offspring gambling problems **(*path b*);** and
3) the impact of the interaction of parental gambling problems and the proposed moderating factor on offspring gambling problems **(*path c*)** [66, 69, 70, 72, 73].

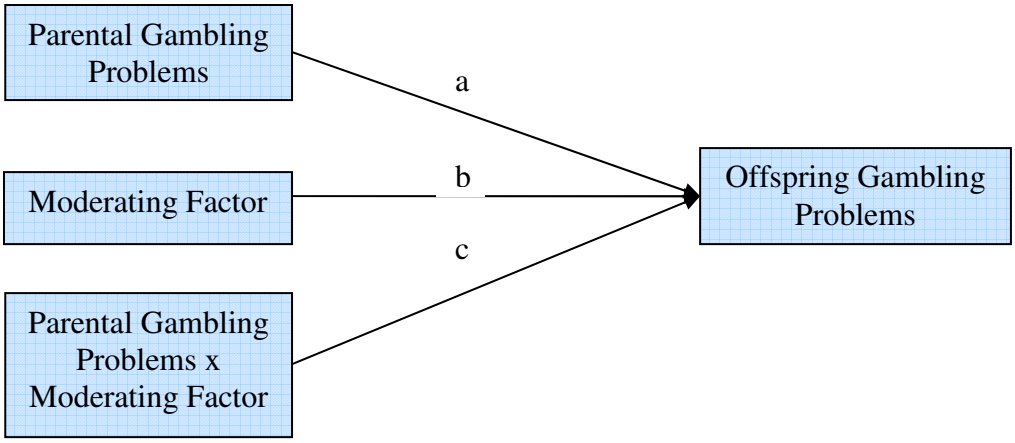

Figure 2.2
A model of moderation

2.1.1.3 The application of a mediation and moderation framework in the *Children at Risk Project*

A consequence of using a mediation and moderation framework for investigating the familial transmission of gambling problems is that there are multiple potentially relevant interpretations of the terms "risk factor" and "protective factor" as stated in the project tender. Mediation and moderation are statistical analyses while risk and protection can be interpretations of outcomes arising from these analyses. For example, it is possible to conceptualise a "risk factor" as a mediating factor that indicates "why" or "how" problem gambling is transmitted from family members [69, 70] or as a moderating factor that indicates "when" or "for whom" problem gambling behaviour is transmitted [70].

In the *Children at Risk Project*, we have defined a ***risk factor*** as a mediator that potentially explains "why" or "how" familial transmission occurs and a ***protective factor*** as any potentially moderating factor that serves to weaken or buffer familial transmission. Compared to risk factors that simply indicate the conditions under which problem ambling behaviour is transmitted, risk factors that *explain* the familial transmission of problem gambling appear more relevant to the project task of analysing "their contribution towards the development of problem gambling in children" and are likely to be more useful in developing guidelines. The conceptualisation of risk factors as mediators and protective factors as moderators is also consistent with the objectives of the more advanced research literatures investigating issues related to intergenerational transmission of problem behaviours such as alcohol use problems (refer to Sections 2.2.6 and 2.2.7) .

In the Children at Risk Project, we have defined a "risk factor" as a mediator that potentially explains "why" or "how" familial transmission occur

In the Children at Risk Project, we have defined a "protective factor" as any potentially moderating factor that serves to weaken or buffer familial transmission

2.1.2 The exploration of a more advanced literature to guide the *Children at Risk Project*

As previously indicated, the aim of the *Children at Risk Project* and literature review was to explore the familial (parent and sibling) transmission of problem gambling and to identify the risk and protective factors related to growing up in problem gambling family. However, because the examination of the transfer of gambling problems from parents or siblings has generally been neglected in the theoretical and empirical literature, our understanding of which factors contribute to the development of gambling problems of children living in problem gambling families remains limited.

Several research literatures more advanced than the problem gambling literature could be explored to guide the selection of potentially relevant risk and protective factors in the development of problem gambling behaviour in children raised in problem gambling families and inform the design of appropriate methodologies to examine the familial transmission of problem gambling. For example, there are insights to be gained from literature relating to the intergenerational transmission of alcohol use problems [66], tobacco use [74], substance use [75], obsessive-compulsive disorder [76,77], health risk behaviours [78], mental health problems such as depression and anxiety [79, 80], obesity [81], antisocial behaviour and conduct problems [82, 83], violence and intimate partner violence [84, 85], offending behaviours [86], and well-being [87].

An examination of these literatures revealed that the literature relating to the intergenerational transmission of alcohol use disorders was among the most advanced and comprehensive. In the alcohol use literature, researchers have devised a research framework that is consistent with the *Children at Risk Project* goals which can be employed to structure the literature review and explore our current understanding of the familial transmission of gambling problems (Section 2.2.3). Researchers in the alcohol use literature have also employed appropriate statistical procedures that can identify mediating risk factors and moderating protective factors in the familial transmission of gambling problems (Sections 2.2.6 and 2.2.7) and have developed etiological models that can serve as the foundation for models relating to problem gambling behaviour (Section 2.2.8). This literature is also advanced enough to inform the design of methodologies appropriate to the study of the familial transfer of gambling problems (Chapter 3).

There is also an emerging consensus that problem gambling can be conceptualised as a behavioural addiction in which impairment of control, rather than the presence of an exogenous psychoactive agent, is the central underlying concept [88-90]. This perspective views that the disorder of problem gambling approximates that of

alcohol dependence, whereby the two disorders display comparable phenomenology (such as preoccupation, tolerance, withdrawal, loss of control, attempts to cease or reduce their behaviour, presence of cravings, and continued behaviour despite adverse consequences), disruption and impaired functioning, comorbidity with each other, patterns of comorbid disorders, course of abstinence and relapse, and patterns of treatment use and outcomes. Moreover, draft proposals for the upcoming fifth edition of the Diagnostic and Statistical Manual of Mental Disorders reveal that problem gambling will be classified as an addiction, based on behavioural and biological similarities to alcohol and substance use disorders.

Although a discussion of the conceptual underpinning of problem gambling is beyond the scope of this report, it is reasonable to assume that the commonalities between problem gambling and alcohol use problems would suggest that the literature investigating the familial transmission of alcohol use problems may serve as a foundation from which research investigating the familial transmission of gambling problems may emerge. We therefore decided to review the extensive literature relating to the familial transmission of alcohol use problems to guide the selection of potentially relevant risk and protective factors and inform the design of appropriate methodologies to examine the development of gambling problems in children raised in problem gambling families.

In this literature review, we:

(1) ***examined the literature investigating the familial (parent and sibling) transfer of alcohol use problems*** in order to identify potentially relevant variables and theoretical models for understanding the development of problem gambling in children raised in problem gambling families; and

(2) ***applied a research framework employed in the alcohol use literature*** to explore our current empirical and theoretical understanding of the development of gambling problems in children raised in problem gambling families and to identify the gaps in our knowledge.

2.2 Intergenerational Transmission of Alcohol Use Problems

The psychosocial adjustment of children raised in problem drinking families has long been a central focus of the alcohol dependence literature. “Children of alcoholics” (COAs) appear to be at increased risk for developing a range of negative outcomes compared to their non-COA counterparts. These outcomes include higher rates of substance abuse, antisocial and conduct problems, attention deficit hyperactivity disorder, depressive symptoms, anxiety disorders, low self-esteem, generalised distress and maladjustment, and lower academic achievement and cognitive functioning [66, 72, 91-96]. For a review of these outcomes, see Harter [91], Sher [66], and Steinhausen [94]. Among the most widely studied outcomes for COAs are alcohol use disorders, for which parental alcohol dependence is a well-established risk factor [66, 67, 91-97]. In the remainder of Section 2.2, we will explore the literature investigating the intergenerational transfer of alcohol use problems.

2.2.1 The role of genetic factors in the intergenerational transmission of alcohol use problems

There is now substantial evidence to support the role of genetic factors as determinants of alcohol use and dependence [see 66, 92, 94]. Efforts to identify genetic influences in the intergenerational transmission of alcohol use problems have been based on family, twin, and adoption studies. Family studies have consistently found an elevated rate of alcohol use problems in the first-degree relatives of alcohol dependent individuals compared to their non-dependent counterparts [66, 94]. Although variable, the findings from twin studies suggest that several alcohol-related variables are under modest genetic influence [66]. Similarly, adoption studies also demonstrate the significant contribution of alcohol use problems of biological family members [66]. Although these studies generally reveal that heritability is stronger for males [66, 94], it has been suggested that this may be an artefact of the lower base rate of alcohol use problems in women [98].

Taken together, family, twin, and adoption studies suggest that genetic factors play an important role in the intergeneration transmission of alcohol use problems. However, there remains limited understanding of the nature and extent of genetic mediation and the ways in which genetic factors interact with a range of environmental factors [66, 92, 94]. Moreover, genetic factors fail to account for the discordant rate in identical twins and do not explain the high rate of alcohol dependence in individuals without a family history of alcohol dependence [99]. There is now clear consensus in the empirical literature that the interaction of genetic and environmental factors is influential in the intergenerational transmission of alcohol use problems [92, 93, 96, 100, 101].

2.2.2 The role of social learning in the intergenerational transmission of alcohol use problems

One of the most basic environmental explanations for the intergenerational transmission of alcohol dependence from parents to children is that children's alcohol consumption patterns are acquired through imitative social learning (i.e., modelling). Parental alcohol use problems are hypothesised to affect offspring alcohol use problems through observation of parental drinking patterns, exposure to several alcohol dependent role models (including parents, parent's friends, other relatives), modelling for coping responses, modelling of alcohol's socio-cultural significance as a marker of adult passage or sex role expression, and increased access to alcohol [71, 96, 99, 102]. Little is known about the impact of explicit parental messages about alcohol use compared to the more subtle messages communicated by parental alcohol use and the associated negative consequences [71]. Sher [66, 92] argues that findings from half-sibling and adoption studies discount the importance of imitative learning and suggest that the modelling effect is accounted for by the interaction of genetic and environmental factors. However, he does acknowledge that modelling of parental drinking behaviour could be an important etiological pathway for at least some children and that parental modelling may result in child drinking outcomes by interacting with other family-related variables, such as parental relationship satisfaction [66, 92].

2.2.3 A research framework for the study of the intergenerational transmission of alcohol use problems

Chassin and Belz [67, p. 194] outline a research framework designed to achieve a comprehensive understanding of alcohol use problems in COAs. This research framework comprises multiple research questions.

RESEARCH FRAMEWORK FOR INTERGENERATIONAL TRANSMISSION OF ALCOHOL USE PROBLEMS

(1) What is the ***magnitude of risk*** associated with parental alcohol use problems for the development of offspring alcohol use problems? Is the level of risk substantial enough to warrant clinical and policy responses?

(2) What is the ***specificity of risk*** associated with parental alcohol use problems for the development of offspring alcohol use problems? Given that parental alcohol use problems covary with other forms of parental psychopathology, such as affective disorders and antisocial personality disorder, is the offspring's risk for alcohol use problems related specifically to parental alcohol use problems or co-occurring parental psychopathology?

(3) What are the mediating mechanisms underlying the relationship between parental and offspring alcohol use problems? That is, what are the ***risk factors*** that explain why COAs are more likely to develop alcohol use problems than their non-COA peers?

(4) What are the ***protective factors*** that may buffer the risk associated with parental alcohol use problems?

This research framework is consistent with the tasks of the *Children at Risk Project* and it is compatible with the definitions of risk and protection that we have adopted in this project. The alcohol use literature now comprises a vast amount of theoretical and empirical literature relating to each of these questions. In the remainder of Section 2.2, we will employ this research framework to structure the review and organise the extensive literature relating to the intergenerational transmission of alcohol use problems. Later in the review (Section 2.3), we will apply this research framework to explore our current empirical and theoretical understanding of the development of gambling problems in children raised in problem gambling families.

2.2.4 Magnitude of risk for the intergenerational transmission of alcohol use problems

It has been suggested that smaller differences between COAs and non-COAs should be expected than between symptomatic and non-symptomatic groups (e.g., alcohol dependent compared to non-alcohol dependent groups) because COAs are a high risk group comprising a subsample of truly vulnerable individuals and a

subsample of non-vulnerable individuals [93]. The magnitude of risk associated with parental alcohol dependence varies across samples [67,100], with ratios between rates of alcohol use disorders generally ranging from 4:1 to 9:1 [91, 92, 95, 96, 100]. The variability in prevalence estimates can be explained by methodological issues such as variations in sampling strategies, the definitions of parental "alcoholism" employed, the diagnostic instruments used, and the representativeness of the sample [66, 71, 91, 96, 100]. It has been argued that, in addition to being statistically significant, this moderate absolute effect of parental alcohol use problems on the development of offspring alcohol use problems is of clinical importance and is substantial enough to have clinical and policy implications [67].

"Children of alcoholics" are 4 to 9 times more likely to develop alcohol use problems than their peers

2.2.5 Specificity of risk for the intergenerational transmission of alcohol use problems

Much of the COA literature is limited in its ability to draw conclusions regarding the effects of parental alcohol use problems independent of other factors, such as socio-demographic factors, co-occurring parental psychiatric disorders (e.g., affective disorders, anxiety disorders, antisocial personality disorder, and other substance use disorders), and concurrent family stressors. Because parental psychopathology is a potential confounding factor in many COA studies, it is generally not possible to infer that the relationships are due to parental alcohol use problems [66. 71, 91, 96]. However, there is some evidence that both maternal and paternal alcohol use problems have a unique effect on alcohol abuse and dependence in young adulthood above and beyond parental depression, antisocial personality disorder, and substance abuse [93].

2.2.6 Risk factors for the intergenerational transmission of alcohol use problems

Despite the negative outcomes experienced by COAs, the manifestation of an alcohol use disorder is not an inevitable consequence of COA status and the development of an alcohol use disorder is not unique or specific to COAs [66, 67, 72, 91, 94-96]. The variation in alcohol use outcomes for COAs implies that there are factors that mediate or explain alcohol use outcomes [67, 96]. In the *Children at Risk Project*, we have defined a ***risk factor*** as a mediator that explains "why" or "how" intergenerational transmission occurs [69, 70] (refer to Section 2.1.1 for a more detailed explanation). Applied to the intergenerational transmission of alcohol use problems, a mediating factor attempts to explain or account for the relationship between parental alcohol use problems and the development of alcohol use problems in offspring [66].

A substantial amount of theoretical and empirical effort in the COA literature has been directed towards the identification of risk factors that can explain the intergenerational transmission of alcohol use problems. These include biological, psychological, family, and social factors (refer to Table 2.2) [66, 72, 92, 93, 95, 97, 99, 102,103]. However, these findings must be interpreted with caution as most studies do not

conduct formal tests of mediation by simultaneously testing all of the three requisite conditions.

Table 2.2
Possible risk factors for the intergenerational transmission of alcohol use problems

Biological factors	*Psychological factors*	*Family factors*	*Social factors*
▪ electrocortical factors ▪ alcohol sensitivity ▪ stress reduction ▪ neurotransmitters	▪ difficult temperament ▪ aggression ▪ attributional style ▪ alcohol expectancies ▪ lower intelligence ▪ coping styles ▪ perceived competencies ▪ behavioural undercontrol ▪ negative affect	▪ parenting behaviours and deficits (e.g., low parental monitoring and discipline) ▪ parent-child interaction ▪ marital conflict ▪ financial strain ▪ family ritual disruption ▪ difficult sibling relations ▪ family instability ▪ family disorganisation ▪ parental loss and family breakdowns ▪ family conflict and violence	▪ peer rejection/ isolation ▪ aggressive social style ▪ limited friend selection ▪ lack of prosocial skill development ▪ lower education

An illustrative example of an empirical study formally testing possible risk factors in the intergenerational transmission of alcohol use problems is provided by Chassin, Pillow, Curran, Molina, and Barrera [71]. This North American study employed statistical modelling to explore parental monitoring, stress, negative affect, and adolescent temperament as mediational mechanisms underlying the relationship between parental and adolescent alcohol/substance use in a sample of 327 adolescents and their parents. The findings of this study revealed that COAs reported higher levels of environmental stress and negative emotionality, which in turn were associated with negative affect. Negative affect, in turn, increased the likelihood of associating with substance-using peers, which predicted higher uptake of alcohol/substance use. Moreover, in this model, COAs received less parental monitoring of their behaviour, which in turn, was associated with drug-using peers and higher uptake of alcohol/substance use.

2.2.7 Protective factors for the intergenerational transmission of alcohol use problems

The variability in alcohol use outcomes among COAs can also be explained by differential exposure to factors that moderate the effects of parental alcohol use

problems [104]. In the *Children at Risk Project*, we have defined a protective factor as any moderating factor that serves to mitigate or buffer the negative effects of a risk factor [63-68] (refer to Section 2.1.1 for a more detailed explanation). In the context of COA research, a moderator variable is one that attenuates or magnifies the strength of the relationship between parental and offspring alcohol use problems [66, 67, 69, 70]. Moderating variables therefore posit "when" or "for whom" the relationship between parental and offspring alcohol use problems occurs [70].

There is an increasing recognition of the need to identify protective factors that buffer risk for COAs. Although there has been less empirical attention has been paid to how the risk of parental alcohol use problems has been buffered by biopsychosocial variables, the available literature suggests that there may be several possible protective factors for the development of alcohol use problems (refer to Table 2.3) [66, 67, 73, 99, 105]. These findings should be interpreted with caution, however, as few studies have provided formal tests of moderation, with appropriate statistical techniques to test for buffering effects. Moreover, buffering effects tend to be inconsistent, generally reflect small effects, and are rarely observed in prospective studies [67].

Table 2.3
Possible protective factors for the intergenerational transmission of alcohol use problems

- Cognitive coping
- Perceived control
- Social class
- Consistent family rituals
- Mother's esteem for the alcohol dependent father
- Amount of attention from primary caregivers
- Low family conflict during infancy
- Birth of another sibling within the first two years of life
- Child social support
- Personality
- Higher self-awareness
- Higher cognitive-intellectual functioning
- The mental health status of the non-alcohol dependent parent
- Parental monitoring
- Consistency of discipline
- Parental social support

An illustrative example of an empirical study formally testing protective moderation in the intergenerational transmission of alcohol use problems is provided by Hussong and Chassin [105]. This North American study explored the ability of five factors (self-awareness, perceived control, family organisation, behavioural coping, and cognitive coping) to buffer the effects of parental alcohol use problems on COA risk for alcohol/substance use initiation in a community sample of 267 adolescents. The findings revealed that greater perceived control and very low or high levels of cognitive coping buffered COA risk for alcohol/substance use initiation during early adolescence.

2.2.8 Models of intergenerational transmission of alcohol use problems

It is clear from existing research findings that there may be several possible risk and protective factors for the development of alcohol use problems in COAs. The COA literature has moved beyond identification of the negative consequences of parental alcohol use problems to developing various models in an attempt to explain the intergenerational transmission of alcohol use disorders. It is important to note that the proposed individual relationships within the larger models are associated with varying levels of empirical support and that the empirical literature, to date, contains very few formal tests of these models. In this Section, we will describe several theoretical models that attempt to explain the intergenerational transmission of alcohol use problems.

2.2.8.1 Models of developmental psychopathology in COAs

Several models have identified offspring alcohol use problems as one of many possible negative child outcomes resulting from a family history of alcohol use problems. For example, Windle and colleagues [95, 96] formulated a model of the developmental psychopathology in COAs in which an inherited tendency (vulnerability) combines with specific stressful conditions to produce a disorder (refer to Figure 2.3).

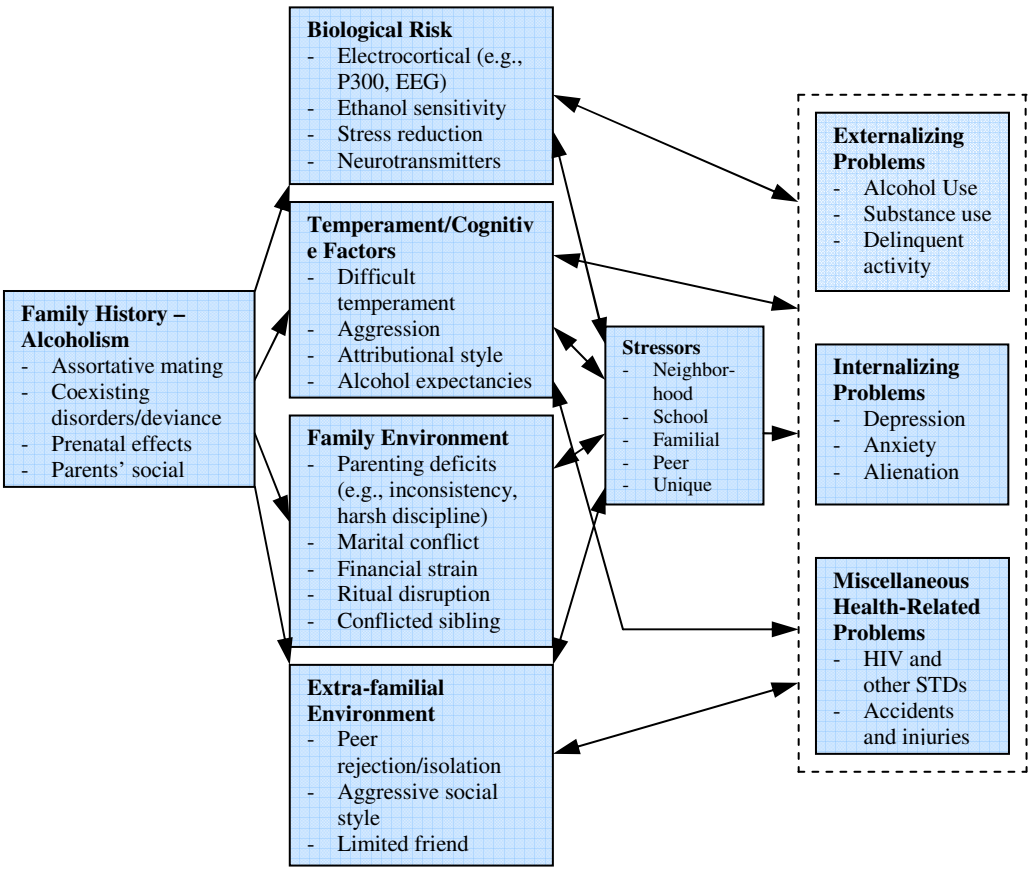

Figure 2.3
Windle's model of the developmental psychopathology in COAs

Seilhamer and Jacob [99] have also proposed a model of the pathways by which parental alcohol use problems influence child outcomes (Figure 2.4). This model posits that three main pathways to child adjustment difficulties (ethanol, family, and modelling effects) are explained by the risk factors of compromised family environments and disrupted parenting, and buffered by constitutional protective factors (e.g., sex, age, intellectual level, temperament, and genetic propensities) and environmental protective factors (e.g., sex of the non-alcohol dependent parent, psychiatric status of the non-dependent parent, duration and intensity of exposure to drinking, treatment experience, peer influences, supportive social institutions, and informal social resources).

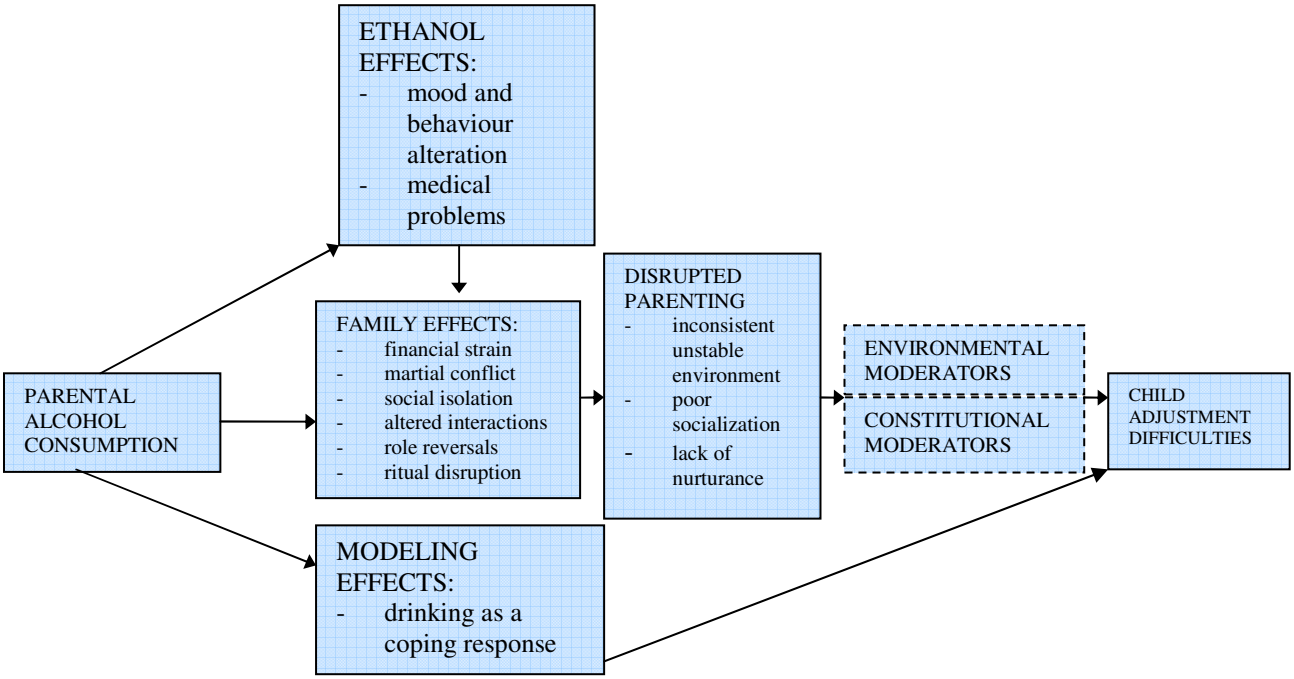

Figure 2.4
Model of influence of parental alcohol use problems on offspring adjustment [74]

While these models recognise the convergence of factors at multiple levels of psychobiological organisation (e.g., biogenetic, psychological, socio-cultural), they are not specific to the intergenerational transmission of alcohol use problems. However, Sher [66, 92] has described several theoretical models that specifically attempt to explain the intergenerational transmission of alcohol use problems. Although there are varying levels of empirical support for these models, they may serve to enhance our understanding of the risk and protective factors possibly involved in the intergenerational transmission of problem gambling behaviour.

2.2.8.2 Models describing possible basic mechanisms of intergenerational transmission of alcohol use problems

Sher [66, 92] provides three broad categories of theoretical models describing possible basic mechanisms of transmission: 1) models related to individual differences in pharmacological effects of ethanol; 2) models related to individual

differences in drinking motivations; and 3) models not readily subsumed under the other categories.

Models related to individual differences in pharmacological effects of ethanol posit that COAs react to alcohol consumption in an abnormal manner (e.g., are overly sensitive or tolerant), which serves to place them at risk for the development of alcohol use problems. The models subsumed under this category include sensitivity to the reinforcing effects of alcohol, initial sensitivity to the reinforcing effects of alcohol, insensitivity to the adverse effects of alcohol, individual differences in alcohol expectancies, proneness to tolerance development, and proneness to develop medical consequences of alcoholism.

Models related to individual differences in drinking motivation hypothesise that COAs are internally motivated to consume alcohol due to psychological or psychobiological disturbances. This class of models provide explanations that are not related to individual differences in the pharmacological effects of alcohol. The models subsumed under this category include self-medication for predisposition to experience negative mood states (such as dysphoria, neuroticism, anxiety, depression), predisposition to seek out altered states of consciousness (sensation seeking), impulsivity and difficulty developing effective inhibitory control of drinking, impaired coping and use of alcohol as a coping strategy, and stronger expectancies for reinforcement from alcohol.

Other models not related to individual differences in the pharmacological effects of alcohol or motivations to drink include *proneness to school failure and its psychosocial sequelae and modelling and social imitation from exposure to alcohol.*:

2.2.8.3 Etiologic pathways

Sher [66, 92] argues that the intergenerational transmission of alcohol use problems involves multiple risk and protective factors and that several of these models possibly operate in conjunction with each other. Embedded within a complex integrative guiding theoretical framework for understanding the mechanisms of the intergenerational transmission of risk of alcohol use disorders, Sher proposed three etiologic pathways: 1) the enhanced reinforcement pathway; 2) the deviance proneness pathway; and 3) the negative affect pathway. Most of the risk factors in the proposed pathways reflect both genetic and environmental influences (e.g., parenting behaviour, life stress) and comprise multiple dimensions (e.g., emotional distress can comprise anxiety and depression). Protective factors are included in the pathway (by dashed lines). Sher cautions that the pathways may omit relevant variables (e.g., social class, ethnicity, alcohol regulatory policies), that they are likely not to be completely independent, and that some variables and pathways are probably not necessary for a complete understanding of intergenerational transmission.

Enhanced reinforcement pathway. The enhanced reinforcement pathway (Figure 2.5), which is based on individual differences in the pharmacological effects of alcohol, proposes that parental alcohol use problems are causally associated with an increased reinforcement value from alcohol in offspring, which in turn is causally related to the development of offspring alcohol use problems.

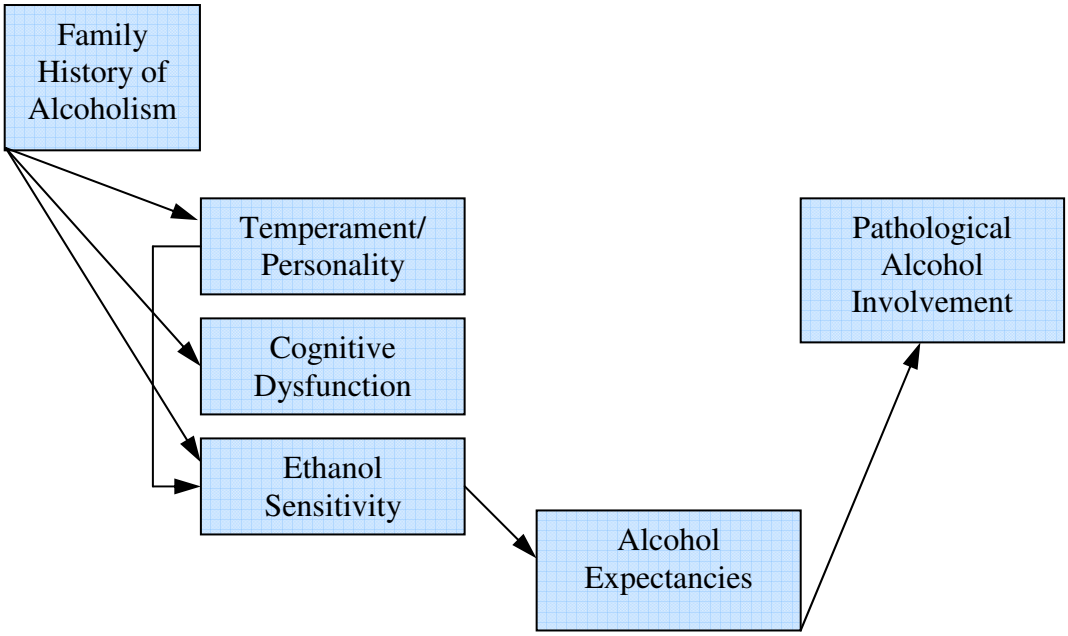

Figure 2.5
The enhanced reinforcement etiologic pathway

Deviance proneness pathway. The variables in the deviant proneness pathway (Figure 2.6) are predominantly behavioural and the focus of the pathway is deficient socialisation. In this pathway, peer influence is conceptualised as the most proximal mediating risk factor to alcohol dependence and parental monitoring of relationships with deviant peers is viewed as a protective factor to peer influence.

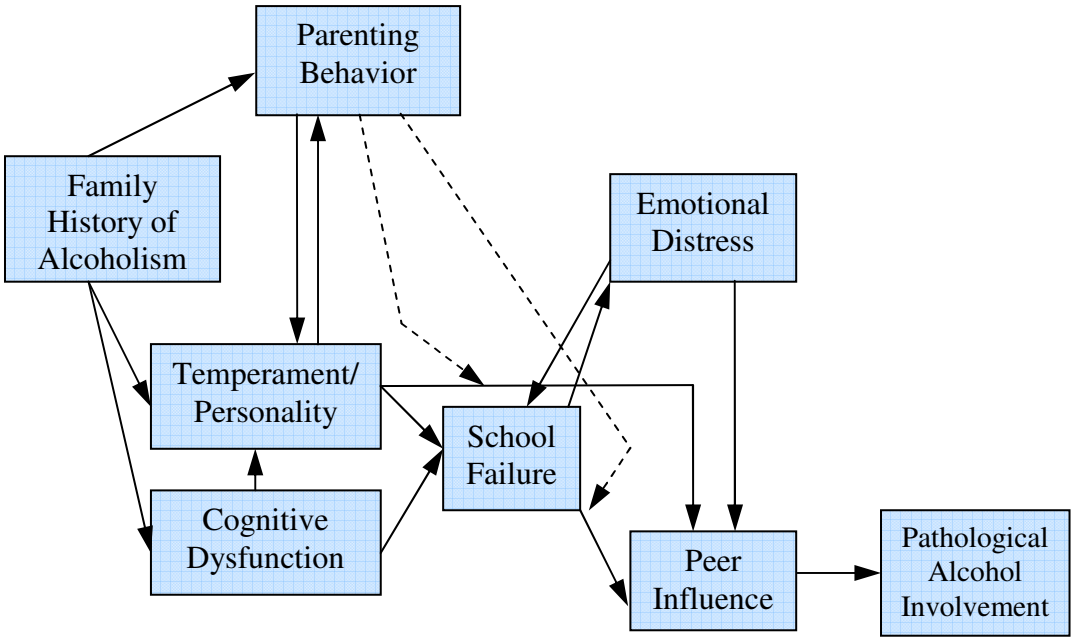

Figure 2.6
The deviance proneness etiologic pathway

Negative affect pathway. The major mediating risk factors in the negative affect pathway (Figure 2.7) are negative affective states, high levels of life stress, and effectiveness of coping resources. In this pathway, coping is viewed as a protective factor by buffering both the relationship between life stress and emotional distress and the relationship between emotional distress and offspring problem drinking. Alcohol expectancies, which are less central in this pathway, are protective factors by buffering the relationship between emotional distress and alcohol use problems.

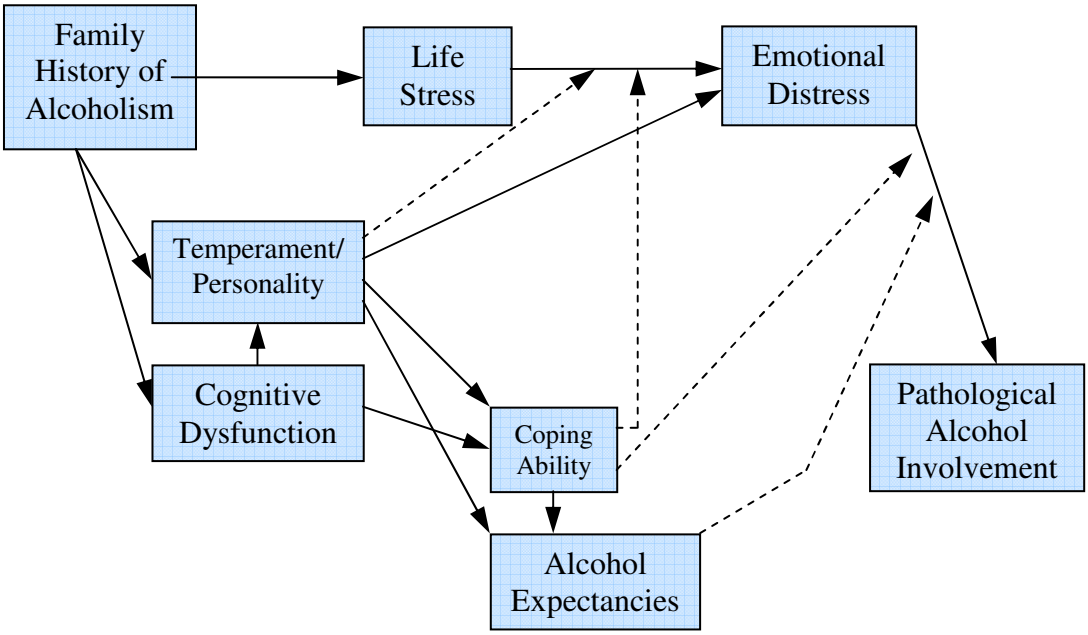

Figure 2.7
The negative affect etiologic pathway

2.2.9 Concluding comments

The research agenda outlined by Chassin and Belz [67] provides a useful framework for organising the extensive empirical and theoretical understanding of the intergenerational transmission of alcohol use problems. Using this research framework, it is clear that parental alcohol use problems impart a considerable risk for the development of alcohol use problems in children and that this risk is probably independent of co-occurring parental psychopathology. Although many studies in the COA literature do not provide formal tests of mediation or moderation, several etiologic theories attempting to explain the mechanisms underlying the intergenerational transmission of alcohol use problems specify potential relationships of numerous variables at multiple levels of psychobiological organisation. These integrative theories may serve as a foundation for the identification of potentially relevant variables and plausible routes for the intergenerational transmission of problem gambling behaviour. They also suggest that future research attempting to explain the intergenerational transmission of gambling problems will eventually require examination of a complex interaction of multiple risk and protective factors.

2.3 Intergenerational Transmission of Problem Gambling Behaviour

The transmission of problem gambling behaviour from parents to their children has generally been neglected by the problem gambling literature. In Section 2.3, we will apply the research framework adopted by Chassin and Belz [67] to explore our current empirical and theoretical understanding of the intergenerational transmission of problem gambling behaviour.

2.3.1 The role of genetic factors in the intergenerational transmission of problem gambling behaviour

A growing body of empirical research has emerged in response to suggestions that a genetic predisposition underlies problem gambling. The findings of this literature have generally suggested that genetics have a significant impact on risk for the development of problem gambling [106-109]. For example, in an examination of 155 twin pairs, Winters and Rich [108] found that male monozygotic twins reported similar frequency for gambling activities involving heavy player promotion and high payoffs. For females, this relationship was found only for electronic gaming machines. Studies conducted by Slutske and colleagues [29, 110] have found a common genetic vulnerability between problem gambling and other behaviours, such as antisocial behaviours and alcohol dependence, in males. A large study of 3,359 twin pairs conducted by Eisen and colleagues [106] revealed that heredity explains between 35% and 54% of the liability for five symptoms of pathological gambling. A meta-analysis of the available family and twin studies conducted by Walters [109] revealed a weak but significant estimated heritability for problem gambling of 16%.

Several studies have also identified some evidence of specific allele variants of genes related to neurotransmitters that impact upon the risk of developing problem gambling [e.g., 111, 112-115]. For example, these studies have identified polymorphisms of dopamine receptor genes, the serotonin transporter gene and monoamine oxidate A gene. There is also some evidence that the frequency of some of these alleles vary with problem gambling severity.

Empirical research suggests that genetics have a relatively weak but significant impact on the risk of developing problem gambling, particularly for males

2.3.2 The role of social learning in the intergenerational transmission of problem gambling behaviour

There is consensus that child and adolescent gambling is promoted by family members and friends acting as significant models for gambling and that the social learning model can be applied to gambling behaviours [20, 25, 41, 42, 46, 48, 52, 116-124]. Parental gambling problems have been hypothesised to directly affect offspring gambling problems through observation of parental gambling, modelling for coping responses, modelling of gambling's socio-cultural significance as a symbol of adulthood, and increased access to gambling products [41, 122].

Child and adolescent gambling is promoted by family members and friends acting as significant models for gambling

Parents seem to perceive gambling behaviour in their children as socially acceptable and appear to show little concern over their children's gambling behaviour [40, 116, 117, 121, 125-127]. Much of the gambling activity of children and adolescents is undertaken with parental awareness and overt acceptance or approval [40, 41, 116, 119, 121, 128-1131]. Only a small proportion of children fear being caught by parents, a trend that decreases with age [116, 125], or report that their parents object to their gambling [119, 132]. Similarly, few parents try to control or restrict their children's gambling and may even encourage their children to gamble [127]. It is therefore not surprising that children and adolescents feel that, unlike cigarette, drug and alcohol use, their gambling behaviour does not need to be hidden from their families [46, 116, 127].

Children and adolescents often become involved in gambling activities at an early age as part of their normal and accepted family social entertainment [43, 118, 126, 127]. Jacobs [43] argues that parents often conclude that their children are wholly responsible for the development of own gambling behaviour and overlook their role in teaching their children to gamble. Indeed, there is now substantial evidence that children are often introduced to gambling by their parents and other family members [25, 43, 52, 118, 120, 123]. Shaffer and Hall [39] found that 15% of children first gambled with their parents and that an additional 20% of children first gambled with other family members. Delfabbro and Thrupp [41] argue that teaching children the rules of gambling makes gambling activities more accessible to them when they are old enough to gamble on their own.

Parents and other family members often introduce children and adolescents to gambling and gamble with them

Many studies also now indicate that the majority of adolescents gamble with their parents or other family members [40, 116, 119, 120, 128, 131-134]. There is substantial evidence that parents participate in various gambling activities with their children (e.g., lottery, cards, bingo, board games), purchase lottery tickets for their children, have children purchase lottery tickets for them, or give lottery tickets as presents [40, 43, 116, 118-120, 127, 128, 135]. For example, Gupta and Derevensky [116] found that 86% of children aged between 9 and 14 years who gambled regularly reported gambling with family members and that 75% of children who gambled within the previous 12 months gambled in their own homes. Of those who gambled in the previous 12 months, 40% gambled with their parents and 46% gambled with other relatives. Similarly, Gupta and Derevensky [46] reported that of those children aged 12 to 17 years who gambled, 65% gambled with family members (including parents, siblings, and extended relatives). In a review of the child and adolescent gambling literature, Hardoon and Derevensky [136] concluded that 40 to 68% of youth report gambling with their families. A study conducted by Delfabbro, Lahn, and Grabosky [40] in the ACT found that the degree of family involvement varies according to the family

member and the form of gambling. In this study, adolescents were found to be most likely to gamble with their parents on lotteries (55.2%), scratch tickets (48.2%), and racing (47.2%); most likely to gamble with their siblings on card games (11.0%) and sports betting (7.4%); and most likely to gamble with other relatives on sports betting (8.1%), scratch tickets (8.1%), and card games (7.9%). Further, substantial proportions (42 to 51%) of parents who gamble have reported that they occasionally gamble in the company of their children [120, 127]

Developmentally, familial influences on adolescent gambling seem to remain somewhat constant as children mature [46, 116]. In contrast, peer influences seem to take on a more important role as children gamble with peers at friend's houses and at school [46, 49, 116]. Regardless of age, however, most adolescents primarily gamble at home with parents [46, 116].

2.3.3 A research framework for the study of the intergenerational transmission of problem gambling behaviour

There is general agreement that both genetic and environmental factors are influential in the intergenerational transmission of problem gambling behaviour. The application of Chassin and Belz's [67] research agenda as a framework to the study of the intergenerational transmission of problem gambling results in multiple research questions.

RESEARCH FRAMEWORK FOR INTERGENERATIONAL TRANSMISSION OF PROBLEM GAMBLING BEHAVIOUR

(1) What is the ***magnitude of risk*** associated with parental problem gambling for the development of offspring problem gambling? Is the level of risk substantial enough to warrant clinical and policy responses?

(2) What is the ***specificity of risk*** associated parental problem gambling for the development of offspring problem gambling? Given that parental problem gambling covaries with other forms of parental psychopathology, such as affective disorders and alcohol use problems, is the offspring's risk for problem gambling related specifically to parental problem gambling or co-occurring parental psychopathology?

(3) What are the mediating mechanisms underlying the relationship between parental and offspring problem gambling? That is, what are the ***risk factors*** that explain why the children of problem gamblers are more likely to develop problem gambling than children of non-problem gamblers?

(4) What are the ***protective factors*** that may buffer the risk associated with parental problem gambling?

In the remainder of Section 2.3, we will explore the literature investigating the intergenerational transmission of gambling problems in relation to current knowledge in each of these research areas.

2.3.4 Magnitude of risk for the intergenerational transmission of problem gambling behaviour

There appears to be a moderate risk associated with parental gambling problems [44], with ratios of offspring gambling problems consistently ranging from 2:1 to 4:1 [35, 39, 40, 43-45, 52, 53, 57]. Evidence of the magnitude of risk associated with parental problem gambling is derived from several studies of adolescents. In an early study, Jacobs and colleagues [35] reported that 29% of North American high school youth who described one or both of their parents as having "a problem with compulsive gambling" reported gambling-related problems compared to 14% of their classmates who did not have problem gambling parents. High school students in Canada who reported that their parents gambled excessively had almost twice the rate of problem and at risk gambling (22.1% and 26.5% respectively) as did those students who did not report excessive parental gambling (9.4% and 15.9% respectively) [45]. In a review of 20 prevalence studies surveying middle and high school youth in North America, Jacobs [43] concluded that problem gamblers reported consistently higher levels of both parental gambling and excessive parental gambling than their non-problem gambling peers by ratios of 3 to 2. A study of 926 Australian adolescents found that 50% of problem gambling adolescents reported that someone close to them (immediate family, family friends, and other relatives) had a gambling problem compared with 14% of the rest of the sample [40]. A Canadian study of parents and adolescents drawn from a large community-based study indicated that children of problem gamblers were 4.47 times more likely to report gambling problems by mid-adolescence (age 16 years) than children of non-problem gamblers [39]. Similarly, data from 3886 North American secondary students indicated that students with one or more family members perceived to have a gambling problem were over four times more likely to endorse having a gambling problem compared to students with no problem gambling family member [44].

The magnitude of risk associated with parental problem gambling is also reported in studies of adults. Gambling problems in at least one parent have been reported by up to 45% of problem gamblers [55, 56, 61, 62, 137,138]. Abbott [52] found that respondents from a community sample with current gambling problems were approximately twice as likely to report that one of their parents also had gambling problems. Gambino et al. [57] found that veterans with problem gambling parents were three times more likely to be probable pathological gamblers and that those with problem gambling grandparents were 12 times more likely to be probable pathological gamblers. Black et al. [53] reported that the prevalence of problem gambling disorders was higher in the first-degree relatives of 31 problem gamblers (12.4%) compared to the relatives of 31 controls (3.5%).

Children of problem gamblers are 2 to 4 times more likely to develop gambling problems than their peers

Although there is some evidence that pathological gamblers seeking treatment report similar rates of maternal and paternal problem gambling behaviour [139], the literature examining the differential impact of paternal and maternal problem gambling suggests that male problem gamblers display stronger intergenerational

transmission than their female counterparts. In a sample of 187 family units recruited from Australian undergraduate students, Oei and Raylu [48] found that paternal problem gambling scores contributed significantly more to offspring problem gambling scores than maternal problem gambling scores. A study of 938 Canadian adolescents revealed that the gambling frequency and problems of both parents was associated with adolescent gambling frequency, but that only severity of paternal gambling problems was related to adolescent gambling problems [42]. 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 [109].

Paternal problem gambling raises the risk for the development of child problem gambling more than maternal problem gambling

2.3.5 Specificity of risk for the intergenerational transmission of problem gambling behaviour

A comprehensive search of the literature has revealed that there is little information regarding the specificity of the intergenerational transmission of problem gambling behaviour. Vachon, Vitaro, Wanner, and Tremblay [42] explored the relationship between parental gambling, parenting practices (parental monitoring and inadequate disciplinary practices), and adolescent gambling in a Canadian community sample of 938 adolescents and their parents. The findings revealed that both the frequency and the severity of parental gambling were associated with the frequency of adolescent gambling and that these associations were significant after controlling for the effects of three covariates (socioeconomic status, gender, and impulsivity-hyperactivity problems). Further research is required to identify whether the intergenerational transmission of gambling problems remain significant after controlling for other factors, such as socio-demographic factors, co-occurring parental psychiatric disorders, and concurrent family stressors

There is almost no literature that investigates whether the risk for problem gambling is specifically related to problem gambling or other issues associated with parental problem gambling

2.3.6 Risk factors for the intergenerational transmission of problem gambling behaviour

In the *Children at Risk Project*, we have defined a ***risk factor*** as a mediator that explains "why" or "how" intergenerational transmission occurs) [69, 70] (refer to Section 2.1.1 for a more detailed explanation. Applied to the intergenerational transmission of gambling problems, the formal testing of mediation requires three conditions to be met: 1) parental gambling problems must be significantly related to offspring gambling problems (*path c*); 2) parental gambling problems must be

significantly related to the potential risk factor (*path a*); and 3) the potential risk factor must be significantly related to offspring gambling problems (*path b*) [66, 69-71]. A mediating risk factor serves to reduce the strength of the association between parental and offspring gambling problems.

A comprehensive search of the literature reveals that only a small number of studies have investigated the mediating mechanisms underlying the relationship between parental and offspring problem gambling by simultaneously testing all of the requisite conditions [39, 42, 48]. In an investigation of the possible influences of parental gambling cognition on offspring gambling behaviour, Oei and Raylu [48] postulated that the relationship between parental gambling behaviour and offspring gambling behaviour is mediated by parental gambling-related cognitions. The study employed structural equation modelling analyses on 189 family units (189 child offspring, 170 fathers, and 187 mothers) recruited through Australian undergraduate university students. A post-hoc model revealed that that parental gambling behaviour was directly related to offspring gambling behaviour, and that parental gambling cognitions were indirectly related to offspring gambling behaviour via offspring gambling cognitions. Although cautioning that this finding should only be taken as preliminary evidence, the authors concluded that there may be a cognitive mechanism of transmission of gambling behaviour in the family from one generation to the next.

Two studies have explored whether ineffective parenting practices mediated the relationship between parental problem gambling and adolescent problem gambling [39, 42]. Vachon, Vitaro, Wanner, and Tremblay [42] explored the possible additive role of parental monitoring and inadequate disciplinary practices in a Canadian community sample of 938 adolescents and their parents. Structural equation modelling revealed that low parental monitoring was significantly associated with a higher level of adolescent gambling frequency and inadequate disciplinary practices were related to heightened levels of adolescent gambling problems. A longitudinal study conducted by Vitaro et al. [39] explored whether low parental monitoring and high coercive discipline mediated the relationship between parental and offspring problem gambling in a Canadian community sample of 142 adolescents and their parents. The findings revealed that ineffective parenting was not related to offspring gambling problems, suggesting that factors other than discipline-based parenting explain the link between parental and offspring problem gambling.

The only studies to use formal tests of mediation have explored parental gambling cognitions and ineffective parenting practices

2.3.6.1 The relationship between parental problem gambling and possible risk factors: Testing Path A

Several studies have evaluated environmental conditions that characterise problem gambling families without measuring offspring problem gambling. These studies are therefore unable to test the relationship between parental and offspring problem gambling (*path c*) or the relationship between the potential risk factor and offspring problem gambling (*path b*) in a formal test of mediation. They are, however, able to provide some insight into the relationship between parental problem gambling

and possible risk factors (*path a*). From this perspective, family dynamics may be an environmental risk factor for the development of problem gambling in children [24, 26, 27, 30-32, 34-36, 54, 139, 140]. In Section 2.3.6.1, we will examine this literature in an attempt to identify risk factors that may explain the relationship between parental and offspring problem gambling.

Family dysfunction. Information from clinical observations and non-standardised survey questionnaires suggests that the children of male problem gamblers are exposed to dysfunctional family environments, and that they have disrupted relationships with their parents. Specifically, it has been noted that these children are often exposed to financial deprivation, emotional deprivation, physical isolation, inconsistent discipline, parental neglect and withdrawal, parental abuse, parental rejection, poor role modelling, family conflict, loss of trust, security, and stability, and strong emphasis on money or material possessions [24, 26, 27, 29-31, 34-36, 141, 142]. Darbyshire et al. [29] conducted a qualitative study of children's experiences of living with treatment-seeking problem gamblers. The central theme of interviews of 15 young people (aged between 7 and 18 years) was the experience of 'pervasive loss', in which there was "*the loss of the gambling parent, in both a physical and an existential sense; the loss of the child's relationship with extended family; the loss of security and trust, as well as more tangible financial losses, such as the loss of savings and even the family home*" (p. 32).

The impact of problem gambling on family functioning has been confirmed by a small number of empirical reports employing a standardised evaluation of the family environment of male problem gamblers or their female partners [55, 143] and female problem gamblers [33]. Using the Family Environment Scale (FES), these studies have found that, compared to the families of normative standardisation samples, the families of problem gamblers are less likely to be assertive, self-sufficient, and decisive; are less interested in political, intellectual, and cultural activities; are less likely to provide commitment, help, and support to each other; are less likely to encourage direct expression of feelings; are less likely to participate in social and recreational activities; are less likely to cast activities into a competitive framework, and; are more likely to openly express anger and conflict. The findings of these studies have revealed that the family environments of problem gamblers are comparable to alcohol dependent controls and psychiatric inpatients [55, 143]. A comparison of the typologies formed by classification of FES profiles to the normative standardisation sample revealed that female problem gamblers were under-represented in achievement-oriented, structured moral-religious, intellectual-cultural, and support-oriented family types, and over-represented in conflict-oriented and disorganised family types [33].

Ineffective parenting practices and styles. In addition to the two studies formally testing the mediating effects of parenting practices [39, 42], the findings of several other studies suggest that parenting practices may be risk factors for the development of gambling problems in the offspring of problem gamblers [38, 139]. Grant and Kim [139] administered the Parental Bonding Instrument to 33 problem gamblers to retrospectively evaluate their perception of their parents' rearing practices. Compared to a control group, problem gamblers reported significantly lower care scores from both mothers and fathers. The problem gamblers also reported low rates of optimal parenting and high rates of neglectful parenting in their families

of origin. Similarly, a study of Native American mothers conducted by Momper and Jackson [38] found that maternal problem gambling was associated with less adequate parenting in the home environment (i.e., lower quality and quantity of emotional support, cognitive stimulation, and structure).

Dyadic relationship dysfunction. There is some evidence that a substantial proportion of the children of problem gamblers have experienced the effects of parental marital (dyadic) relationship dysfunction that could potentially mediate the relationship between parental and child gambling problems. The early literature investigating the impact of problem gambling on the family documented the typical course for the effect of problem gambling behaviour on the marital or dyadic relationships of male problem gamblers [24, 26, 27]. This conceptualisation divides the effect of problem gambling on partners and the dyadic relationship into three distinct phases: the denial phase (characterised by lack of awareness regarding the extent of the gambling behaviour and rationalisation of the gambling behaviour), the stress phase (characterised by deficient interpersonal communication, increased bailouts, social isolation, and feelings of frustration and resentment), and the exhaustion phase (characterised by multiple somatic ailments, intense psychological distress, a high incidence of maladaptive behaviour, unsatisfactory sexual relationships, and an increased likelihood of seeking professional assistance).

This conceptualisation of the impact of problem gambling on the parental dyadic relationship has been empirically supported by some descriptive studies that are largely derived from surveys of male Gamblers Anonymous members [31] and female Gam-Anon members [30, 31]. For example, empirical findings confirm that the partners of problem gamblers report an initial lack of awareness of the extent of gambling, a high incidence of arguments over gambling losses, and conflict in intimate relationships [30, 31, 144, 145]. A significant proportion of partners report borrowing from friends and family, covering for their partners, making payments on debts, and working to meet basic needs [30-32]. Empirical findings also confirm the generally unsatisfactory nature of the sexual relationship between male problem gamblers and their partners [30, 31, 144, 145]. Surveys indicate that a significant proportion of female partners and male problem gamblers consider separation or divorce [30, 31, 145, 146] and that the rate of divorce is higher than that found in the general population [147]. Compared to their peers, children of problem gamblers have experienced elevated rates of parental separation, divorce, or death before the age of fifteen [34, 35].

Although these studies provide some indication of the impact of problem gambling on parental intimate relationships, to date, there has been limited standardised evaluation of these impacts. Hodgins and colleagues [148, 149] explored the correlates of relationship satisfaction among 186 “concerned significant others” (56% spouse or common law partners) of predominantly male problem gamblers. The findings of this Canadian study revealed that the average relationship satisfaction score fell between the poor and average ranges and that lower relationship satisfaction was associated with a greater number of emotional consequences and negative gambler consequences, and greater gambling problem severity. Dowling and colleagues [33], in a secondary study that was derived from a treatment outcome study for female pathological gamblers in Australia, evaluated the relationship functioning of 44 female pathological gamblers in cohabiting relationships and 29 partners in cohabiting relationships. The findings revealed that both the female pathological

gamblers and their partners reported poor adjustment in their dyadic relationships compared to the married standardisation sample.

Co-occurring parental psychopathology. There is a large and burgeoning body of research that has investigated the association between problem gambling and co-morbid conditions. There is now evidence from several major population studies with high quality standardised measurement tools and sound methodologies that problem gambling is associated with depression and mood disorders, anxiety disorders, alcohol use problems, substance use problems, and personality disorders [(e.g., 6, 9, 10, 16, 18, 19, 150-154)]. For example, in a North American survey of 43,093 respondents, Petry, Stinson, and Grant [(152)] found that problem gamblers were more likely than non-problem gamblers to report a lifetime major depressive disorder (37%, odds ratio = 3.0), anxiety disorder (41%, odd ratio = 3.4), alcohol use disorder (73%, odd ratio = 6.3), drug use (38%, odd ratio = 5.4), nicotine dependence (60%, odds ratio = 7.2), and personality disorder (61%, odds ratio = 9.1). These findings suggest that children living with a problem gambling parent are exposed to high levels of psychopathology and comorbid problems in that parent.

Descriptive surveys also indicate that children living in problem gambling families are exposed to high levels of psychopathology and comorbid problems in their non-gambling parent. For example, a significant proportion of female partners have reported emotional disturbances, such as anger, resentment, depression, anxiety, isolation, loneliness, guilt, responsibility, confusion, helplessness, and hopelessness [(30, 31, 146, 148, 149)]. They have also reported high rates of emotionally-related physical complaints in response to the gambling behaviour, such as headaches, gastrointestinal ailments, feeling faint and dizzy, and hypertension [(31, 146, 155)]. Female partners have reported a higher rate of suicidal ideation [(31)] and attempted suicide [(30)] than the general population [(155)], as well as engaging in maladaptive behaviour such as excessive drinking, smoking, under- or over-eating, and impulsive spending in order to cope [(30, 146)]. A study of 440 partners of problem gamblers recruited from Australian treatment services revealed that intrapersonal issues were among the most common presenting problems [(156)]. There is also evidence that, compared to their peers, a substantial proportion of children of problem gamblers have experienced the effects of parental alcohol abuse, substance abuse, and overeating behaviour [(29, 32, 34, 35)]. The findings of Lesieur and Rothschild [(32)] confirm that children of parents with multiple problems (comorbid alcohol dependence, substance abuse, or overeating behaviour) report more adjustment difficulties than children of parents with only a gambling problem.

The limited standardised evaluation of the psychological functioning of the partners of problem gamblers has, however, revealed mixed findings. Dowling and colleagues [(33)] found that 29 cohabiting partners of treatment-seeking female problem gamblers did not display elevated psychopathology (depression, state anxiety, trait anxiety, and self-esteem) compared to normative standardisation samples. Similarly, Rychtarik and McGillicuddy [(157)] found that 23 predominantly female partners seeking "significant other" treatment displayed depression and anxiety scores in the average range. In contrast, Hodgins and colleagues [(148, 149)] found that 186 partners and family members (56% spouse or common law partners) seeking treatment as "concerned significant others" displayed higher psychological distress than the normative scores for adult non-patients, but lower psychological distress than adult mental health

outpatients. Multivariate models revealed that psychological distress was greater when the concerned other was a spouse, the concerned other was younger, and there was a greater number of emotional and behavioural consequences.

Taken together, these findings indicate that the non-gambling parent of children living in problem gambling families may experience a high degree of emotional difficulty. These findings are consistent with the results of several studies that suggest that the first-degree relatives of problem gamblers report an increased prevalence of a range of psychiatric disorders (including alcohol disorders, mood disorders, drug use disorders, antisocial personality disorders, and generalised anxiety disorders) than the relatives of non-problem gamblers [53, 54, 59, 62, 158-160]. Early views conceptualised the distress experienced by the partners of problem gamblers from a personality deficit model [157], whereby partners meet their dysfunctional needs by partnering with a problem gambler [27, 28, 31, 142]. More recent research, however, argues for a stress and coping perspective, whereby the emotional distress experienced by the partner results from ineffective skills to repeatedly cope with the difficulties created by the gambling problem [157].

Impaired family coping. There is presently little information available to indicate the ways in which family members cope with problem gambling. Krishnan and Orford [136] explored the gambling-related coping strategies employed by 16 family members (mostly partners) of problem gamblers and found that family members most often engaged in controlling strategies, such as exercising control of the finances, searching for evidence of gambling, and keeping a careful watch on the gambler. It remains unclear which family coping styles serve to exacerbate poor family outcomes.

Family violence. Empirical literature suggesting that problem gambling is a risk factor for family and intimate partner violence is emerging [30, 32, 161-165]. The findings of a North American study investigating whether problem gambling in the partner of emergency department patients is a risk factor for intimate partner violence found that the relative odds of experiencing intimate partner violence were ten times higher for women whose partners were problem gamblers [164]. A Canadian study of 248 problem gamblers recruited from newspaper advertisements [161] reported that although violence perpetration or victimisation was not associated with any index of gambling severity, over half reported perpetrating intimate partner violence (56%) or being victims of intimate partner violence (60%) reported being victims of intimate partner violence.

Several of these studies indicate that children raised in problem gambling families experience high rates of parental violence and abuse [30, 32, 162, 165]. A community survey in the Canadian province of Alberta revealed that diagnosed pathological gamblers reported higher rates of child physical abuse (17%) than the general population [162]. Using data drawn from the US National Comorbidity Survey replication from 3334 participants, Afifi and colleagues [165] found that pathological gamblers were 13.2 times more likely to report perpetration of severe child abuse than non-gamblers.

Gambling-related financial consequences. There is some evidence that financial losses resulting from parental problem gambling can impact on the food,

shelter, and safety needs of children. A cohort study of Pacific families with children in New Zealand examining the association between maternal gambling and families' food, shelter, and safety needs [166] reported that households with gambling mothers were more likely to have food and housing issues related to lack of money compared to households with non-gambling mothers. Maternal gambling, especially with mothers who had been criticised about their gambling, was significantly associated with poorer basic household nutritional variety and financial stress. The findings of a study of 440 partners of problem gamblers recruited from Australian treatment services confirms that financial issues are among the most common presenting problems [156].

Studies that evaluate the characteristics of problem gambling families without measuring offspring problem gambling suggest that risk factors for the intergenerational transmission of gambling problems may include:

- ***family dysfunction***
- ***ineffective parenting practices and styles***
- ***dyadic relationship dysfunction***
- ***co-occurring parental psychopathology***
- ***impaired family coping***
- ***family violence***
- ***gambling-related financial consequences***

2.3.6.2 The relationship between possible risk factors and offspring problem gambling: Testing Path B

Several studies have evaluated the factors associated with youth problem gambling without measuring parental problem gambling. These studies are therefore unable to test the relationship between parental and offspring problem gambling (*path c*) or the relationship between parental problem gambling and the potential risk factor (*path a*) in a formal test of mediation. They may be, however, able to provide some insight into the relationship between possible risk factors and offspring problem gambling (*path b*). From this perspective, the correlates of youth problem gambling may serve as possible risk factors in explaining the relationship between parental and offspring problem gambling. In Section 2.3.6.2, we will examine this literature in an attempt to identify factors that may possibly explain the relationship between parental and offspring problem gambling.

Personality factors. Problem gambling has been associated with personality factors such as impulsivity [121, 122 167-170], excitability [171], disinhibition [171], intensity-seeking [122], and risk-propensity [63]. In a study of 765 adolescents, Vitaro et al. [170] 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, Vitaro, Brendgen, Ladouceur, and Tremblay [169] 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. Gupta and Derevensky [171] 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 stop responding despite unfavorable contingencies.

Emotional distress. Another important finding from this emerging area of research is 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., 43, 50, 63, 171, 172, 173-175)]. Ste-Marie, Gupta, and Derevensky [(174)] 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 [(171)] found that problem gambling secondary students were more likely to meet the criteria for "clinical depression" (23%) on a depression scale than regular, occasional, or non-gamblers (10-12%), with female problem gamblers reporting the highest occurrence of depression (58%).

Impaired coping. Preliminary evidence indicates that adolescent problem gambling is associated with unhelpful coping styles, such as emotion-based, avoidant, and distraction oriented coping styles [(63, 122, 175-177)]. Bergevin, Gupta, Derevensky, and Kaufman [(176)] explored the relationships between problem gambling, stressful life events, and coping styles in 2156 secondary school students aged 11 to 20 years. The findings revealed that adolescent problem gamblers reported more major negative life events, less task-focused coping, and more avoidance-focused coping than non-problem gamblers. The findings of some of these studies also suggest that there may be gender-specific patterns of coping among adolescent problem gamblers [(122, 176)]. For instance, Nower, Derevensky, and Gupta [(122)] found that male problem gamblers employed more avoidance-oriented coping (e.g., seeking emotional outlets, distraction with other activities, and using humour) while female problem gamblers employed less active and solution-focused coping. Additionally, Bergevin et al. [(176)] found that only male problem gamblers reported the use of more emotion-focused coping strategies than their non problem-gambling counterparts.

Alcohol and substance use. There is also substantial evidence that adolescents displaying gambling related problems are at increased risk for multiple risk behaviours, such as alcohol or substance use [(e.g., 43, 46, 47, 49, 50, 122, 171, 172, 177-180)]. An Australian study exploring the psychosocial correlates of problem gambling in 926 adolescents aged 11 to 19 years found that problem gamblers were 10 to 20 times more likely to have use 'hard' drugs compared with non-problem gamblers and that 75 percent of problem gamblers drank alcohol without adult supervision on at least weekly basis [(172)]. In a review of 20 prevalence studies surveying middle and high school youth in North America, Jacobs [(43)] 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.

Risk-taking behaviours. 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 [(43, 131, 169, 178,

[179]. These include physical violence, vandalism, shoplifting, illegal activities, truancy, poor academic achievement, school problems, and problems with the police, conduct problems, and lower school connectedness [43, 47, 50, 63, 130, 177, 179, 181]. For instance, Hardoon et al. [47] 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 behaviour. 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 problems with the police [43].

Gambling attitudes and beliefs. Youth gambling attitudes and beliefs have been associated with a range of gambling-related indices, such as gambling frequency, gambling-related negative consequences, gambling involvement, and problem gambling severity [41, 43, 46, 121, 172, 180, 182-185]. In a review of a large number of North American studies, Jacobs [43] reported that youth problem gamblers displayed more positive gambling attitudes than other youth (e.g., lotteries are good idea, winning a big lottery jackpot is not very rare, gambling is a harmless pastime, and I can make a lot of money playing games of chance). In particular, problem gambling adolescents are more likely to report winning money as a reason for gambling [185], seem to hold stronger beliefs that gambling is a potentially profitable activity [41, 172], and rate their perceived gambling ability as higher [46] than their non-problem gambling counterparts.

Gambling expectancies. Research investigating gambling expectancies in adolescent populations is only beginning to emerge. In developing a gambling expectancy questionnaire, Gillespie, Derevensky, and Gupta [186] found that adolescents hold a variety of positive and negative gambling outcome expectancies. Three distinct positive outcome expectancy constructs emerged, including enjoyment/arousal (the gambling benefits of enjoyment, arousal, and entertainment), self-enhancement (the gambling benefits of feeling in control, feeling powerful, and feeling more accepted by peers), and making money (the benefit of financial gain as a result of gambling). In a secondary study, problem and at-risk gamblers endorsed items on each of the three positive expectancy subscales more highly than social gamblers and non-gamblers [187].

In addition, two negative outcome expectancy constructs emerged, including overinvolvement (the risks of cognitive, affective, and social preoccupation with gambling), and emotional impact (negative emotions such as guilt, shame, loss of control as a result of gambling). Problem gamblers have endorsed the Overinvolvement subscale more highly than social gamblers and at-risk gamblers but did not differ significantly on their endorsement of this subscale from non-gamblers [187]. Gillespie et al. [187] explain that the negative outcome expectancies of problem gamblers may have developed as a result of personal experience, while the similar negative outcome expectancies of non-gamblers may be a deterrent to experimentation.

Family problems. 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 [47, 51, 63, 183]. In a sample of 2336 Canadian secondary school students, Hardoon, Gupta, and Derevensky [47] found that at-risk and problem gamblers reported having family problems and perceived their parents and other family members as uncaring, harsh, or overly critical. They also reported that they felt emotionally detached or distant from family members. A study of 116 students in grades 9 to 12 from a North American urban secondary school found that lower levels of parental attachment and parental monitoring were associated with adolescent problem gambling [51]. Chalmers and Willoughby [183] investigated the role of several familial factors in the development of adolescent problem gambling and found that sibling risk behaviours predicted male problem gambling and parental monitoring and parental relationships predicted female problem gambling.

Other risk factors. Models of risk factors for adolescent problem gambling [126, 188] outline some other risk factors that have been implicated in the development of youth problem gambling. These include male gender, early onset of gambling experiences, coming from lower social classes, paternal pathological gambling, access to gambling venues, high extroversion, low conformity and self-discipline, models for deviant behaviour, parent-friends normative conflict, and low self-esteem.

Studies that evaluate the factors associated with youth problem gambling without measuring parental problem gambling suggest that risk factors for the intergenerational transmission of gambling problems may include:

- ***personality factors (e.g., sensation seeking and impulsivity)***
- ***emotional distress***
- ***impaired coping***
- ***alcohol and substance use***
- ***risk-taking behaviours***
- ***gambling attitudes and beliefs***
- ***gambling expectancies***
- ***family problems***

2.3.7 Protective factors for the intergenerational transmission of problem gambling behaviour

In the *Children at Risk Project*, we have defined a protective factor as any moderating factor that serves to mitigate or buffer the negative effects of a risk factor such as parental gambling problems [63-68] (refer to Section 2.1.1 for a more detailed explanation). Applied to the intergenerational transmission of gambling problems, the formal testing of moderation requires a significant interaction between parental problem gambling and the proposed moderating variable to predict offspring problem gambling (*path c*) [66, 69, 70, 72, 73]. A comprehensive search of the gambling literature reveals that only one study has formally tested for a moderation effect [42]. This study explored the degree to which parenting practices (parental monitoring and inadequate disciplinary practices) interacted with parent gambling in predicting adolescent gambling in a Canadian community sample of 938 adolescents and their parents. Multiple-group models performed to test this moderation hypothesis revealed that neither monitoring nor inadequate discipline moderated the relationship between

parent and adolescent gambling. Thus, parental monitoring did not seem to operate as a protective factor for adolescents exposed to gambling parents.

Although not providing a formal test of moderation or employing appropriate analytic techniques to test for a buffering effect for the presence of parental problem gambling, other studies provide some evidence that protective factors for the intergenerational transmission of gambling problems may include female gender, family cohesion, and school connectedness.

One of the most consistently identified factors associated with adolescent problem gambling is male gender, with many studies suggesting that problem gambling is at least twice as prevalent amongst males than females[eg., 11, 37, 40, 43, 45, 47, 63, 122, 171, 174, 177-179, 183, 187, 189-191]. A review article of North American studies by Jacobs [43] revealed that males were three to five times more likely to be classified with problem gambling categories than girls. Moreover, a meta-analysis of family studies conducted by Walters [109] revealed a stronger family effect for males than females and for fathers but not mothers. The authors suggest that this finding, which suggests a stronger familial effect for the sons of problem gambling fathers than for the daughters of problem gambling mothers, may simply be an artefact of higher base rates for problem gambling in males. However, they also suggest that alternative explanations include a learning or social modelling effect, whereby problem gambling is more likely to be passed down from fathers to sons than from mothers to daughters, or that there is a sex-linked genetic process occurring in the development of problem gambling.

Protective factors for the development of adolescent problem gambling have generally remained unexplored. However, a study conducted by Dickson, Derevensky, and Gupta [63] examined whether several protective factors (family cohesion, effective coping, mentor relationships, achievement motivation and involvement in conventional organisations) moderated the combined effects of several previously identified risk factors (trait anxiety, school problems, low self-perceived academic achievement, stressful life experiences, perceived familial and peer problem behaviour, risk propensity and being male) for the development of problem gambling in adolescence. The results revealed that family cohesion was the only protective factor that directly predicted problem gambling; school connectedness only indirectly predicted gambling severity by influencing other variables in the model.

Protective factors for the intergenerational transmission of gambling problems may include female offspring gender, family cohesion and school connectedness

2.4 Sibling Transmission of Alcohol Use Problems

In this review of the literature, we have focused on the influence of parental problem gambling on the development of offspring problem gambling (intergenerational transmission of problem gambling). This review has clearly highlighted that there are significant gaps in our understanding of problem gambling

outcomes for the children of problem gamblers. Before summarising these gaps (Section 2.6), we will explore the potential influence of siblings in the development of alcohol use and gambling problems.

Most studies exploring the familial transmission of alcohol use problems have investigated the role of parental influences; the role of sibling alcohol use has received comparatively little attention. However, there is now emerging evidence that the drinking practices of siblings exert a significant influence on adolescent alcohol use problems [192, 193]. Theoretically, sibling influence may be important as siblings can potentially operate in the same way as similar-age peers [194, 195]. It has been argued that, like peers, sibling influence reflects the "horizontal transmission" of alcohol use problems [196-198]. In the remainder of Section 2.4, we will apply Chassin and Belz's [67] research agenda to explore the literature investigating the sibling transmission of alcohol use problems.

2.4.1 Magnitude of risk for the sibling transmission of alcohol use problems

Studies of sibling influence have found that adolescent alcohol use and alcohol use problems are significantly associated with alcohol use by siblings[192-194, 198-202], even when the siblings are biologically unrelated [197]. Indeed, several studies have found that sibling alcohol use is a stronger predictor of adolescent drinking behaviour than parental alcohol use[192-194] . While most studies of sibling influence examine early to mid-adolescent samples, there is some evidence that sibling influence on alcohol use extends into young adulthood [198].

2.4.2 Specificity of risk for the sibling transmission of alcohol use problems

There is also evidence that sibling alcohol use exerts a unique influence on adolescent alcohol use [195, 198, 200]. Findings suggest that siblings influence alcohol use and dependence, after controlling for potentially relevant "third variables" such as comorbid substance dependence, shared peer groups, parental alcohol/substance use problems, social class and family size, rearing styles, maternal low education, maternal stressful life events, maternal depression, single-parent families, parental violence, parental arrest, and low family income [194, 195, 198, 200].

2.4.3 Risk factors for the sibling transmission of alcohol use problems

There may be several potential pathways through which the alcohol use patterns of siblings could be related. Although siblings may have inherited the same genetic predisposition for alcohol use from their parents [203], the resemblance between the alcohol use of siblings has most often been explained in terms of socialization mechanisms, such as role modelling, imitation, similarity selection, and social reward [193-195, 197, 198, 202, 204]. Exposure to sibling alcohol use may provide social norms, attitudes, values, and behaviours [194, 198, 202, 204], increase the likelihood of affiliation with substance-using peer groups (including engaging in alcohol use together) [193-195], or enhance the adoption of alcohol use to cope with stressful events [193]. Siblings may also provide greater access to opportunities for drinking or purchasing or supplying alcohol for the target sibling [193-195, 198, 200]. Finally, factors in the shared family environment, such as the quality of parenting, may be responsible for similar sibling alcohol use outcomes [194, 203].

Windle [193] employed structural equation modelling with data from over 570 secondary school students to explore the degree to which exposure to sibling alcohol use increased the likelihood of selection into substance-using peer groups or the adoption of alcohol use to cope with stressful events. The findings of this North American study revealed that sibling alcohol use significantly predicted peer substance use and adolescent coping motives for drinking, which in turn predicted adolescent alcohol use. These findings support the suggestion that sibling alcohol use may operate indirectly through peer selection and coping mechanisms.

2.4.4 Protective factors for the sibling transmission of alcohol use problems

Several studies have explored which factors buffer sibling influence on alcohol use. With mixed results [202], the association between the alcohol use of siblings has been buffered by several factors, such as sibling age, sibling gender, warmer mutual sibling relationships, frequency of sibling conflict with mutual friends, and family conflict [195, 197, 198]. For instance, Rowe and Gully [195] employed three aspects of sibling mutual interaction (warmth, conflict, and frequency of sibling conflict with mutual friends) to evaluate sibling effects on substance use in 418 sibling pairs aged 10 to 16 years. They employed formal tests of moderation to reveal that conflict was a protective factor for the relationship between the substance use of younger and older brothers. This study also found that sibling conflict remained a significant protective factor after controlling for family demographics (social class and family size), parental substance use, and child-rearing style (perceived parental control and parental warmth).

2.5 Sibling Transmission of Problem Gambling Behaviour

The empirical evidence suggests that sibling alcohol use problems impart a considerable and unique risk for the development of alcohol use problems in children and that several factors may be risk and protective factors for the sibling transmission of alcohol use problems. In contrast, there has been no empirical investigation of the risk or protective mechanisms of siblings on the problem gambling behaviour of children and adolescents.

It is evident, however, that this is an important area of research given that a significant proportion of adolescents report that their siblings introduced them to gambling activity and that they regularly gamble with their siblings [40, 46, 118, 119, 181]. Ladouceur and Mirealt [119] found that 57% of secondary school students in Canada who had ever gambled played with their siblings and that a small proportion reported that their siblings helped to finance their gambling. Ide-Smith and Lea [118] found that a substantial proportion of 13- to 14-year-olds in the UK reported that siblings "got them into" betting on dominoes (20%), wagering (24%), card games (15%), and slot machines (24%) and that they gambled with their siblings on card games (37%), coin games (31%), slot machines (29%), wagering (20%), and dominoes (20%). Gupta and Derevensky [116] reported that 53% of children aged between 9 and 14 years who had gambled in the previous 12 months reported that they had gambled with their siblings and that there was a small positive relationship between age and gambling with siblings. Huxley and Carroll [181] reported that a fifth (21%) of 539 fruit machine users

aged 11 to 12 years and 14 to 15 years played with their siblings. Finally, an Australian study found that adolescents are most likely to gamble with their siblings on card games (11.0%) and sports betting (7.4%), followed by scratch tickets (5.0%), lotteries (4.0%), racing (3.8%), internet (3.5%), and gaming machines (3.5%) [40]. There is also some evidence that adolescent females report gambling with their siblings more than males [46].

A significant proportion of problem gamblers also report that their siblings display problematic gambling behaviour [47, 188, 205]. Hardoon, Gupta, and Derevensky [47] found that students in Grade 7 to 13 classified as probable pathological gamblers or at-risk gamblers reported significantly higher rates of problem gambling for both their brothers (8.0% and 7.5% respectively) and sisters (5.3% and 3.2% respectively) than non-gamblers or social gamblers. Grant and Kim [205] reported that a slightly higher proportion of male (34.0%) pathological gamblers seeking medication treatment reported at least one sibling with problematic gambling behavior than their female counterparts (28.2%). Dickson, Gupta, and Derevensky [63] found that the odds of developing a gambling problem were approximately four times greater for an individual with a sibling with a gambling problem. It is evident that further research is required to explore this form of "horizontal transmission" of problem gambling.

2.6 What Are The Gaps in our Understanding of The Familial Transmission of Problem Gambling Behaviour?

Clearly, there are significant gaps in our theoretical and empirical understanding of problem gambling outcomes for children raised in problem gambling families. The empirical data base relating to the intergenerational and sibling transmission of problem gambling behaviour is in its infancy. Using Chassin and Belz's [67] research agenda as a framework, this literature review clearly shows that a substantial degree of empirical investigation addressing multiple research questions is required to enhance our knowledge in this research area.

There is now substantial evidence to suggest that parental problem gambling is a significant risk factor for the development of offspring problem gambling. There appears to be a moderate risk associated with parental gambling problems. Using various methodologies, research findings consistently indicate that children of problem gamblers are 2 to 4 times more likely to develop gambling problems themselves than the children of non-problem gamblers. Although these rates are somewhat lower than the risk associated with parental alcohol use problems, it is apparent that the magnitude of risk associated with parental problem gambling for the development of offspring gambling problems is substantial enough to warrant clinical and policy responses. There is a need, however, to determine the degree to which the effects of parental problem gambling impact on offspring problem gambling above and beyond those of co-occurring parental psychiatric disorders such as affective disorders and alcohol use problems.

It is clear that little is known about the mediating mechanisms by which parental problem gambling may result in elevations in offspring problem gambling or the factors that may protect against the development of this relationship. A mediating risk factor explains "why" or "how" the relationship between a predictor (e.g.,

parental problem gambling) and an outcome (e.g., offspring gambling problems) occurs [69, 70] (refer to Section 2.1.1.1 for a more detailed explanation). Empirical research and theory has yet to develop and test theory-based hypotheses or conceptual models that articulate the processes underlying the intergenerational transmission of gambling problems. The hypotheses and models attempting to explain the etiologic mechanisms underlying the intergenerational transfer of alcohol use problems potentially have utility within the problem gambling field as they can serve to guide our selection of potentially relevant variables for study in the mediation and moderation of risk for the development of problem gambling behaviour in children of problem gamblers [67, 92]. The study of mediation of risk in the intergenerational transmission of problem gambling is central to understanding risk and protective factors among the children of problem gamblers but remains a significant gap in the empirical literature.

The alcohol use literature has identified a range of possible mediating mechanisms underpinning the intergenerational transmission of alcohol use problems that might be of relevance in the intergenerational transfer of gambling problems. These include psychological factors (e.g., difficult temperament, aggression, attributional style, gambling expectancies, cognitive dysfunction, coping styles, perceived competencies, behavioural undercontrol, negative mood states/emotional distress, sensation seeking, impulsivity, impaired coping), family factors (e.g., parenting behaviours and deficits, parent-child interaction, marital conflict, financial strain, family ritual disruption, difficult sibling relations, family instability, family disorganisation, parental loss and family breakdowns, family conflict and violence), and social factors (e.g., peer rejection/isolation, aggressive social style, limited friend selection, prosocial skills, education, school failure, social rejection, deviant behaviours, exposure to gambling, peer influence).

Critical supportive data attempting to explain the intergenerational transmission of problem gambling is lacking because there have been few appropriate analyses that simultaneously test all the requisite relationships between parental problem gambling, a potential mediating risk factor, and offspring problem gambling. In general, the research in the problem gambling literature does not evaluate the relationship between parental and offspring problem gambling (*path c*). Studies identifying environmental characteristics of problem gambling families have only provided evidence for *path a*. The failure of these studies to measure offspring problem gambling and formally test *path b* precludes the conclusion that such conditions are related to the development of offspring problem gambling. Conversely, studies examining the correlates of youth problem gambling only provide evidence for *path b*. The failure of these studies to measure parental problem gambling and formally test *path a* in these studies precludes the interpretation that these correlates explain the intergenerational transmission of problem gambling.

Nevertheless, the current status of the empirical literature may highlight some potential hypotheses for the mechanisms underlying the transmission of problem gambling from parents to their children. Formal tests of mediation suggest that offspring gambling cognitions [48] may explain the relationship between parental and offspring problem gambling. The findings derived from formal tests of mediation relating to parenting practices, however, are mixed [39, 42]. Potential mediators suggested by studies identifying environmental characteristics of problem gambling

families include family dysfunction, ineffective parenting practices and styles, dyadic relationship dysfunction, co-occurring parental psychopathology, impaired family coping, family violence, and gambling-related financial losses. Potential mediators suggested by studies examining the correlates of youth problem gambling include personality factors (e.g., sensation-seeking and impulsivity), emotional distress, impaired coping, alcohol and substance use, risk-taking behaviours, gambling attitudes and beliefs, gambling expectancies, and family problems.

There is also little information available about the factors that may protect against or buffer the intergenerational transmission of problem gambling. A moderating protective factor serve to mitigate or buffer the negative effects of a risk factor such as parental gambling problems [63-68] (refer to Section 2.1.1.2 for a more detailed explanation). Potential protective factors identified from the alcohol use literature include coping, perceived control, social class, family rituals, mother's esteem for the alcohol dependent father, amount of attention from primary caregivers, low family conflict, birth of another sibling, child social support, personality, higher self-awareness, higher intellectual functioning, the psychiatric status of the non-dependent parent, parental monitoring, consistent discipline, social support and resources, child gender, age, parental gender, duration and intensity of exposure, treatment experience, peer influences, and gambling expectancies. A comprehensive search of the problem gambling literature has revealed that only one study [42] has employed a formal test of moderation; this study found that parental monitoring failed to buffer the relationship between parental and adolescent gambling. Other protective factors may include female offspring gender, family cohesion, and school connectedness.

Most studies investigating the familial transmission of alcohol use problems have focussed on the role of parents. The role of sibling alcohol use has received relatively little empirical attention, despite findings that the alcohol use problems of siblings impart a considerable and unique risk for the development of alcohol use problems. In a comprehensive search of the problem gambling literature, we could not find any research that has specifically investigated sibling influence in the development of gambling problems. It is apparent, however, that the influence of siblings is an important future area of research given findings that a significant proportion of adolescent gamblers report that they were introduced to gambling by their siblings and regularly gamble with their siblings, and that adult problem gamblers report high rates of gambling problems for their siblings.

This literature review has outlined the need for attention to issues of mediation and moderation in research investigating the familial transmission of problem gambling. However, to date, there is little information available examining the transmission of gambling problems from parents to children or siblings to children. Identifying potentially modifiable risk and protective factors in the development of problem gambling in children living in problem gambling families has important theoretical and applied implications. The identification of mediating and moderating mechanisms is important in informing the construction of etiologic theories of the familial transmission of problem gambling and the design of targeted prevention and intervention strategies and programs necessary to reduce the intergenerational cycle of transmission of problem gambling from one generation to the next [20, 39, 48, 67, 96, 101, 206].

CHAPTER 3
METHODOLOGICAL CONSIDERATIONS: DEVELOPING A RESEARCH METHODOLOGY FOR THE *CHILDREN AT RISK PROJECT*

3.1 Introduction

The *Children at Risk Project* aimed to develop an appropriate methodology to conduct an analysis of the contribution of risk exposures towards the development of problem gambling in children raised in problem gambling families. In order to satisfy these objectives, data was collected from a large scale national community telephone survey of adults retrospectively reporting on the gambling behaviour of family members during their childhoods (Study 1). These data were supplemented with results of a survey of adolescents aged 12 to 18 years sampled from secondary schools (Study 2), a survey of young adults sampled from tertiary institutions (Study 3), and a survey of individuals seeking problem gambling counselling (Study 4). In Study 4, participants retrospectively reported on the gambling behaviour of their family members during their childhoods and prospectively reported on the gambling behaviour of their children. For all studies, childhood was defined as under the age of 18 years. Multiple research methodologies were employed to overcome some of the methodological considerations raised by the nature of the research questions.

The COA literature raises a number of methodological issues to consider in studies examining the intergenerational or sibling transmission of problem gambling. In this chapter, the COA literature is examined to inform the design of appropriate methodologies examining the intergenerational or sibling transmission of problem gambling in terms of sample selection, data collection strategies, assessment methods, study design, consideration of potential sources of heterogeneity, and statistical analyses.

3.2 Sample Selection

Most COA studies have employed non-representative samples that were not selected via probability sampling methods. For example, many samples have comprised university students, whereby the most at-risk participants are filtered or screened out by university entry requirements [91, 93, 208]. Others have collected data from clinical samples such as individuals in treatment for alcohol use problems, individuals attending self-help groups (e.g., Al-Anon), or children of clients in treatment for alcoholism [91, 96, 100, 101, 207, 208]. This recruitment method is problematic as individuals in treatment for alcohol dependence, children of self-identified problem drinkers in treatment, and self-identified COAs may not be representative of the general COA population [91, 96, 100, 101, 207, 208]. Studies based on clinical samples may lack control groups of non-COAs or non-alcohol dependent individuals [66] and overestimate risk of alcohol dependence in COAs by biasing sample selection toward the extreme end of the continuum of severity [66, 100]. More recent studies have identified COAs from specific or general population samples [209]. In the *Children at Risk Project*, we therefore employed a general community sample in Study 1 that is most representative of adults with and without a family history of problem gambling

[91, 93, 208]. However, in order to obtain an even more comprehensive understanding of the relationship between problem gambling in a family member and child problem gambling outcomes, this data was supplemented from a secondary school sample in Study 2, a university and technical college sample in Study 2, and a clinical sample in Study 4.

Participants of all ages have been recruited for COA research. While the research questions can be adequately addressed by the methodology proposed in Study 1, the measurement of problem gambling in family members using this study design relies on retrospective reports of adult children [100, 207]. Retrospective reports may be unreliable due to memory biases or incomplete or inaccurate records [99, 100]. In the *Children at Risk Project*, adolescents and young adults reported a current or past family history of gambling problems in Studies 2 and 3, and problem gambling counselling clients reported whether their own children had gambling problems in Study 4.

Sample sizes, which have been of particular concern in COA research, are likely to have contributed to inconsistencies in findings [66, 91, 93]. It has been argued that the COA literature contains both Type 1 (false positive) errors because of many dependent variables examined using small samples and Type 2 (false negative) errors because of the limited statistical power characterising studies with small samples [66, 91, 93]. In order to manage the inter-related problems of Type 1 and Type 2 errors, the *Children at Risk Project* employed appropriate procedures to control for Type 1 errors (e.g., using multivariate statistics) while reducing the likelihood of Type 2 errors by recruiting samples of adequate size to detect effects of reasonable magnitude [66, 91].

3.3 Data Collection Strategies

The two primary methods of examining the impact of a family history of alcohol use problems are the family study method and the family history method [66, 96, 100, 101, 207, 209]. The family study method involves the direct assessment of each available first-degree family member (e.g., parents, siblings, and offspring) for the presence of alcohol use problems, whereas the family history method involves data collection from a single first-degree family member regarding the presence of an alcohol use disorder within each family member. It is generally agreed that the family study method is superior as it is more precise and accurate, particularly when more extensive or subtle diagnostic information (e.g., alcohol dependence subtypes, degree of comorbidity) is required [66, 93, 207, 209]. However, the family history method is often the preferred alternative as it is faster, simpler, more efficient, and less expensive [66, 207, 209]. It is the only method available when there are practical constraints such as time, geographical accessibility, and financial constraints, or when family members are unavailable for interview because of death, ill health, migration, or refusal to participate [66, 100, 207]. The family history method has displayed good to excellent specificity, but more modest sensitivity, and is therefore likely to underestimate the effects of parental alcohol use problems and the role of other parental psychopathology [66, 93, 207]. The family history method also displays high inter-rater reliability, and good test-retest reliability (refer to [207]). Given time constraints, the family history method was the preferred method in all studies of the *Children at Risk Project*.

3.4 Family History Assessment Methods

A range of instruments have been employed to assess the presence of parental alcohol use disorders. Many studies employ single questions or the Children of Alcoholics Screening Test (CAST) [210]. Alcohol dependence questionnaires have been adapted from self-report to parent-report, such as the Michigan Alcoholism Screening Test (MAST-family) [211], the Short Michigan Alcoholism Screening Tests for Mother (M-SMAST) and Father (F-SMAST) [212]. Other approaches include the Family History Research Diagnostic Criteria (FH-RDC) [213], interview data, diagnostic criteria for alcohol abuse or dependence, the Family Tree Questionnaire (FTQ) [214], the family history section of the Renard Diagnostic Interview (RDI) [215], family history surveys, alcohol dependence treatment, and the Adult Children of Alcoholics Index [216] (refer to Hodgins and Shimp [209] for a detailed review of these measures). The range of instruments and inconsistency in criteria for diagnosing alcohol dependence has generally made it difficult to compare across studies [99, 208].

The CAST was designed to identify children of alcoholics by measuring feelings, attitudes, perceptions, and experiences related to parental drinking. Higher scores indicate higher levels of being affected by the parental alcoholism. The CAST is suitable for use with children from 9 years to adults. The original 30-item true/false CAST [210] has displayed good psychometric properties in a number of independent investigations. The CAST has displayed high internal consistency, good test-retest reliability, good discriminant validity with self-identification, and construct validity with measures of parental alcohol use [217, 218]. However, the CAST has been criticised on the grounds that many of the items are based on subjective reactions, that it may be relatively insensitive to past parental alcohol use problems or an absent or non-custodial parent, and that the items do not measure diagnostic criteria of alcohol abuse or dependence [66]. The CAST-6 [219], a shortened version of the CAST, was developed from independent principal components analyses of three samples: outpatient psychiatric sample, individuals seeking treatment from substance abuse programs, and medical students. The CAST-6 has displayed high internal reliability (Cronbach's alpha ranging from 0.86 to 0.92), good test-retest reliability (0.94), high item-total correlations with the CAST (ranging from 0.92 to 0.94), and good discriminant validity with the original CAST [101, 209, 219].

There are numerous variations of single screening questions designed to identify COAs. Although it has been argued that classification of respondents on the basis of a single item is unreliable [66, 208], there is substantial evidence that the reliability and validity of single-item questions for identifying COAs is satisfactory. Several studies have found good concordance between single questions and other measures, such as the CAST or items from the CAST [220, 221], the CAST-6 [209], stringent diagnostic criteria and the FH-RDC [207, 222], personal interviews [223], clinical judgement of treatment personnel regarding COA status [224], sibling and parent report [210, 225], and the MAST-family measures [212, 225]. Single items have also displayed good test-retest reliabilities [209, 224, 225].

Cuijpers and Smit [207] compared a single question *(Has your natural father or mother ever had a problem with drinking?)* and the FH-RDC using data from the National Comorbidity Survey of the North American population aged 15 to 54 years. The FH-RDC requires at least one alcohol-related problem in addition to parental problem drinking. They found good agreement between the two methods of identifying parental alcohol dependence, with the single-question method displaying high specificity. They also found that the single question method displays only a small downward bias in identifying psychiatric disorders in COAs. They concluded that a single question on parental problem drinking is adequate when short questionnaires are required. Hodgins and Shimp [209] compared several single questions with the CAST-6, the FH-RDC, the CAST, the F-SMAST, the M-SMAST, the FTQ, and the MAST-family. Using a face-to-face interview as the comparison standard, this study found a number of single questions performed equally as well as the CAST-6 and other more complex methods.

None of the screening instruments for identifying COAs have been modified for use with a problem gambling sample. Given the length of the questionnaires due to the range of risk and protective factors assessed and lack of validation of an existing measure for identifying a family history of problem gambling, the *Children at Risk Project* screened for problem gambling behaviour of each family member using single items.

Many of the available measures have been criticised on the grounds that they rely on respondents understanding of the meaning of the terminology employed, such as problem drinking [207, 208, 226] . In order to enhance reliability of classification, where practicable, the *Children at Risk Project* provided definitions of problem gambling before assessing the family history of problem gambling. We employed the definition of problem gambling provided in the project specification: "Problem gambling is characterised by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others or for the community" [1].

3.5 Study Design: Longitudinal and Cross-sectional Designs

Understanding the heterogeneous outcomes of COAs can be facilitated by the use of prospective longitudinal research designs [66, 91, 96, 101]. Prospective longitudinal study designs allow for the examination of the interplay between mediators and moderators operating across different developmental stages [66, 91, 96, 101] . In contrast, cross-sectional investigations are inherently limited in their ability to resolve the direction of causality and to eliminate third-variable explanations [66, 96, 101]. However, cross-sectional evaluations of models that use a methodology for determining high-risk subjects can provide an important first step in developing an understanding of risk processes and serve as the foundation for more refined modelling with prospective data [93]. Given the time constraints associated with the *Children at Risk Project* and the infancy of the investigation related to the familial transmission of problem gambling behaviour, we employed cross-sectional designs to serve as the foundation for future prospective longitudinal research.

3.6 Consideration of the Potential Sources of Heterogeneity

The COA literature raises a number of other methodological issues to consider in studies examining the intergenerational or sibling transmission of problem gambling. Most relevant are calls for the COA literature to consider important potential sources that may account for the heterogeneity of COA outcomes [66, 67, 96, 100, 101]. These sources of heterogeneity create formidable methodological challenges for research into the intergenerational transmission of alcohol use problems [67, 97]. However, an understanding of the heterogeneity relating to transmission can facilitate the development of targeted prevention and treatment strategies [101].

3.6.1 Cohabitation issues and relationship to the child

While cohabitation issues and relationship to the child are generally not considered in the COA literature, the heterogeneity in outcomes associated with COA status may be associated with the level of direct exposure to parental alcohol use problems and associated difficulties [96]. Specifically, the degree of exposure is important for etiological theories that suggest that social learning is associated with the intergenerational transmission of alcohol use problems [96]. Some COAs may have relatively low contact with their biological parent(s) and/or siblings [72]. Study 4 of the *Children at Risk Project*, which comprised the largest number of problem gamblers, examined the nature of the relationship (biological or step-family members) and the degree of contact between the participant and family member (living with the family member on a full- or part-time basis) [72].

3.6.2 Density of family history

Most of the COA literature has generally ignored the density of alcohol use problems in the family (e.g., both parents have alcohol use problems, parents and siblings have alcohol use problems, or mutigenerational alcohol use problems) [66, 67, 91, 100, 101, 208]. It has, however, been argued that assortative mating serves to increase the rate of alcohol use disorders in COAs due to a genetic predisposition for alcohol dependence inherited from both sides of the family and to an increase in compromised rearing environments and "alcohologenic nature" of the family environment [96, 100]. There is some evidence that COAs with two alcohol dependent parents are more likely than COAs with one alcohol dependent parent or no alcohol dependent parents to report an earlier age of first alcohol intoxication, more behavioural problems preceding alcohol treatment, and a faster procession from first intoxication to treatment for alcohol use problems [227]. However, the number of alcohol dependent parents has not affected measures of pre-treatment drinking, drinking severity, and treatment outcome [227]. The *Children at Risk Project* will examine the effect on problem gambling outcomes when one or more family members are problem gamblers.

3.6.3 Lifespan developmental factors

The COA literature requires increased attention to lifespan developmental factors in considering the outcomes of parental alcohol use problems [66, 91, 96, 101, 208]. These factors include: the child's developmental stage at the time of active parental drinking; the parent's current stage of alcoholism or recovery; the current

developmental level of children; the recency of parental alcohol use problems; and the duration of parental alcohol use problems [66, 67, 91, 99,208]. An understanding of which factors are differentially important at different developmental stages will facilitate targeted preventive intervention [96]. Study 4 of the *Children at Risk Project* will explore some of these developmental factors.

3.6.4 Gender of the problem gambling parent

It is acknowledged that effects of parental alcohol use problems may vary with the gender of the alcohol dependent parent [67, 91, 99]. Given that changes in legislation and public acceptance of gambling in Australia and other western countries have led to an increase in the prevalence of gambling and problem gambling for women [e.g., 8], caution must be taken in generalising across genders. Although there is some evidence that suggests that male problem gamblers may display stronger familial transmission than their female counterparts (refer to Section 2.3.4), it has been speculated that the deleterious effects of female problem gambling on the family, particularly on dependent children, may be exacerbated given women's historically greater involvement with the family and their traditional familial roles as caregiver and nurturer [20, 24, 29, 205, 228, 229]. The *Children at Risk Project* administered separate screening questions for fathers, mothers, and siblings in order to further explore the differential impacts on children of paternal and maternal forms of problem gambling [29].

3.6.5 Other 'third variable' influences

In Section 2.2.5, we argued that much of the COA literature is limited in its ability to draw conclusions regarding the effects of parental alcohol use problems independent of co-occurring parental psychiatric disorders. It has also been argued that much of the COA literature also does not adequately account for other 'third-variable' influences associated with alcohol use problems such as unemployment, socio-economic status, relocations, financial hardship, and divorce or separations [67, 71 91, 96, 99-101, 207, 208]. Given that these family stressors in problem gambling families may result in a higher degree of risk by potentiating each other [96, 99], the *Children at Risk Project* took these influences into account in order to identify the factors that are uniquely associated with parental gambling problems [96, 100, 101].

3.6.6 Predominant gambling form

It has been suggested that the effect of parental alcohol use problems differs depending on the subtype of alcohol use problem [66, 91, 96, 100, 101]. The most influential attempt at subtyping problem gambling is the 'pathway typology model', which proposes that there are three major entry pathways into PG: 1) 'normal' or non-pathologically disturbed gamblers; 2) emotionally disturbed or vulnerable gamblers; and 3) biologically-based impulsive gamblers [230]. However, research attempting to subtype problem gambling is in its infancy [230, 231]. When there is some consensus on the optimal way of subtyping problem gambling, future research should explore the effect of problem gambling subtypes on the intergenerational transmission of problem gambling. It is also reasonable to assume that the predominant form of problem gambling may have a differential effect on the experience of a family history of problem gambling. Study 4 of the *Children at Risk Project* explored the problem

gambling activities for each family member as it had the highest number of problem gamblers.

3.6.7 Child characteristics

Most of the COA literature investigates COAs as a unitary group. However, potential differential effects of parental alcohol use may vary as a function of child socio-demographic factors, such as gender, age, ethnicity, and comorbidity [66, 91, 96, 101]. The *Children at Risk Project* examined these factors in the familial transmission of gambling problems.

3.6.8 Family structure

Much of the COA literature has limited its evaluation to children growing up in intact families because researchers have been interested in family dynamics. However, it is likely that findings derived from evaluation of two-parent families may not be generalisable to those from one-parent families or step-families [66]. Study 1 of the *Children at Risk Project* therefore considered the impact of children growing up in one-parent families, step-parent families, and two-parent families.

3.7 Statistical Analyses

Methodological and statistical sophistication is critical in order to expand current knowledge in the relatively advanced COA literature as it is increasingly evident that COA outcomes are complex, differential, and multi-determined [66, 101]. Cross-temporal relationships among variables can be analysed using multivariate statistical modelling, such as covariate structure modelling or structural equation modelling, or bootstrapping methods [66, 69, 101, 232, 233]. These procedures have the advantage of evaluating complex multivariate models that correspond to multiple hypothesised interrelationships among a broad range of continuous and categorical variables [69, 70, 232]. They are therefore useful tools to test the effects of presumed mediators and moderators on the development of alcohol use problems [66, 70, 101, 232]. However, simple mediation and moderation analyses are often a valuable step in understanding a bivariate causal relationship. Given the infancy of the investigation related to the familial transmission of problem gambling behaviour, simple but formal statistical tests of mediation and moderation were employed in the *Children at Risk Project* in order to form a solid foundation for future research evaluating complex multivariate models.

3.8 Concluding Comments

This chapter has outlined the need for careful assessment, consideration of heterogeneity, a developmental perspective, a multivariate framework, attention to issues of mediation and moderation, and attention to study design in research investigating the familial transmission of problem gambling. These issues have been taken into consideration in developing the research methodology for the *Children at Risk Project*.

CHAPTER 4
CHILDREN AT RISK PROJECT AIMS AND HYPOTHESES

4.1 Introduction

In the *Children at Risk Project*, we assessed a wide range of variables thought to be potentially etiologically relevant in the familial (parental and sibling) transmission of gambling problems. Although there is a lack of research investigating the familial transmission of problem gambling, the limited empirical literature evaluating the characteristics of problem gambling families and the correlates of youth problem gambling was employed to identify variables that may potentially serve as risk and protective factors for the familial transmission of problem gambling. The theoretical and methodological perspectives provided by the alcohol dependence field were also employed to generate a number of hypotheses. Given the infancy of the field, one goal of the current research program was to evaluate the unique contribution of several factors by testing some of the individual linkages within the integrative models. Given that the project aimed to identify risks that could be viable targets for targeted population level intervention strategies and programs, an attempt was made to investigate the role of variables that are amenable to direct modification or variables that allow for targeted intervention.

4.2 Project Aims

We applied Chassin and Belz's [67] research agenda to formulate the aims of the current project. The aims of the project were to:

1) Determine the magnitude of risk associated with family member problem gambling for the development of child/adult child problem gambling.

2) Determine the specificity of risk associated with family member problem gambling for the development of child/adult child problem gambling after controlling for other "third-party" variables.

3) Identify the risk factors that explain why individuals raised in problem gambling families are more likely to develop problem gambling than individuals raised in non-problem gambling families.

4) Identify the protective factors that may buffer the risk associated with family member problem gambling.

5) Provide some indication of the relative importance of the identified risk and protective factors in order to appropriately target prevention and intervention efforts [212].

4.3 Project Hypotheses

Specifically, it was hypothesised that:

1) Family member problem gambling will be positively associated with child/adult child problem gambling.

2) Family member problem gambling will remain positively associated with child/adult child problem gambling after controlling for relevant socio-demographic factors, family member psychopathology, and concurrent family stressors. Refer to Table 4.1 for a full list of control variables employed in the multiple studies of the *Children at Risk Project*.

3) Several psychological, family, and social factors will mediate or explain the relationship between family member and child/adult child problem gambling. Refer to Table 4.1 for a full list of risk factors that were evaluated in the *Children at Risk Project*.

4) Several psychological, family, and social factors will buffer the risk associated with family member problem gambling for the development of child/adult child problem gambling. Refer to Table 4.1 for a full list of protective factors that were evaluated in the *Children at Risk Project*.

Table 4.1
Control variables, risk factors, and protective factors assessed in the four Children at Risk Project studies

Tested control variables	Tested risk factors	Tested protective factors
Socio-demographic • Gender • Age • Metro/rural • Relationship status • Living alone • Employment status • Educational qualifications • Country of birth • Aboriginal and Torres Straight Islander (ATSI) status • Gross personal weekly income • Gross household weekly income ***Family member psychopathology*** • Family member problem drinking • Family member drug problems • Family member mental health issues ***Concurrent family stressors*** • Parental unemployment • Parental separation/divorce • Family member physical illness • Financial debts • Family member imprisonment	***Psychological factors*** • Gambling attitudes • Non-productive coping • Life dissatisfaction • Substance use (alcohol, marijuana, other drug) • Positive gambling expectancies (*Enjoyment/Arousal, Self-Enhancement, Money*) • Gambling motives (*Enhancement, Coping, Social*) • Sensation seeking • Depression/psychological distress • Antisocial behaviours ***Family factors*** • Family member problem drinking • Family member drug problems • Family member mental health issues • Parenting practices (*Inconsistent discipline*) • Parental separation/divorce • Family financial problems/debts • Family dissatisfaction • Living situation dissatisfaction • Money dissatisfaction • Family conflict • Parenting style (*Paternal/maternal authoritarian, Paternal/maternal permissive*) • Parental unemployment ***Social factors*** • Age of first gamble • Number of gambling friends • Gambling with parents, siblings, and friends • Gambling at home and friends' homes	***Psychological factors*** • Coping (*Productive coping, Reference to Others*) • Coping resources • Negative gambling expectancies (*Overinvolvement, Emotional Impact*) ***Family factors*** • Two-parent family • Greater number of siblings • Parental employment (paternal, maternal) • Parenting practices (*Positive parenting, Parental involvement*) • Family functioning • Parenting style (*Paternal/maternal authoritative*) ***Social factors*** • Female gender • Younger age • Australian born status • Younger age left home • Raised in a metropolitan region • Social capital when growing up • Physical health

CHAPTER 5
STUDY 1: COMMUNITY TELEPHONE SURVEY

Study 1 comprised data from a large scale national community telephone survey of adults.

5.1 Method

5.1.1 Participants

The sample comprised 3953 participants (1938 males, 2015 females). A summary of the demographic characteristics for Study 1 participants is displayed in Table 5.1.

Table 5.1
Demographic characteristics of Study 1 participants

Demographic variable	**Total sample (*n* = 3953)**	**Males (*n* = 1938)**	**Females (*n* = 2015)**
Age (years)			
18-24	352 (8.9%)	246 (12.7%)	106 (5.3%)
25-29	192 (4.9%)	108 (5.6%)	84 (4.2%)
30-39	812 (20.6%)	331 (17.1%)	481 (23.9%)
40-49	838 (21.2%)	393 (20.3%)	445 (22.1%)
50-59	589 (14.9%)	271 (14.0%)	318 (15.8%)
60-69	643 (16.3%)	337 (17.4%)	306 (15.2%)
70 or older	525 (13.3%)	252 (13.0%)	273 (13.6%)
Relationship status			
Never married	742 (18.9%)	512 (26.5%)	230 (11.4%)
Married	2321 (58.8%)	1041 (53.8%)	1280 (63.7%)
Other ‘live-in’ relationship (de facto)	227 (5.8%)	117 (6.0%)	110 (5.5%)
Separated but not divorced	87 (2.2%)	33 (1.7%)	54 (2.7%)
Divorced	286 (7.2%)	134 (6.9%)	152 (7.6%)
Widowed	282 (7.1%)	98 (5.1%)	184 (9.2%)
Living situation			
Single/married person living alone	712 (18.1%)	386 (19.9%)	326 (16.2%)
Group household (not related)	106 (2.7%)	83 (4.3%)	23 (1.1%)
Other related individuals	321 (8.1%)	195 (10.1%)	126 (6.3%)
Couple with no children	400 (10.1%)	216 (11.1%)	184 (9.2%)
One parent family, dependent children	133 (3.4%)	35 (1.8%)	98 (4.9%)
Two parent family, dependent children	1399 (35.5%)	596 (30.8%)	803 (40.0%)
Two parent family, children not at home	551 (14.0%)	282 (14.6%)	269 (13.4%)
Family with independent children	270 (6.8%)	128 (6.6%)	142 (7.1%)
Single with independent children	51 (1.3%)	14 (0.7%)	37 (1.8%)

Table 5.1 cont…

Employment status			
Work full-time	1215 (30.9%)	825 (42.6%)	390 (19.5%)
Work part-time/casual	886 (22.5%)	276 (14.2%)	610 (30.5%)
Self-employed	244 (6.2%)	149 (7.7%)	95 (4.8%)
Unemployed and looking for work	86 (2.2%)	61 (3.1%)	25 (1.3%)
Full-time student	121 (3.1%)	82 (4.2%)	39 (2.0%)
Full-time home duties	300 (7.6%)	15 (0.8%)	285 (14.3%)
Retired/pension	989 (25.1%)	485 (25.0%)	504 (25.2%)
Not employed and not looking for work	56 (1.4%)	18 (0.9%)	38 (1.9%)
Sick or disability pension	39 (1.0%)	26 (1.3%)	13 (0.7%)
Occupation			
Professional or senior government	6630 (34.1%)	288 (29.1%)	342 (39.7%)
Business manager or executive	181 (9.8%)	117 (11.8%)	64 (7.4%)
Business owner or self-employed	154 (8.3%)	102 (10.3%)	52 (6.0%)
Sales or clerical	338 (18.3%)	104 (10.5%)	234 (27.1%)
Technical or skilled	317 (17.1%)	234 (23.7%)	83 (9.6%)
Semi-skilled	118 (6.4%)	62 (6.3%)	56 (6.5%)
Manual worker	112 (6.1%)	81 (8.2%)	31 (3.6%)
Highest educational qualification			
University or college degree	1278 (32.5%)	569 (29.5%)	709 (35.4%)
Trade, technical certificate or diploma	868 (22.0%)	471 (24.4%)	397 (19.8%)
Completed secondary school	715 (18.2%)	376 (19.5%)	339 (16.9%)
Completed primary school	1071 (27.2%)	512 (26.5%)	559 (27.9%)
Did not complete primary school	5 (0.1%)	4 (0.2%)	1 (0.0%)
Country of birth			
Australia	3145 (83.5%)	1529 (82.5%)	1616 (83.6%)
Europe	391 (10.4%)	204 (11.0%)	192 (9.9%)
Asia	91 (2.4%)	60 (3.2%)	44 (2.3%)
New Zealand	89 (2.4%)	35 (1.9%)	54 (2.8%)
Africa	35 (0.9%)	16 (0.9%)	19 (1.0%)
North America	16 (0.4%)	9 (0.5%)	7 (0.4%)
Languages spoken at home			
English only	3591 (91.0%)	1734 (89.6%)	1857 (92.3%)
English and another language	356 (9.0%)	202 (10.4%)	154 (7.7%)
ATSI status	47 (1.5%)	21 (1.4%)	26 (1.6%)

[a] Variation in sample size is due to missing data

5.1.2 Measures

Participants completed self-report measures evaluating family history of problem gambling (paternal, maternal, and sibling), their own gambling participation and problem gambling, control variables, possible risk factors, and possible protective factors. Refer to Table 5.2 for a summary of the variables examined in Study 1.

Table 5.2
Summary of variables examined in Study 1

Family history of problem gambling	Control variables	Possible risk factors	Possible protective factors	Outcome variable
• Any family member problem gambling • Paternal problem gambling • Maternal problem gambling • Sibling problem gambling	• Demographic factors (gender, age, relationship status, living alone, employment status, educational qualifications, Australian born, ATSI status, gross personal weekly income, gross household weekly income) • Family member (father, mother, sibling) psychopathology when growing up (problem drinking, drug problem, mental health issue)	• Number of gambling friends when growing up • Age of first gamble • Family member (father, mother, sibling) psychopathology when growing up (problem drinking, drug problem, mental health issue)	• Demographic factors (female gender, Australian born status) • Family characteristics when growing up (two-parent family, younger age left home, greater number of siblings, metropolitan region) • Social capital when growing up (help from friends, family or neighbours; feeling safe walking alone)	• Participant problem gambling

5.1.2.1 Family history of problem gambling

The perceived presence of paternal (father/stepfather/foster father), maternal (mother/stepmother/foster mother), and sibling (sibling/step-sibling/foster sibling) problem gambling when growing up was assessed using a single screening item with a follow-up item. The screening item was "*When you were growing up, did any family member have an issue with their gambling?*". Response options for this item were: *yes*, *no*, and *don't know/can't remember*. In this study, responses were recoded into: (1) a negative endorsement of problem gambling (*no*, *don't know/can't remember*) and (2) a positive endorsement of family member problem gambling (*yes*). Participants who positively endorsed the screening item were then asked to identify the family member(s) in a follow-up item.

5.1.2.2 Gambling participation

Participants were required to report gambling participation over the past 12 months on a range of gambling activities (raffles, bingo or housie, lotteries, scratch tickets, informal cards for money [not at casino], horse racing, trotting or harness racing, greyhound racing, EGMs at hotels, EGMs at clubs, EGMs at a casino, casino gambling, off-course sports betting, fixed odds sports betting, soccer pools, keno at club or hotel, Internet gambling, and informal indoor games for money). Response options for each gambling activity were: *yes, no,* and *don't know/can't remember.* In this study, responses were recoded into participation (*yes*) and non-participation (*no, don't know/can't remember).*

5.1.2.3 Participant problem gambling

The nine-item Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI) [235] was employed to evaluate problem gambling severity. Respondents indicated how often each item applied to them in the last 12 months on a four-point scale: (0) *never,* (1) *sometimes,* (2) *most of the time, and* (3) *almost always*. Scores range from 0 to 27 and higher scores indicate higher problem severity. Scores on the PGSI can be used to classify individuals as non-problem gamblers (score of 0), low risk gamblers (scores of 1 or 2), moderate risk gamblers (scores between 3 and 7), or problem gamblers (scores of 8 or higher). The PGSI has been adopted as the preferred measurement tool for population-level research in Australia [1]. The PGSI has displayed good internal consistency, test-retest reliability, criterion validity with measures of gambling involvement, unitary dimensional structure, item variability, and concurrent validity with measures of problem gambling [1, 12, 235, 234]. It has been validated in many jurisdictions, including Canada, Europe, and Australia. Several studies suggest that the PGSI outperforms other measures of problem gambling severity in population-level research in terms of overall rationale, internal consistency, item difficulty, construct validity, classification validity, and factor structure [12, 235-237]. The PGSI has displayed very good sensitivity (the rate of positive test results among those with the disorder) and specificity (the rate of negative test results among those without the disorder) [235]. The PGSI tends to be slightly more conservative in estimating prevalence of problem gambling than the South Oaks Gambling Screen, but higher than the DSM-IV [1, 235]. A description of the psychometric properties of the PGSI in Study 1 is displayed in Table A.1 (Appendix A).

5.1.2.4 Control variables

Demographic factors. Several demographic factors were employed as possible control variables, including gender, age, relationship status, living alone, employment status, educational qualifications, Australian born status, Aboriginal or Torres Straight Islander (ATSI) status, gross personal weekly income, and gross household weekly income.

Family member psychopathology when growing up. The perceived presence of paternal (father/stepfather/foster father), maternal (mother/stepmother/foster mother), and sibling (sibling/step-sibling/foster sibling) psychopathology (problem drinking, drug problem, mental health issue) when growing up was evaluated using a series of single screening items with follow-up items. The screening items were: *When you were growing up, did any family member have an issue with alcohol*?, *When you were growing up, did any family member have an issue with non-prescription or illegal drugs,* and *When you were growing up did any family member have any mental health issue including depression?*. Response options for these items were: *yes, no,* and *don't know/can't remember.* In this study, responses were recoded into: (1) a negative endorsement of psychopathology (*no, don't know/can't remember)* and (2) a positive endorsement of psychopathology (*yes)*. Participants who positively endorsed each screening item were then asked to identify the family member(s) in follow-up items.

5.1.2.5 Risk factors

Number of gambling friends when growing up. Participants were required to indicate how many of their friends gambled for money when they were growing up. Response options for this item were: (1) *none of my friends*, (2) *some of my friends*, and (3) *most of my friends*.

Age of first gamble. An open-ended question was employed to measure how old participants were when they first gambled for money.

Family member psychopathology when growing up. The perceived presence of paternal (father/stepfather/foster father), maternal (mother/stepmother/foster mother), and sibling (sibling/step-sibling/foster sibling) psychopathology (problem drinking, drug problem, mental health issue) when growing up was evaluated using a series of single screening items with follow-up items. The screening items were: *When you were growing up, did any family member have an issue with alcohol*?, *When you were growing up, did any family member have an issue with non-prescription or illegal drugs,* and *When you were growing up did any family member have any mental health issue including depression?*. Response options for these items were: *yes, no,* and *don't know/can't remember.* In this study, responses were recoded into: (1) a negative endorsement of psychopathology (*no, don't know/can't remember)* and (2) a positive endorsement of psychopathology (*yes)*. Participants who positively endorsed each screening item were then asked to identify the family member(s) in follow-up items.

5.1.2.6 Protective factors

Demographic factors. Several demographic factors were employed as possible protective factors, including female gender and Australian born status.

Family characteristics when growing up. Several family characteristics when participants were growing up were employed as possible protective factors, including being raised in a two-parent (rather than single-parent) family, leaving home at a younger age, a greater number of siblings under the age of 18 years living in the household, and mostly living in a metropolitan (rather than rural) region.

Social capital when growing up. Social capital when growing up was measured using two single items: (1) *When you were growing up, could you get help from friends, family, or neighbours when you needed it?* and (2) *When you were growing up, did you feel safe walking down your street after dark?* Response options for both items included (1) *no, not at all,* (2) *sometimes*, and (3) *yes, definitely*.

5.1.3 Procedure

The methodology for this project was approved by the Monash University Human Research Ethics Committee (CF07/3951 – amended). The data were collected by two independent market research providers using a targeted random digit dialling telephone survey methodology to interview adult respondents living in Australia. A small number of pilot cases were collected by Monash University staff to test the survey. This sample was representative of the general population for age, sex, and geographic location. Incremental sampling with quota allocation was used to ensure adequate numbers of the target groups.

Nearly 100,000 randomly selected telephone numbers were called in this study. Up to 10 call backs were implemented in the event of a live number. Of this total number of telephone numbers called, 43,647 were not contactable (i.e. they did not answer, were busy or the numbers were not working). Although interviews were completed with 5206 participants, 3953 interviews had the complete dataset required for the analyses conducted in Study 1 (Table 5.3) (i.e., completed PGSI and family history of problem gambling). Note that this number varies slightly from analysis to analysis.

Table 5.3
Summary of the sample outcome

Category	***n***
Total numbers called	95157
No answer, busy, not working	43647
Total contacts made	51510
Refusals	5850
Screened out/ ineligible	842
Completed interviews	5206
Interviews with completed dataset for these analyses (completed PGSI) (exact numbers vary slightly from analysis to analysis)	3953

5.1.4 Data analyses

Detailed information relating to the psychometric properties of the PGSI for Study 2 is displayed in Appendix A.

5.1.4.1 Magnitude of risk

The relationships between familial (any family member, paternal, maternal, sibling) and participant gambling problems were examined using (1) a series of cross-tabulations of familial problem gambling and participant problem gambling risk categories, and (2) a series of Pearson's bivariate correlations.

5.1.4.2 Specificity of risk

A series of Pearson's bivariate correlations and hierarchical multiple regression analyses were employed to evaluate the degree to which each measure of familial gambling problems (any family member, paternal, maternal, sibling) predicted participant gambling problems, after controlling for other factors. The dependent variable was PGSI scores and variables were entered into each multiple regression analysis in two steps. The control factors, which were simultaneously entered in the first step, served as covariates to eliminate potential "third variable" explanations for the results. Each measure of familial problem gambling, which served as the independent variable, was entered in the second step of each regression analysis.

5.1.4.3 Risk factors

The formal testing of mediation in this study requires three conditions to be met: 1) family member gambling problems must be significantly related to participant gambling problems (*path c*); 2) family member gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to participant gambling problems (*path b*) [66, 69, 70]. A series of Pearson's bivariate correlations were employed to test each of the three requisite conditions. Those possible risk factors that satisfied the three requisite conditions were formally tested as mediating risk factors using a series of hierarchical regression analyses. The dependent variable was PGSI scores and variables were entered into each multiple regression analysis in two steps. In these analyses, the measure of familial problem gambling (any family member, paternal, maternal, sibling), which served as the independent variable, was entered in the first step. The potential risk factor, which served as a possible mediator, was entered in the second step. A factor was considered to be a mediating risk factor when its addition in the second step significantly increased the proportion of variance accounted for in participant gambling problems and reduced the strength of the association between family member and participant gambling problems. The Sobel test, which uses the unstandardised regression coefficients and the standard errors of the unstandardised regression coefficients for *paths a* and *b*, was employed to determine the significance of the reduction in association.

5.1.4.4 Protective factors

The formal testing of moderation for this study requires a significant interaction between familial problem gambling and the proposed protective factor to predict participant problem gambling [66, 69, 70, 72, 73]. A series of hierarchical multiple regression analyses were employed to evaluate whether the potential protective factors moderated the relationships between familial and participant gambling problems. As commonly recommended, each continuous variable was centred using the mean-deviation method, whereby a new score is produced by subtracting the variable mean from each individual score before fitting each regression model [238]. A series of new variables (interactions) were then created by computing the product of each measure of familial gambling problems and each potential protective factor. The dependent variable was PGSI scores and variables were entered into each multiple regression analysis in two steps. In these analyses, the measure of familial problem gambling and the potential protective factor were simultaneously entered in the first step. The newly created interaction term between the measure of familial problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a moderator if the interaction in the second step was statistically significant. The split file procedure was employed to visually analyse scatterplots and conduct separate regression analyses to determine whether categorical moderator variables were protective. Each regression equation was examined using the ITALASSI interaction viewer (version 1.2) (http://www.provalisresearch.com/ITALASSI/ITALdowload.html) to determine whether continuous moderator variables were protective. This program graphs the effect of different levels of each moderator on the relationship between familial and participant gambling problems.

5.2 Results

5.2.1 Gambling and problem gambling behaviour

Overall, 82.4% of participants reported that they had gambled at least once in the previous 12 months. The most frequent gambling activities were buying raffle tickets (61.3%), lotteries (59.9%), scratch tickets (38.3%), horse racing (23.3%), EGMs at hotels (19.7%), and EGMs at clubs (17.7%). Less frequent forms of gambling activities were keno at a club or hotel (9.5%), EGMs at a casino (6.9%), informal cards for money not at a casino (6.6%), any other game at a casino (6.1%), trotting or harness racing (5.4%), bingo or housie (4.6%), off-course football betting (4.4%), greyhound racing (4.2%), informal indoor games for money (e.g., backgammon, cards) (3.7%), fixed odds sports betting (2.3%), internet gambling (2.0%), and soccer pools (0.6%).

Within this sample, 92.5% of participants were classified as non-problem gamblers (PGSI scores of 0), 4.9% were classified as low risk gamblers (PGSI scores of 1 or 2), 1.7% were classified as moderate risk gamblers (PGSI scores of 3 to 7), and 0.9% were classified as problem gamblers (PGSI scores of 8 to 27).

5.2.2 Familial transmission of problem gambling behaviour

Overall, 7.3% of the sample reported that any family member (including father/stepfather/foster father, mother/stepmother/foster mother, or siblings/step-siblings/foster siblings) had a gambling problem when they were growing up.

5.2.2.1 Magnitude of risk for the familial transmission of problem gambling behaviour

Table 5.4 displays the cross-tabulation of family member problem gambling and participant problem gambling risk categories. The data in this table reveal that participants with a family history of problem gambling (parents or siblings) are 3.0 times more likely to display moderate risk gambling and 9.6 times more likely to display problem gambling than their peers, χ^2 (3) = 74.02, $p < .001$.

Table 5.4
Cross-tabulation of family member problem gambling and participant problem gambling risk categories

PGSI risk category	No family member problem gambling	Family member problem gambling
No problem	3404 (92.9%)	254 (87.6%)
Low risk	184 (5.0%)	9 (3.1%)
Moderate risk	55 (1.5%)	13 (4.5%)
Problem	20 (0.5%)	14 (4.8%)

Table 5.5 displays the Pearson's bivariate correlations between family member problem gambling, participant problem gambling, and control variables. An examination of this table reveals that there is a weak but significant positive correlation between family member gambling problems and participant gambling problems and that family member gambling problems account for 1.1% of the variance in participant gambling problems.

Of those participants reporting a family history of problem gambling, most reported problem gambling in only one family member (89.7%) but a small proportion reported gambling problems in two (8.3%) or three (2.1%) family members. There was no association between family density (1, 2, or 3 family members) and PGSI scores, $r = .03$, $p = .58$.

5.2.2.2 Specificity of risk for the familial transmission of problem gambling behaviour

Table B.1 (Appendix B) provides the results from a hierarchical regression analysis examining the prediction of participant gambling problems by family member gambling problems after controlling for other factors. The control variables explained 2.6% of the variance in participant gambling problems ($p < .001$). After taking the influence of all of these other predictors in the model into account, family member gambling problems still displayed a statistically significant relationship with participant gambling problems and explained an additional 0.9% of the variance in participant gambling problems ($p < .001$).

Table 5.5
Pearson's correlations between family member problem gambling, participant problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Any family member PG	__																			
2. PGSI scores	.11**	__																		
3. Gender	.06**	-.10**	__																	
4. Age	-.05**	-.05**	.04*	__																
5. Relationship status	.00	.05**	-.10**	-.07**	__															
6. Living alone	-.03	.03	-.04*	.26**	.63**	__														
7. Employment status	-.01	-.02	.10**	.44**	.10**	.17**.	__													
8. Educational qualifications	-.01	.01	.01	.16**	.07**	.09**	.14**	__												
9. Australian born status	.04**	.03	.02	-.05**	.04*	-.01	-.04**	.02	__											
10. ATSI status	-.00	.00	.00	-.05**	-.01	-.03	.00	.01	.06**	__										
11. Gross personal weekly income	-.01	-.05**	.07**	.08**	-.03	.02	.06**	.06**	-.01	-.03	__									
12. Gross household weekly income	-.02	-.04*	.05**	-.05**	.08**	-.01	.02	.07**	.01	-.03	.74**	__								
13. Paternal problem drinking	.19**	.04*	.04*	-.00	-.04**	-.04**	.01	-.01	.05**	.03	-.01	-.04*	__							
14. Maternal problem drinking	.14**	.03*	.03*	-.04**	-.01	-.03	-.06**	-.01	.01	.06**	-.03	.00	.15**	__						
15. Sibling problem drinking	.10**	.00	-.01	.05**	.02	.06**	.02	-.01	.03*	.07**	.00	.01	.03	.04*	__					
16. Paternal drug problems	.05**	.02	.03	-.05**	-.04*	-.03	-.03	-.01	.01	.11**	-.01	.01	.15**	.09**	.04*	__				
17. Maternal drug problems	.08**	.07**	.02	-.04**	.01	-.03	-.03*	-.01	.03	.03	-.01	.00	.10**	.24**	.06**	.17**	__			
18. Sibling drug problems	.12**	.01	.01	-.06**	-.01	-.00	-.04**	-.02	.03*	.05**	-.00	.01	.13**	.04*	.24**	.08**	.07**	__		
19. Paternal mental health issues	.08*	.04*	.04*	-.06**	-.01	-.04*	-.02	-.02	.02	.01	.02	.01	.16**	.02	.01	.08**	.02	.03*	__	
20. Maternal mental health issues	.07**	-.00	.06**	-.07**	.01	-.05**	-.02	-.04*	.01	-.02	-.03	-.03	.07**	.15**	-.01	-.00	.23**	.03	.06**	__
21. Sibling mental health issues	.03*	.01	.01	-.02	.02	.01	-.02	-.03	.04**	.00	-.01	.02	.03	.04**	.21**	.00	-.00	.19**	.03	.05**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

5.2.2.3 Risk factors for the familial transmission of problem gambling behaviour

The formal testing of mediation for the familial transmission of problem gambling behaviour requires three conditions to be met: 1) family member gambling problems must be significantly related to participant gambling problems (*path c*); 2) family member gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to participant gambling problems (*path b*). Table 5.6 displays the Pearson's bivariate correlations between family member problem gambling, participant problem gambling, and possible risk factors.

Testing Path C: An examination of Table 5.6 reveals that there is a statistically significant relationship between family member gambling problems and participant gambling problems.

Testing Path A: An examination of Table 5.6 reveals that family member gambling problems are significantly related to most of the potential mediating risk factors, including age of first gamble, paternal problem drinking, maternal problem drinking, sibling problem drinking, paternal drug problems, maternal drug problems, sibling drug problems, paternal mental health issues, maternal mental health issues, and sibling mental health issues. Number of gambling friends was the only variable to display no significant association with family member gambling problems.

Testing Path B: An examination of Table 5.6 also reveals that several potential mediating risk factors are significantly associated with participant gambling problems, including number of gambling friends, age of first gamble, paternal problem drinking, maternal problem drinking, maternal drug problems, and paternal mental health issues. The remaining variables displayed no significant association with participant gambling problems.

Taken together, these findings imply that five of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the familial transmission of gambling problems: age of first gamble, paternal problem drinking, maternal problem drinking, maternal drug problems, and paternal mental health issues. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, family member problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in participant gambling problems and reduced the strength of the association between family member and participant gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Table 5.6
Pearson's correlations between family member problem gambling, participant problem gambling, and possible risk factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Any family member problem gambling	-											
2. PGSI scores	.11**	-										
3. Number of gambling friends	.03	.14**	-									
4. Age of first gamble	-.05**	-.09**	-.26**	-								
5. Paternal problem drinking	.19**	.04*	.03	-.07**	-							
6. Maternal problem drinking	.14**	.03*	.02	-.04	.15**	-						
7. Sibling problem drinking	.10**	.00	.03*	-.03	.03	.04*	-					
8. Paternal drug problems	.05**	.02	.01	.00	.15**	.09**	.04*	-				
9. Maternal drug problems	.08**	.07**	.03*	-.01	.10**	.24**	.06**	.17**	-			
10. Sibling drug problems	.12**	.01	.03*	-.03	.13**	.04*	.24**	.08**	.07**	-		
11. Paternal mental health issues	.08**	.04*	.02	-.05**	.16**	.02	.01	.08**	.02	.03*	-	
12. Maternal mental health issues	.07**	-.00	.02	-.05**	.07**	.15**	-.01	.00	.23**	.03*	.06**	-
13. Sibling mental health issues	.03*	.01	.01	-.02	.03	.04**	.21**	.00	.00	.19**	.03	.05**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Age of first gamble. Table B.2 (Appendix B) provides the results from a hierarchical regression analysis examining whether age of first gamble mediated the relationship between family member and participant gambling problems. In step 1, family member gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of age of first gamble in step 2 significantly increased the proportion of variance accounted for in participant gambling problems ($p < .001$) and reduced the strength of the association between family member and participant gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 3.46$, $p < .001$. Lower age of first gamble therefore served to explain, in part, the relationship between family member and participant gambling problems.

Paternal problem drinking. Table B.3 (Appendix B) provides the results from a hierarchical regression analysis examining whether paternal problem drinking mediated the relationship between family member and participant gambling problems. In step 1, family member gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of paternal problem drinking in step 2 did not significantly increase the proportion of variance accounted for in participant gambling problems ($p = .24$). Paternal problem drinking therefore did not serve to explain the relationship between family member and participant gambling problems.

Maternal problem drinking. Table B.4 (Appendix B) provides the results from a hierarchical regression analysis examining whether maternal problem drinking mediated the relationship between family member and participant gambling problems. In step 1, family member gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of maternal problem drinking in step 2 did not significantly increase the proportion of variance accounted for in participant gambling problems ($p = .24$). Maternal problem drinking therefore did not serve to explain the relationship between family member and participant gambling problems.

Maternal drug problems. Table B.5 (Appendix B) provides the results from a hierarchical regression analysis examining whether maternal drug problems mediated the relationship between family member and participant gambling problems. In step 1, family member gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of maternal drug problems in step 2 significantly increased the proportion of variance accounted for in participant gambling problems ($p < .001$) and reduced the strength of the association between family member and participant gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 3.09$, $p = .002$. Maternal drug problems therefore served to explain, in part, the relationship between family member and participant gambling problems.

Paternal mental health issues. Table B.6 (Appendix B) provides the results from a hierarchical regression analysis examining whether paternal mental health issues mediated the relationship between family member and participant gambling problems. In step 1, family member gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of paternal mental health issues in step 2 significantly increased the proportion of variance accounted for in participant gambling problems ($p = .049$) and reduced the strength of the association between family member and participant gambling problems. However, the Sobel test indicated that that this reduction in the strength of the association was not significant, $z = 1.91$, $p = .06$.

5.2.2.4 Protective factors for the familial transmission of problem gambling behaviour

The formal testing of moderation for the familial transmission of problem gambling requires a significant interaction between family member problem gambling and the proposed protective factor to predict participant problem gambling. A series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between family member gambling problems and participant gambling problems. In these analyses, family member problem gambling and the potential protective factor were entered in the first step. The interaction of family member problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender and being born in Australia as protective factors for the familial transmission of problem gambling (Table B.7 in Appendix B). There was a significant interaction between family member problem gambling and gender ($p < .001$) and Australian born status ($p = .002$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between family member and participant problem gambling was stronger for males and participants who were not born in Australia. These findings indicate that being female and being born in Australia serve as protective factors for the familial transmission of problem gambling.

Family characteristics. A series of hierarchical multiple regression analyses were employed to examine the role of being raised in a two-parent family, being younger when leaving home, a greater number of siblings, and living in a metropolitan region while growing up as protective factors for the familial transmission of problem gambling (Table B.8 in Appendix B). Although there was no significant interaction between family member gambling problems and living in a metropolitan or rural region ($p = .06$), there was a significant interaction between family member problem gambling and the other family characteristics: single-parent or two-parent family ($p = .001$), age left home ($p = .02$), and number of siblings ($p = .001$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between family member and participant problem gambling was stronger for participants raised in two-parent families. An examination of the regression equations using the interaction viewer revealed that the relationship between family member and participant gambling problems was stronger when participants reported being older when they left home and when they had fewer siblings. These findings indicate that being raised in a one-parent family, leaving home at a younger age, and having a greater number of siblings served as protective factors for the familial transmission of problem gambling.

Social capital. A series of hierarchical multiple regression analyses were employed to examine social capital (being able to get help from friends, family or neighbours when needed; feeling safe walking down street after dark) while growing up as protective factors for the familial transmission of problem gambling (Table B.9 in Appendix B). There was a significant interaction between familial problem gambling and both measures of social capital: able to get help ($p < .001$) and feeling safe ($p < .001$). An examination of the regression equations using the interaction viewer revealed that the

relationship between family member and participant gambling problems was stronger when participants were unable to get help and feel safe. These findings indicate that social capital serves as a protective factor for the familial transmission of problem gambling.

5.2.3 Paternal transmission of problem gambling behaviour

Overall, 4.0% of the sample reported that their father/stepfather/foster father had a gambling problem when they were growing up.

5.2.3.1 Magnitude of risk for the paternal transmission of problem gambling behaviour

Table 5.7 displays the cross-tabulation of paternal problem gambling and participant problem gambling risk categories. The data in this table indicate that participants with problem gambling fathers are 5.1 times more likely to display moderate risk gambling and 10.7 times more likely to display problem gambling than their peers, χ^2 (3) = 97.89, $p < .001$.

Table 5.7
Cross-tabulation of paternal problem gambling and participant problem gambling risk categories

PGSI risk category	No paternal problem gambling	Paternal problem gambling
No problem	3524 (92.8%)	134 (85.4%)
Low risk	192 (5.1%)	1 (0.6%)
Moderate risk	56 (1.5%)	12 (7.6%)
Problem	24 (0.6%)	10 (6.4%)

Table 5.8 displays the Pearson's bivariate correlations between paternal problem gambling, participant problem gambling, and control variables. An examination of this table reveals that there is a weak but significant positive correlation between paternal gambling problems and participant gambling problems and that paternal gambling problems account for 1.4% of the variance in participant gambling problems.

5.2.3.2 Specificity of risk for the paternal transmission of problem gambling behaviour

Table B.10 (Appendix B) provides the results from a hierarchical regression analysis examining the prediction of participant gambling problems by paternal gambling problems after controlling for other factors. The control variables explained 2.6% of the variance in participant gambling problems ($p < .001$). After taking the influence of all of these other predictors in the model into account, paternal gambling problems still displayed a statistically significant relationship with participant gambling problems and explained an additional 1.2% of the variance in participant gambling problems ($p < .001$).

Table 5.8
Pearson's correlations between paternal problem gambling, participant problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Paternal problem gambling	__																			
2. PGSI scores	.12**	__																		
3. Gender	.02	-.10**	__																	
4. Age	-.05**	-.05**	.04*	__																
5. Relationship status	.00	.05**	-.10**	-.07**	__															
6. Living alone	-.01	.03	-.04*	.26**	.63**	__														
7. Employment status	.01	-.02	.10**	.44**	.10**	.17**.	__													
8. Educational qualifications	-.01	.01	.01	.16**	.07**	.09**	.14**	__												
9. Australian born status	.04**	.03	.02	-.05**	.04*	-.01	-.04**	.02	__											
10. ATSI status	.01	.00	.00	-.05**	-.01	-.03	.00	.01	.06**	__										
11. Gross personal weekly income	-.00	-.05**	.07**	.08**	-.03	.02	.06**	.06**	-.01	-.03	__									
12. Gross household weekly income	-.01	-.04*	.05**	-.05**	.08**	-.01	.02	.07**	.01	-.03	.74**	__								
13. Paternal drinking problem	.22**	.04*	.04*	-.00	-.04**	-.04**	.01	-.01	.05**	.03	-.01	-.04*	__							
14. Maternal drinking problem	.09**	.03*	.03*	-.04**	-.01	-.03	-.06**	-.01	.01	.06**	-.03	.00	.15**	__						
15. Sibling drinking problem	.00	.00	-.01	.05**	.02	.06**	.02	-.01	.03*	.07**	.00	.01	.03	.04*	__					
16. Paternal drug problem	.07**	.02	.03	-.05**	-.04*	-.03	-.03	-.01	.01	.11**	-.01	.01	.15**	.09**	.04*	__				
17. Maternal drug problem	.10**	.07**	.02	-.04**	.01	-.03	-.03*	-.01	.03	.03	-.01	.00	.10**	.24**	.06**	.17**	__			
18. Sibling drug problem	.07**	.01	.01	-.06**	-.01	-.00	-.04**	-.02	.03*	.05**	-.00	.01	.13**	.04*	.24**	.08**	.07**	__		
19. Paternal mental health issue	.09**	.04*	.04*	-.06**	-.01	-.04*	-.02	-.02	.02	.01	.02	.01	.16**	.02	.01	.08**	.02	.03*	__	
20. Maternal mental health issue	.04**	-.00	.06**	-.07**	.01	-.05**	-.02	-.04*	.01	-.02	-.03	-.03	.07**	.15**	-.01	-.00	.23**	.03	.06**	__
21. Sibling mental health issue	.01	.01	.01	-.02	.02	.01	-.02	-.03	.04**	.00	-.01	.02	.03	.04**	.21**	.00	-.00	.19**	.03	.05**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

5.2.3.3 Risk factors for the paternal transmission of problem gambling behaviour

The formal testing of mediation for the paternal transmission of problem gambling behaviour requires three conditions to be met: 1) paternal gambling problems must be significantly related to participant gambling problems (*path c*); 2) paternal gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to participant gambling problems (*path b*). Table 5.9 displays the Pearson's bivariate correlations between paternal problem gambling, participant problem gambling, and possible risk factors.

Testing Path C: An examination of Table 5.9 reveals that there is a statistically significant relationship between paternal gambling problems and participant gambling problems.

Testing Path A: An examination of Table 5.9 reveals that paternal gambling problems are significantly related to several potential mediating risk factors, including age of first gamble, maternal problem drinking, maternal drug problems, sibling drug problems, paternal mental health issues, and maternal mental health issues. The remaining variables displayed no significant association with paternal gambling problems.

Testing Path B: An examination of Table 5.9 also reveals that several potential mediating risk factors are significantly associated with participant gambling problems, including the number of gambling friends, age of first gamble, maternal problem drinking, maternal drug problems, and paternal mental health issues. The remaining variables displayed no statistically significant relationship with participant gambling problems.

Taken together, these findings imply that four of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the paternal transmission of gambling problems: age of first gamble, maternal problem drinking, maternal drug problems, and paternal mental health issues. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, paternal problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in participant gambling problems and reduced the strength of the association between paternal and participant gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Table 5.9
Pearson's correlations between paternal problem gambling, participant problem gambling, and possible risk factors

	1	2	3	4	5	6	7	8	9	10
1. Paternal problem gambling	__									
2. PGSI scores	.12**	__								
3. Number of gambling friends	.02	.14**	__							
4. Age of first gamble	-.04**	-.09**	-.26**	__						
5. Maternal problem drinking	.09**	.03*	.02	-.04*	__					
6. Sibling problem drinking	.00	.00	.03*	-.03	.04*	__				
7. Maternal drug problems	.10**	.07**	.03*	-.01	.24**	.06**	__			
8. Sibling drug problems	.07**	.01	.03*	-.03	.04*	.24**	.07**	__		
9. Paternal mental health issues	.09**	.04*	.02	-.05**	.02	.01	.02	.03*	__	
10. Maternal mental health issues	.04**	-.00	.02	-.05**	.15**	-.01	.23**	.03*	.06**	__
11. Sibling mental health issues	.01	.01	.01	-.02	.04**	.21**	.00	.19**	.03	.05**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Age of first gamble. Table B.11 (Appendix B) provides the results from a hierarchical regression analysis examining whether age of first gamble mediated the relationship between paternal and participant gambling problems. In step 1, paternal gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of age of first gamble in step 2 significantly increased the proportion of variance accounted for in participant gambling problems ($p < .001$) and reduced the strength of the association between paternal and participant gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.25$, $p = .02$. Lower age of first gamble therefore served to explain, in part, the relationship between paternal and participant gambling problems.

Maternal problem drinking. Table B.12 (Appendix B) provides the results from a hierarchical regression analysis examining whether maternal problem drinking mediated the relationship between paternal and participant gambling problems. In step 1, paternal gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of maternal problem drinking in step 2 did not significantly increase the proportion of variance accounted for in participant gambling problems ($p = .16$). Maternal problem drinking therefore did not serve to explain the relationship between paternal and participant gambling problems.

Maternal drug problems. Table B.13 (Appendix B) provides the results from a hierarchical regression analysis examining whether maternal drug problems mediated the relationship between paternal and participant gambling problems. In step 1, paternal gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of maternal drug problems in step 2 significantly increased the proportion of variance accounted for in participant gambling problems ($p = .001$) and reduced the strength of the association between paternal and participant gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 3.44$, $p < .001$. Maternal drug problems therefore served to explain, in part, the relationship between paternal and participant gambling problems.

Paternal mental health issues. Table B.14 (Appendix B) provides the results from a hierarchical regression analysis examining whether paternal mental health issues mediated the relationship between paternal and participant gambling problems. In step 1, paternal gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of paternal mental health issues in step 2 did not significantly increase the proportion of variance accounted for in participant gambling problems ($p = .07$). Paternal mental health issues therefore did not serve to explain the relationship between paternal and participant gambling problems.

5.2.3.4 Protective factors for the paternal transmission of problem gambling behaviour

The formal testing of moderation for the paternal transmission of problem gambling behaviour requires a significant interaction between paternal problem gambling and the proposed protective factor to predict participant problem gambling. A series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between paternal gambling problems and participant gambling problems. In these analyses,

paternal problem gambling and the potential protective factor were entered in the first step. The interaction of paternal problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender and being born in Australia as protective factors for the paternal transmission of problem gambling (Table B.15 in Appendix B). There was a significant interaction between paternal problem gambling and gender ($p < .001$) and Australian born status ($p < .001$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between paternal and participant problem gambling was stronger for males and participants who were not born in Australia. These findings indicate that being female and being born in Australia serve as protective factors for the paternal transmission of problem gambling.

Family characteristics. A series of hierarchical multiple regression analyses were employed to examine the role of being raised in a two-parent family, being younger when leaving home, a greater number of siblings, and living in a metropolitan region while growing up as protective factors for the paternal transmission of problem gambling (Table B.16 in Appendix B). Although there was no significant interaction between paternal gambling problems and number of siblings ($p = .45$) and living in a metropolitan or rural region ($p = .12$), there was a significant interaction between paternal problem gambling and the other family characteristics: single-parent or two-parent family ($p < .001$) and age left home ($p < .001$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between paternal and participant problem gambling was stronger for participants raised in two-parent families. An examination of the regression equation using the interaction viewer revealed that the relationship between paternal and participant gambling problems was stronger when participants reported being older when they left home. These findings indicate that being raised in a one-parent family and leaving home at a younger age served as protective factors for the paternal transmission of problem gambling.

Social capital. A series of hierarchical multiple regression analyses were employed to examine social capital (being able to get help from friends, family or neighbours when needed; feeling safe walking down street after dark) while growing up as protective factors for the paternal transmission of problem gambling (Table B.17 in Appendix B). There was a significant interaction between paternal problem gambling and both measures of social capital: able to get help ($p = .002$) and feeling safe ($p < .001$). An examination of the regression equations using the interaction viewer revealed that the relationship between paternal and participant gambling problems was stronger when participants were unable to get help and feel safe. These findings indicate that social capital serves as a protective factor for the paternal transmission of problem gambling.

5.2.4 Maternal transmission of problem gambling behaviour

Overall, 1.7% of the sample reported that their mother/stepmother/foster mother had a gambling problem when they were growing up.

5.2.4.1 Magnitude of risk for the maternal transmission of problem gambling behaviour

Table 5.10 displays the cross-tabulation of maternal problem gambling and participant problem gambling risk categories. The data in this table indicate that participants with problem gambling mothers are 1.7 times more likely to display moderate risk gambling and 10.6 times more likely to display problem gambling than their peers, χ^2 (3) = 35.30, $p < .001$.

Table 5.10
Cross-tabulation of maternal problem gambling and participant problem gambling risk categories

PGSI risk category	No maternal problem gambling	Maternal problem gambling
No problem	3599 (92.6%)	59 (86.8%)
Low risk	191 (4.9%)	2 (2.9%)
Moderate risk	66 (1.7%)	2 (2.9%)
Problem	29 (0.7%)	5 (7.4%)

Table 5.11 displays the Pearson's bivariate correlations between maternal problem gambling, participant problem gambling, and control variables. An examination of this table reveals that there is a weak but significant positive correlation between maternal gambling problems and participant gambling problems and that maternal gambling problems account for 0.4% of the variance in participant gambling problems.

5.2.4.2 Specificity of risk for the maternal transmission of problem gambling behaviour

Table B.18 (Appendix B) provides the results from a hierarchical regression analysis examining the prediction of participant gambling problems by maternal gambling problems after controlling for other factors. The control variables explained 2.6% of the variance in participant gambling problems ($p < .001$). After taking the influence of all of these other predictors in the model into account, maternal gambling problems still displayed a statistically significant relationship with participant gambling problems and explained an additional 0.2% of the variance in participant gambling problems ($p = .007$).

Table 5.11
Pearson's correlations between maternal problem gambling, participant problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Maternal problem gambling	__																			
2. PGSI scores	.07**	__																		
3. Gender	.03*	-.10**	__																	
4. Age	-.06**	-.05**	.04*	__																
5. Relationship status	.03	.05**	-.10**	-.07**	__															
6. Living alone	-.01	.03	-.04*	.26**	.63**	__														
7. Employment status	-.04*	-.02	.10**	.44**	.10**	.17**.	__													
8. Educational qualifications	-.02	.01	.01	.16**	.07**	.09**	.14**	__												
9. Australian born status	.03	.03	.02	-.05**	.04*	-.01	-.04**	.02	__											
10. ATSI status	.02	.00	.00	-.05**	-.01	-.03	.00	.01	.06**	__										
11. Gross personal weekly income	-.01	-.05**	.07**	.08**	-.03	.02	.06**	.06**	-.01	-.03	__									
12. Gross household weekly income	-.01	-.04*	.05**	-.05**	.08**	-.01	.02	.07**	.01	-.03	.74**	__								
13. Paternal drinking problem	.08**	.04*	.04*	-.00	-.04**	-.04**	.01	-.01	.05**	.03	-.01	-.04*	__							
14. Maternal drinking problem	.23**	.03*	.03*	-.04**	-.01	-.03	-.06**	-.01	.01	.06**	-.03	.00	.15**	__						
15. Sibling drinking problem	.01	.00	-.01	.05**	.02	.06**	.02	-.01	.03*	.07**	.00	.01	.03	.04*	__					
16. Paternal drug problem	.07**	.02	.03	-.05**	-.04*	-.03	-.03	-.01	.01	.11**	-.01	.01	.15**	.09**	.04*	__				
17. Maternal drug problem	.12**	.07**	.02	-.04**	.01	-.03	-.03*	-.01	.03	.03	-.01	.00	.10**	.24**	.06**	.17**	__			
18. Sibling drug problem	.09**	.01	.01	-.06**	-.01	-.00	-.04**	-.02	.03*	.05**	-.00	.01	.13**	.04*	.24**	.08**	.07**	__		
19. Paternal mental health issue	.04**	.04*	.04*	-.06**	-.01	-.04*	-.02	-.02	.02	.01	.02	.01	.16**	.02	.01	.08**	.02	.03*	__	
20. Maternal mental health issue	.08**	-.00	.06**	-.07**	.01	-.05**	-.02	-.04*	.01	-.02	-.03	-.03	.07**	.15**	-.01	-.00	.23**	.03	.06**	__
21. Sibling mental health issue	.00	.01	.01	-.02	.02	.01	-.02	-.03	.04**	.00	-.01	.02	.03	.04**	.21**	.00	-.00	.19**	.03	.05**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

5.2.4.3 Risk factors for the maternal transmission of problem gambling behaviour

The formal testing of mediation for the maternal transmission of problem gambling behaviour requires three conditions to be met: 1) maternal gambling problems must be significantly related to participant gambling problems (*path c*); 2) maternal gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to participant gambling problems (*path b*). Table 5.12 displays the Pearson's bivariate correlations between maternal problem gambling, participant problem gambling, and possible risk factors.

Testing Path C: An examination of Table 5.12 reveals that there is a statistically significant relationship between maternal gambling problems and participant gambling problems.

Testing Path A: An examination of Table 5.12 reveals that maternal gambling problems are significantly related to several potential mediating risk factors, including paternal problem drinking, paternal drug problems, sibling drug problems, paternal mental health issues, and maternal mental health issues. The remaining variables displayed no significant association with maternal gambling problems.

Testing Path B: An examination of Table 5.12 also reveals that several potential mediating risk factors are significantly associated with participant gambling problems, including the number of gambling friends, age of first gamble, paternal problem drinking, and paternal mental health issues. The remaining variables displayed no statistically significant relationship with participant gambling problems.

Taken together, these findings imply that only two of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the maternal transmission of gambling problems: paternal problem drinking and paternal mental health issues. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, maternal problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in participant gambling problems and reduced the strength of the association between maternal and participant gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Paternal problem drinking. Table B.19 (Appendix B) provides the results from a hierarchical regression analysis examining whether paternal problem drinking mediated the relationship between maternal and participant gambling problems. In step 1, maternal gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of paternal problem drinking in step 2 significantly increased the proportion of variance accounted for in participant gambling problems ($p = .04$) and reduced the strength of the association between maternal and participant gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.16$, $p = .03$. Paternal problem drinking therefore served to explain, in part, the relationship between maternal and participant gambling problems.

Table 5.12
Pearson's correlations between maternal problem gambling, participant problem gambling, and possible risk factors

	1	2	3	4	5	6	7	8	9	10
1. Maternal problem gambling	-									
2. PGSI scores	.07**	-								
3. Number of gambling friends	.02	.14**	-							
4. Age of first gamble	-.02	-.09**	-.26**	-						
5. Paternal problem drinking	.08**	.04*	.03	-.07**	-					
6. Sibling problem drinking	.01	.00	.03*	-.03	.03	-				
7. Paternal drug problems	.07**	.02	.01	.00	.15**	.04*	-			
8. Sibling drug problems	.09**	.01	.03*	-.03	.13**	.24**	.08**	-		
9. Paternal mental health issues	.04**	.04*	.02	-.05**	.16**	.01	.08**	.03*	-	
10. Maternal mental health issues	.08**	-.00	.02	-.05**	.07**	-.01	.00	.03*	.06**	-
11. Sibling mental health issues	.00	.01	.01	-.02	.03	.21**	.00	.19**	.03	.05**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Paternal mental health issues. Table B.20 (Appendix B) provides the results from a hierarchical regression analysis examining whether paternal mental health issues mediated the relationship between maternal and participant gambling problems. In step 1, maternal gambling problems significantly predicted participant gambling problems ($p < .001$). The addition of paternal mental health issues in step 2 significantly increased the proportion of variance accounted for in participant gambling problems ($p = .02$) and reduced the strength of the association between maternal and participant gambling problems. The Sobel test indicated that that this reduction in the strength of the association was not significant, $z = 1.81$, $p = .07$.

5.2.4.4 Protective factors for the maternal transmission of problem gambling behaviour

The formal testing of moderation for the maternal transmission of problem gambling behaviour requires a significant interaction between maternal problem gambling and the proposed protective factor to predict participant problem gambling. A series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between maternal gambling problems and participant gambling problems. In these analyses, maternal problem gambling and the potential protective factor were entered in the first step. The interaction of maternal problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender and being born in Australian as protective factors for the maternal transmission of problem gambling (Table B.21 in Appendix B). There was a significant interaction between maternal problem gambling and gender ($p < .001$) and Australian born status ($p = .005$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between maternal and participant problem gambling was stronger for males and participants who were not born in Australia. These findings indicate that being female and being born in Australia serve as protective factors for the maternal transmission of problem gambling.

Family characteristics. A series of hierarchical multiple regression analyses were employed to examine the role of being raised in a two-parent family, being younger when leaving home, having a greater number of siblings, and living in a metropolitan region while growing up as protective factors for the maternal transmission of problem gambling (Table B.22 in Appendix B). Although there was no significant interaction between maternal gambling problems and age left home ($p = .11$) and living in a metropolitan or rural region ($p = .22$), there was a significant interaction between maternal problem gambling and the other family characteristics: single-parent or two-parent family ($p = .04$) and number of siblings ($p < .001$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between maternal and participant problem gambling was stronger for participants raised in two-parent families. An examination of the regression equation using the interaction viewer revealed that the relationship between maternal and participant gambling problems was stronger when participants reported a smaller number of siblings. These findings indicate that being raised in a one-parent

family and having a greater number of siblings serve as protective factors for the maternal transmission of problem gambling.

Social capital. A series of hierarchical multiple regression analyses were employed to examine social capital (being able to get help from friends, family or neighbours when needed; feeling safe walking down street after dark) while growing up as protective factors for the maternal transmission of problem gambling (Table B.23 in Appendix B). There was no significant interaction between maternal problem gambling and either measure of social capital: able to get help (p = .50) and feeling safe (p = .83). These findings indicate that social capital does not serve as a protective factor for the maternal transmission of problem gambling.

5.2.5 Sibling transmission of problem gambling behaviour

Overall, 2.6% of the sample reported that their siblings/stepsiblings/foster siblings had a gambling problem when they were growing up.

5.2.5.1 Magnitude of risk for the sibling transmission of problem gambling behaviour

Table 5.13 displays the cross-tabulation of sibling problem gambling and participant problem gambling risk categories. The data in this table indicate that participants with problem gambling siblings are only 1.8 times more likely to display moderate risk gambling and 1.1 times more likely display problem gambling, χ^2 (3) = 1.27, p = .74.

Table 5.13
Cross-tabulation of sibling problem gambling and participant problem gambling risk categories

PGSI risk category	No sibling problem gambling	Sibling problem gambling
No problem	3567 (92.6%)	91 (90.1%)
Low risk	187 (4.9%)	6 (5.9%)
Moderate risk	65 (1.7%)	3 (3.0%)
Problem	33 (0.9%)	1 (1.0%)

Table 5.14 displays the Pearson's bivariate correlations between sibling problem gambling, participant problem gambling, and control variables. An examination of this table confirms that there is no significant association between sibling gambling problems and participant gambling problems.

5.2.5.2 Specificity of risk for the sibling transmission of problem gambling behaviour

Table 5.14 reveals that there is no statistically significant relationship between sibling and participant gambling problems. Therefore no further statistical analyses were conducted.

Table 5.14
Pearson's correlations between sibling problem gambling, participant problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Sibling problem gambling	__																			
2. PGSI scores	.00	__																		
3. Gender	.06**	-.10**	__																	
4. Age	.01	-.05**	.04*	__																
5. Relationship status	-.02	.05**	-.10**	-.07**	__															
6. Living alone	-.01	.03	-.04*	.26**	.63**	__														
7. Employment status	.01	-.02	.10**	.44**	.10**	.17**.	__													
8. Educational qualifications	.00	.01	.01	.16**	.07**	.09**	.14**	__												
9. Australian born status	.01	.03	.02	-.05**	.04*	-.01	-.04**	.02	__											
10. ATSI status	.01	.00	.00	-.05**	-.01	-.03	.00	.01	.06**	__										
11. Gross personal weekly income	.02	-.05**	.07**	.08**	-.03	.02	.06**	.06**	-.01	-.03	__									
12. Gross household weekly income	.02	-.04*	.05**	-.05**	.08**	-.01	.02	.07**	.01	-.03	.74**	__								
13. Paternal problem drinking	.08**	.04*	.04*	-.00	-.04**	-.04**	.01	-.01	.05**	.03	-.01	-.04*	__							
14. Maternal problem drinking	.06**	.03*	.03*	-.04**	-.01	-.03	-.06**	-.01	.01	.06**	-.03	.00	.15**	__						
15. Sibling problem drinking	.19**	.00	-.01	.05**	.02	.06**	.02	-.01	.03*	.07**	.00	.01	.03	.04*	__					
16. Paternal drug problems	.05**	.02	.03	-.05**	-.04*	-.03	-.03	-.01	.01	.11**	-.01	.01	.15**	.09**	.04*	__				
17. Maternal drug problems	.01	.07**	.02	-.04**	.01	-.03	-.03*	-.01	.03	.03	-.01	.00	.10**	.24**	.06**	.17**	__			
18. Sibling drug problems	.12**	.01	.01	-.06**	-.01	-.00	-.04**	-.02	.03*	.05**	-.00	.01	.13**	.04*	.24**	.08**	.07**	__		
19. Paternal mental health issues	.03	.04*	.04*	-.06**	-.01	-.04*	-.02	-.02	.02	.01	.02	.01	.16**	.02	.01	.08**	.02	.03*	__	
20. Maternal mental health issues	.01	-.00	.06**	-.07**	.01	-.05**	-.02	-.04*	.01	-.02	-.03	-.03	.07**	.15**	-.01	-.00	.23**	.03	.06**	__
21. Sibling mental health issues	.04*	.01	.01	-.02	.02	.01	-.02	-.03	.04**	.00	-.01	.02	.03	.04**	.21**	.00	-.00	.19**	.03	.05**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

5.2.5.3 Risk and protective factors for the sibling transmission of problem gambling behaviour

Table 5.14 reveals that there is no statistically significant relationship between sibling and participant gambling problems. Therefore no further statistical analyses were conducted to identify risk and protective factors associated with the sibling transmission of gambling problems.

5.3 Summary of Findings

- Overall, 82.4% of participants reported that they had gambled at least once in the previous 12 months. The most frequent gambling activities in the previous 12 months were buying raffle tickets, lotteries, scratch tickets, horse racing, EGMs at hotels, and EGMs at clubs.

- Within this sample, 92.5% of participants were classified as non-problem gamblers, 4.9% were classified as low risk gamblers, 1.7% were classified as moderate risk gamblers, and 0.9% were classified as problem gamblers.

- Overall, 7.3% of the sample reported that any family member (parents or siblings) had a gambling problem when they were growing up. Specifically, 4.0% reported that their father/stepfather/foster father had a gambling problem when they were growing up, 1.7% reported that their mother/stepmother/foster father had a gambling problem when they were growing up, and 2.6% reported that their siblings/stepsiblings/foster siblings had a gambling problem when they were growing up.

- There was no association between family density of problem gambling and participant problem gambling outcomes.

- There was a weak but statistically significant relationship between family member (parents or siblings) and participant problem gambling that remained significant after controlling for other factors. Participants with a family history of problem gambling were 3.0 times more likely to display moderate risk gambling and 9.6 times more likely to display problem gambling than their peers.

- There was a weak but statistically significant relationship between paternal and participant problem gambling that remained statistically significant after controlling for other factors. Participants with problem gambling fathers were 5.1 times more likely to display moderate risk gambling and 10.7 times more likely to display problem gambling than their peers.

- There was a weak but statistically significant relationship between maternal and participant gambling problems that remained statistically significant after controlling for other factors. Participants with problem gambling mothers were 1.7 times more likely to display moderate risk gambling and 10.6 times more likely to display problem gambling than their peers.

- There was no statistically significant relationship between sibling and participant problem gambling. Participants with problem gambling siblings were only 1.8 times more likely to display moderate risk gambling and 1.1 times more likely display problem gambling than their peers.

- A summary of the risk and protective factors identified in Study 1 are displayed in Table 5.15. In this table, we prioritised the risk and protective factors according to which most contributed to, and buffered, the familial transmission of gambling problems.

- Formal tests of mediation allow us to identify risk factors that *explain* why indivuals raised in problem gambling families are more likely to develop problem gambling than their peers. One other potential risk factor that was associated with both family member problem gambling and participant problem gambling, but that did not formally mediate the relationship between them, was maternal problem drinking. This factor is worthy of further study in the familial transmission of gambling problems.

Table 5.15
Summary of the risk and protective factors identified in Study 1

Family member transmission	Risk factors	Protective factors
Any family member	1. Lower age of first gamble 2. Maternal drug problem 3. Paternal mental health issues [a]	1. Female gender 2. Social capital (feeling safe walking alone) 3. Social capital (help from friends, family or neighbours) 4. Single-parent family 5. Higher number of siblings 6. Australian born status 7. Younger age of leaving home
Paternal	1. Maternal drug problem 2. Lower age of first gamble	1. Social capital (help from friends, family or neighbours) 2. Female gender 3. Single-parent family 4. Younger age of leaving home 5. Australian born status 6. Social capital (feeling safe walking alone)
Maternal	1. Paternal problem drinking 2. Paternal mental health issues [a]	1. Female gender 2. Higher number of siblings 3. Australian born status 4. Single-parent family

[a] Risk factor but reduction in strength of association not significant

CHAPTER 6
STUDY 2: SECONDARY SCHOOL SURVEY

The data from the large scale national community telephone survey of adults (Study 1) was supplemented with results of a survey of adolescents aged 12 to 18 years sampled from secondary schools (Study 2).

6.1 Method

6.1.1 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) from secondary schools in Victoria. The majority of participants (81.8%) were born in Australia. Participants most often lived with their biological mother (90.8%), biological father (73.4%), biological brothers (52.1%), and biological sisters (45.4%). Much smaller proportions of participants lived with stepfathers (5.7%), grandmothers (4.7%), other children (2.8%), step-brothers or sisters (2.5%), aunts (2.1%), grandfathers (2.1%), and other adults (2.1%). Other demographic characteristics of the sample are displayed in Table 6.1.

6.1.2 Measures

Participants completed self-report measures evaluating family history of problem gambling (paternal, maternal, and sibling), youth gambling participation and problem gambling, control variables, possible risk factors, and possible protective factors. Refer to Table 6.2 for a summary of the variables examined in Study 2.

6.1.2.1 Family history of problem gambling

The perceived presence of paternal (father/male guardian), maternal (mother/female guardian), and sibling (sibling/step-sibling) problem gambling was assessed using a series of single screening items based on the national definition of problem gambling [(1)]. These items were *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).* Response options for each item were: *Yes, now; Yes, in the past (over 12 months ago); No; Don't know; My [family member] doesn't gamble*. In this study, responses were recoded into: (1) a negative endorsement of problem gambling (*No; Don't know; My [family member] doesn't gamble*) and (2) a positive endorsement of family member problem gambling (*Yes, now; Yes, in the past*). Participants who positively endorsed the screening item for a given family member were required to indicate the type of gambling their family member(s) gambled on: *card games at home; horse/dog race betting at the TAB/track; poker machines; casino tables; don't know; other*.

Table 6.1
Demographic characteristics of Study 2 participants

	Total sample (*n* = 612)[a] [b]	**Males (*n* = 240)**	**Females (*n* = 371)**
Language spoken at home			
English	423 (69.5%)	163 (67.9%)	260 (70.5%)
Another language	42 (6.9%)	19 (7.9%)	23 (23.3%)
English and another language	144 (23.6%)	58 (24.2%)	86 (23.3 %)
Parents' living situation			
Living together	435 (71.4%)	174 (70.7%)	261 (72.5%)
Separated or divorced	129 (21.2%)	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	251 (41.3%)	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	454 (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%)
Don't know or doesn't apply	41 (6.7%)	15 (6.2%)	26 (7.0%)
Mother/female guardian employment status			
Full-time	274 (45.1%)	106 (44.2%)	168(45.7%)
Part-time	176 (28.9%)	65 (27.1%)	111 (30.2%)
Not working	127 (20.9%)	59 (24.6%)	68 (18.5%)
Retired	18 (3.0%)	5 (2.1%)	13 (3.5%)
Don't know or doesn't apply	13 (2.1%)	5 (2.1%)	8 (2.2%)

[a] One participant did not report gender
[b] Variation in sample size is due to missing data

Table 6.2
Summary of variables examined in Study 2

Family history of problem gambling	Control variables	Possible risk factors	Possible protective factors	Outcome variable
• Any family member problem gambling • Paternal problem gambling • Maternal problem gambling • Sibling problem gambling	• Demographic factors (gender, age, Australian born status) • Problem drinking (any family member) • Family stressors (parental unemployment, parental separation/divorce, family member illness, family member emotional problem, financial debts, family member imprisonment)	• Number of gambling friends • Age of first gamble • Gambling attitudes • Coping (*Non-productive coping*) • Parenting practices (*Inconsistent discipline*) • Parental separation/divorce • Family member emotional problems • Financial debts • Family dissatisfaction • Living situation dissatisfaction • Money dissatisfaction • Life dissatisfaction • Substance use (alcohol, marijuana, other drug) • Non-gambling parent problem drinking	• Demographic factors (female gender, younger age, Australian born status, greater number of siblings) • Parental employment (paternal, maternal) • Coping (*Productive coping, Reference to Others*) • Coping resources • Parenting practices (*Positive parenting, Parental involvement*) • Physical health	• Youth problem gambling

6.1.2.2 Youth gambling participation

Participants were asked to indicate how often they gambled on a range of gambling activities with money or possessions during the previous 12 months. Response options were: *Never, At least once; Once a month or more often*. Gambling activity types included: *Scratchies/lottery; Sports (not including horse or dog racing); Horse or dog racing at the TAB; Horse or dog racing at the racetrack; Internet gambling; Table/card games at the casino; Poker machines; Card games at home or school; Other (specified).* On each of the selected types of gambling, the participant was asked to indicate with whom they usually gamble. Response options were: *No-one, I do it alone; With parents; With brother or sister; With other relatives; With friends*.

6.1.2.3 Youth problem gambling

The *DSM-IV-Multiple Response-Juvenile* (DSM-IV-MR-J) [239] is a 12-item measure of problem gambling in children and adolescents who have gambled in the past year. The DSM-IV-MR-J was employed in Study 2 in preference to the PGSI (which was employed in the remaining studies of the *Children at Risk Project)* as the participants in Study 2 were aged between 12 and 18 years. The scale comprises nine dimensions of pathological gambling: preoccupation, tolerance, loss of control, withdrawal, escape, chasing, lies, unsocial/illegal acts, falling out with family/truancy. The DSM-IV-MR-J was selected due to its conservative nature and similarity to the current accepted symptomatology of problem gambling (DSM-IV criteria). Most of the questions in the instrument have four response options: *Never*, *Once or twice*, *Sometimes*, or *Often*. According to Fisher [239], the items on the scale are scored as follows, based on the responses provided: A 'yes' answer to DSM-IV-MR-J items 1 and 3 is represented by the response *often*. A 'yes' answer to item 2 is represented by the response *yes*. A 'yes' answer to items 4 and 5 is represented by the responses of *sometimes* or *often*. A 'yes' answer to question 6 is represented by the response of *more than half the time* or *every time*. A 'yes' answer to questions 7, 8, and 9 is represented by the responses of *once or twice*, *sometimes*, or *often*. Fisher [239] employed a cut-off score of 4 or above 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 [47, 128, 240, 241]. Although the classifications of the DSM-IV-MR-J (non-problem gambling, at-risk gambling, and problem gambling) differ from those provided by the PGSI (no problem, low risk gambling, moderate risk gambling, and problem gambling), we employed the at-risk gambling category to provide at least one intermediary category for consideration. The internal consistency reliability is acceptable (α =.75) and it has had adequate construct validity and factor structures [239]. A description of the psychometric properties of the DSM-IV-MR-J in Study 2 is displayed in Table D.1 (Appendix D).

6.1.2.4 Control variables

Demographic factors. Several demographic factors were employed as possible control variables, including gender, age, and Australian born status.

Problem drinking (any family member). The perceived presence of paternal (father/male guardian), maternal (mother/female guardian), and sibling (sibling/step-

sibling) problem drinking 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). These items were *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).* Response options for each item were: *Yes, now; Yes, in the past (over 12 months ago); No; Don't know; My [family member] doesn't drink*. In this study, responses were recoded into: (1) a negative endorsement of problem drinking (*No; Don't know; My [family member] doesn't drink*), and (2) a positive endorsement of family member problem drinking (*Yes, now; Yes, in the past*).

Family stressors. Six single items from the A-FILE [242] were employed to evaluate family stressors (parental unemployment, parental separation/divorce, family member serious illness or injury, family member emotional problem, financial debts due to credit cards or charges, and family member jail, juvenile detention, or court probation) over the previous 12 months. These A-FILE items employ a dichotomous *yes/no* response format.

6.1.2.5 Possible risk factors

Number of gambling friends. A single item was employed to evaluate how many of the participants friends gamble. Response options included *None of my friends; Some of my friends;* and *Most of my friends*.

Age of first gamble. An open-ended question was employed to evaluate the age at which participants first gambled on any of the gambling activities with money or possessions.

Gambling attitudes. The Gambling Attitude Scale (GAS) [121] consists of 12 statements that, with appropriate reversals, are summed to produce scores ranging from 12 to 60, whereby high scores represent positive attitudes towards gambling. The items are rated using a five-point response from (1) *strongly disagree* to (5) *strongly agree*. The GAS has displayed high internal reliability (α = .79). A description of the psychometric properties of the GAS in Study 2 is displayed in Table D.1 (Appendix D).

Coping (Non-productive coping). The *Adolescent Coping Scale – General (Short Form)* [243] is an 18-item questionnaire that assesses 18 distinct but related coping strategies. The items are rated using a five-point scale from (1) *doesn't apply to me or don't do it* to (5) *used a great deal*. This study employed the General form which evaluates how an individual copes with concerns in general, rather than responses to a specific concern. The 8-item Non-Productive Coping subscale is one of the three subscales derived from factor analyses of the items. This subscale evaluates avoidance strategies generally associated with an inability to cope. This subscale of the ACS has displayed acceptable internal consistency (α = .66) [244]. A description of the psychometric properties of the Non-Productive Coping subscale in Study 2 is displayed in Table D.1 (Appendix D).

Parenting practices (Inconsistent discipline). The Inconsistent Discipline subscale of the Alabama Parenting Questionnaire (APQ) [245] was employed in this

study. While scales such as the Parental Authority Questionnaire [246] provide context or global measures of parenting style, the APQ is designed to measure empirically identified specific aspects of positive and negative parenting behaviours. The 6-item Inconsistent Discipline subscale evaluates consistency in applying discipline (e.g., the punishment your parents/guardians give depends on their mood). The items are evaluated on a 5-point response scale from (1) *never* to (5) *always* [245]. The APQ has been validated with children aged between 6 and 13 years [245, 247]. The Inconsistent Discipline subscale has displayed adequate internal consistency ($\alpha = .73$) [247]. Test-retest reliabilities, construct validity, and discriminant validity across clinical and volunteer samples are adequate for all subscales and scores are not related to social desirability scores [245, 247]. A description of the psychometric properties of the Inconsistent Discipline subscale in Study 2 is displayed in Table D.1 (Appendix D).

Parental separation/divorce. One item from the Family Transitions subscale of the A-FILE [242] was employed to evaluate parental/guardian separation or divorce. The A-FILE, which is a measure of family life events and changes over the previous 12 months, employs a dichotomous *yes/no* response format.

Family member emotional problems. One item from the Family Responsibilities and Strains subscale of the A-FILE [242] was employed to evaluate whether a family member had emotional problems. The A-FILE, which is a measure of family life events and changes over the previous 12 months, employs a dichotomous *yes/no* response format.

Financial debts. One item from the Legal Conflict Issues subscale of the A-FILE [242] was employed to evaluate more financial debts due to credit cards or charges. The A-FILE, which is a measure of family life events and changes over the previous 12 months, employs a dichotomous *yes/no* response format.

Life dissatisfaction. Single items from the Centre for Adolescent Health Gatehouse Project Survey were employed to measure life dissatisfaction (family dissatisfaction, living situation dissatisfaction, money dissatisfaction, life dissatisfaction) [248, 249]. This survey was conducted in 1999 on a cohort of 2,782 Victorian students originally surveyed as Year Eight students in 1997. The Gatehouse Project commenced in 1997 as a randomised controlled trial to determine whether the implementation of a school-based intervention, that included both individual and environment-focused components, could improve students' emotional well-being [248, 249]. These items were: *How have you been getting on with your family recently?* (family), *How happy are you with the place you are living at the moment?* (living situation), *How has your money situation been recently?* (money), and *How satisfied with your life have you been overall?* (life). Participants answered using a 3-point response format indicating (1) satisfaction, (2) neither satisfaction nor dissatisfaction, or (3) dissatisfaction.

Substance use. A single item (*How often do you have a drink containing alcohol?*) was employed to evaluate alcohol use. Response options were *Don't drink*; *Less than once per week; 1-2 days per week; 3-4 days per week; 5-6 days per week;* and *every day*. Drug use was evaluated using a single item (*Have you ever used any of the following drugs?*). Participants were required to endorse use of marijuana and other drugs (not prescribed).

Non-gambling parent problem drinking. The perceived presence of either paternal (father/male guardian) or maternal (mother/female guardian) problem drinking was assessed using two screening items consistent with the National Health and Medical Research Council (NHMRC) Australian guidelines to reduce health risks from drinking alcohol [250]. These items were *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).* Response options for each item were: *Yes, now; Yes, in the past (over 12 months ago); No; Don't know; My [family member] doesn't drink*. In this study, responses were recoded into: (1) a negative endorsement of problem drinking (*No; Don't know; My [family member] doesn't drink*), and (2) a positive endorsement of family member problem drinking (*Yes, now; Yes, in the past*). Maternal problem drinking was conceptualised as a risk factor for the paternal transmission of problem gambling behaviour and paternal problem drinking was conceptualised as a risk factor for the maternal transmission of problem gambling behaviour.

6.1.2.6 Possible protective factors

Demographic factors: Several demographic factors were employed as possible protective factors, including female gender, younger age, Australian born status, and greater number of siblings.

Parental employment (paternal, maternal). Single items were employed to evaluate paternal and maternal employment. Response options included *full-time*; *part-time*; *not working*; or *retired*. For these variables, responses were recoded into (1) unemployed (*not working*) and (2) employed (*full-time, part-time, retired*).

Coping (Productive coping, Reference to Others). The *Adolescent Coping Scale – General (Short Form)* [244] is an 18-item questionnaire that assesses 18 distinct but related coping strategies. The items are rated using a five-point scale from (1) *doesn't apply to me or don't do it* to (5) *used a great deal*. This study employed the General form which evaluates how an individual copes with concerns in general, rather than responses to a specific concern. Two of the three subscales derived from factor analyses of the items are the 6-item Productive Coping subscale (attempting to solve the problem whilst remaining physically fit and socially connected) and the 4-item Reference to Others subscale (referring to others in a bid to deal with the concern). These subscales have displayed tolerable internal consistency for the purpose of identifying protective factors: Productive Coping ($\alpha = .61$) and Reference to Others ($\alpha = .50$). A description of the psychometric properties of the Productive Coping and Reference to Others subscale in Study 2 is displayed in Table D.1 (Appendix D).

Coping resources. The Revised Resources for Adolescents (RRA) is a 48-item modified version of the Conservation of Resources Evaluation for Adults (CORE) for use with adolescents. The RRA has been found to be a valid and reliable measure of young peoples' resources ($\alpha = .91$) [251]. Conservation of resources (COR) theory is a theory of coping behaviour under conditions of stress that posits that to prevent resource loss or establish resources, other resources must be invested. Consequently, individuals who are endowed with strong personal or social resource reserves should

better resist the deleterious effects of stress and withstand everyday challenges [252, 253]. The Resources Questionnaire (RQ), a 10-item short form of the RRA, is based on the ten items rated as most important in a survey of 172 secondary school students [254]. This scale has shown good internal consistency (α = .78). Participants are required to indicate how much of each of the ten resources they have available to them, such as parental support, a stable family life, feeling independent, and money for needs. Each of the ten items is scored from (1) *none* to (5) *a lot*. Total scores can range from 10 to 50, with higher scores indicating a higher level of coping resources. A description of the psychometric properties of the RQ in Study 2 is displayed in Table D.1 (Appendix D).

Parenting practices (Positive parenting, Parental involvement). The Positive Parenting subscale and the Parental Involvement subscales of the Alabama Parenting Questionnaire (APQ) [245] were employed in this study. While scales such as the Parental Authority Questionnaire [246] provide context or global measures of parenting style, the APQ is designed to measure empirically identified specific aspects of positive and negative parenting behaviours. The 6-item Positive Parenting subscale evaluates the use of positive reinforcement (e.g., your parents/guardians tell you that you are doing a good job) and the 10-item Parental Involvement subscale evaluates the degree of parental involvement (e.g., your parents/guardians talk to you about your friends). The items are evaluated on a 5-point response scale from (1) *never* to (5) *always* [245]. The APQ has been validated with children aged between 6 and 13 years [245, 247]. Both subscales have displayed adequate internal consistencies: Positive Parenting (α = .77) and Parental Involvement (α = .75) [247]. Test-retest reliabilities, construct validity, and discriminant validity across clinical and volunteer samples are adequate for all subscales and scores are not related to social desirability scores [245, 247]. A description of the psychometric properties of the Positive Parenting and Parental Involvement subscales in Study 2 is displayed in Table D.1 (Appendix D).

Physical health. A single item from the Centre for Adolescent Health Gatehouse Project Survey (*How have you felt physically recently?*) was employed to measure physical health [248, 249]. This survey was conducted in 1999 on a cohort of 2,782 Victorian students originally surveyed as Year Eight students in 1997. The Gatehouse Project commenced in 1997 as a randomised controlled trial to determine whether the implementation of a school-based intervention, that included both individual and environment-focused components, could improve students' emotional well-being [248, 249]. Response options for this item included: *I have felt physically unwell*; *Overall, neither good nor bad*; and *I have felt physically well*.

6.1.3 Procedure

Ethics approval was obtained from the University of Melbourne Human Research Ethics Committee (No. 0825006), 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.

This study administered 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. Data for this study were collected from November 2008 to October 2009. Of the 119 schools that were contacted, 17 agreed to participate. A detailed summary of the participating schools is displayed in Appendix C. The participating schools included 14 government schools (including one community school and one long distance education school) and 3 independent schools (two female-only and one male-only school). Each metropolitan region (e.g., southern metropolitan) and two regional areas (e.g., Hume) were represented by at least one school.

Several recruitment strategies were selected in order to improve school participation rates and maximise the proportions of youth problem gamblers and problem gambling family members in the sample. These strategies included (a) targeting Government, Independent, and Catholic secondary schools within regions in which the Victorian Government has imposed regional electronic gaming machine caps; (b) targeting secondary schools that had partnership agreements with the University of Melbourne Graduate School of Education; (c) targeting secondary schools that were previously involved in the consultation for the guide for Victorian schools developed by researchers at the Problem Gambling Research and Treatment Centre [255]; (d) presenting the project information to the Victorian Association of State Secondary Principals annual meeting and including information statements in their monthly e-bulletins; and (e) liaising with the Distance Education Centre of Victoria (DECV) to recruit their students using online technologies.

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, and the guide for Victorian schools [255]. 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 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 the administration of the participating schools. All students who received parental permission were also given information about the project and were required to provide verbal assent to participate in the study. 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) and online versions according to the preference of the participating school. The online survey was constructed using the University of Melbourne's recommended survey tool (http://www.surveymonkey.com). Regardless of format, each survey was identical in content. Participants were informed that their participation was voluntary, that their responses were anonymous and confidential, and that they were free to withdraw during the data collection procedure. Participants required approximately 20 minutes to complete the survey. A movie ticket was given to all participants in compensation for their time. Students who completed the survey received a movie ticket when they returned the questionnaire to the researcher.

6.1.4 Data analyses

Detailed information relating to the psychometric properties of each variable, data preparation, and assumption testing for Study 2 is displayed in Appendix D.

6.1.4.1 Magnitude of risk

The relationships between familial (any family member, paternal, maternal, sibling) and youth gambling problems were examined using (1) a series of cross-tabulations of familial problem gambling and youth problem gambling risk categories, and (2) a series of Pearson's bivariate correlations.

6.1.4.2 Specificity of risk

A series of Pearson's bivariate correlations and hierarchical multiple regression analyses were employed to evaluate the degree to which each measure of familial gambling problems (any family member, paternal, maternal, sibling) predicted youth gambling problems, after controlling for other factors. The dependent variable was DSM-IV-MR-J scores and variables were entered into each multiple regression analysis in two steps. The control factors, which were simultaneously entered in the first step, served as covariates to eliminate potential "third variable" explanations for the results. Each measure of familial problem gambling, which served as the independent variable, was entered in the second step of each regression analysis.

6.1.4.3 Risk factors

The formal testing of mediation in this study requires three conditions to be met: 1) family member gambling problems must be significantly related to youth gambling problems (*path c*); 2) family member gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to youth gambling problems (*path b*) [66, 69, 70]. A series of Pearson's bivariate correlations were employed to test each of the three requisite conditions. Those possible risk factors that satisfied the three requisite conditions were formally tested as mediating risk factors using a series of hierarchical regression analyses. The dependent variable was DSM-IV-MR-J scores and variables were entered into each multiple regression analysis in two steps. In these analyses, the measure of familial problem gambling (any family member, paternal, maternal, sibling), which served as the independent variable, was entered in the first step. The potential risk factor, which served as a possible mediator, was entered in the second step. A factor was considered to be a mediating risk factor when its addition in the second step significantly increased the proportion of variance accounted for in youth gambling problems and reduced the strength of the association between family member and youth gambling problems. The Sobel test, which uses the unstandardised regression coefficients and the standard errors of the unstandardised regression coefficients for *paths a* and *b*, was employed to determine the significance of the reduction in association.

6.1.4.4 Protective factors

The formal testing of moderation in this study requires a significant interaction between familial problem gambling and the proposed protective factor to predict youth problem gambling [66, 72, 69, 70 73]. A series of hierarchical multiple regression analyses were employed to evaluate whether the potential protective factors moderated the relationships between familial and youth gambling problems. As commonly recommended, each continuous variable was centred using the mean-deviation method, whereby a new score is produced by subtracting the variable mean from each individual score before fitting each regression model [238]. A series of new variables (interactions) were then created by computing the product of each measure of familial gambling problems and each potential protective factor. The dependent variable was DSM-IV-MR-J scores and variables were entered into each multiple regression analysis in two steps. In these analyses, the measure of familial problem gambling and the potential protective factor were simultaneously entered in the first step. The newly created interaction term between the measure of familial problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a moderator if the interaction in the second step was statistically significant. The split file procedure was employed to visually analyse scatterplots and conduct separate regression analyses to determine whether categorical moderator variables were protective. Each regression equation was examined using the ITALASSI interaction viewer (version 1.2) (http://www.provalisresearch.com/ITALASSI/ITALdowload.html) to determine whether continuous moderator variables were protective. This program graphs the effect of different levels of each moderator on the relationship between familial and youth gambling problems.

6.2 Results

6.2.1 Youth gambling and problem gambling behaviour

Overall, 67.5% of participants reported that they had gambled at least once in the previous 12 months. Table 6.3 displays the frequency of gambling reported by participants on a range of gambling activities in the previous 12 months. An examination of this table reveals that the most frequent gambling activity was playing card games at home or school. Smaller proportions of participants reported gambling on scratch tickets or lottery and sports (not including horse or dog racing).

The cross-tabulation of gambling activities and people with whom participants gambled is displayed in Table 6.4. An examination of this table reveals that participants most commonly gambled with friends on several forms of gambling: sports, Internet gambling, table/card games at the casino, poker machines, and card games at home or school. Participants most often gambled with their parents on several other gambling activities: scratchies/lotteries, horse or dog racing at the TAB, and horse or dog racing at the racetrack.

Table 6.3
Current (12-month) gambling activity participation for Study 2 participants

Gambling activity	Never	At least once	Once a month or more often
Scratchies/lottery	316 (51.6%)	263 (43.0%)	22 (3.6%)
Sports (not incl. horse or dog racing)	498 (81.4%)	84 (13.7%)	20 (3.3%)
Horse or dog racing at the TAB	477 (77.9%)	113 (18.5%)	11 (1.8%)
Horse or dog racing at the racetrack	522 (85.3%)	74 (12.1%)	6 (1.0%)
Internet gambling	567 (92.6%)	25 (4.1%)	11 (1.8%)
Table/card games at the casino	577 (94.3%)	19 (3.1%)	7 (1.1%)
Poker machines	562 (91.8%)	34 (5.6%)	6 (1.0%)
Card games at home or school	357 (58.3%)	182 (29.7%)	64 (10.5%)

Table 6.4
Cross-tabulation of gambling activities and people with whom participants gamble

Gambling activity	Alone	Parents	Brother/ sister	Other relatives	Friends
Scratchies/lottery	13.3%	59.8%	12.5%	11.0%	2.7%
Sports (not horse/dog racing)	15.6%	34.4%	6.3%	8.3%	35.4%
Horse or dog racing at the TAB	5.9%	62.2%	13.4%	10.9%	22.7%
Horse/dog racing at racetrack	2.7%	55.4%	10.8%	20.3%	35.1%
Internet gambling	41.2%	11.8%	2.9%	11.8%	41.2%
Table/card games at the casino	12.0%	4.0%	16.0%	4.0%	52.0%
Poker machines	8.1%	24.3%	15.5%	8.1%	56.8%
Card games at home or school	6.6%	20.2%	24.6%	19.7%	66.7%

Within this sample, 95.0% of participants were classified as non-problem gamblers (DSM-IV-MR-J scores of 0 or 1), 4.4% were classified as at-risk gamblers (DSM-IV-MR-J scores of 2 or 3), and 0.7% were classified as problem gamblers (DSM-IV-MR-J scores of 4 or higher).

6.2.2 Familial transmission of problem gambling behaviour

Overall, 10.0% of the sample reported that any family member (including father/male guardian, mother/female guardian, or siblings/step-siblings) had a gambling problem. These participants reported that their family members were most likely to gamble on EGMs (50.7%), horse/dog race betting at the TAB/track (29.0%), casino tables (24.6%), and card games at home (14.5%). Some participants indicated that their family members gambled on other activities (26.1%) or that they did not know what their family members gambled on (7.2%).

6.2.2.1 Magnitude of risk for the familial transmission of problem gambling behaviour

Table 6.5 displays the cross-tabulation of family member problem gambling and youth problem gambling risk categories. The data in this table reveal that youth with a family history of problem gambling (parents or siblings) are 3.5 times more

likely to display at-risk gambling and 4.5 times more likely to display problem gambling than their peers, χ^2 (2) = 11.26, p = .004.

Table 6.5
Cross-tabulation of family member problem gambling and youth problem gambling risk categories

DSM-IV-MR-J risk category	No family member problem gambling	Any family member problem gambling
No problem	481 (96.0%)	48 (85.7%)
At-risk	18 (3.6%)	7 (12.5%)
Problem	2 (0.4%)	1 (1.8%)

Table 6.6 displays the Pearson's bivariate correlations between family member problem gambling, youth problem gambling, and control variables. The data in this table reveals that there is a weak but significant positive correlation between family member gambling problems and youth gambling problems and that family member gambling problems account for 1.1% of the variance in youth gambling problems.

Of those participants reporting a family history of problem gambling, most reported problem gambling in only one family member (86.0%) but a small proportion reported gambling problems in two (14.0%) family members. There was no difference in DSM-IV-MR-J scores for participants reporting one (M = 0.4, SD = 0.9) or two (M = 0.6, SD = 1.2) family members with gambling problems, Levene's F = 1.21, p = .28, t (54) = -0.56, p = .58.

6.2.2.2 Specificity of risk for the familial transmission of problem gambling behaviour

Table E.1 (Appendix E) provides the results from a hierarchical regression analysis examining the prediction of youth gambling problems by family member gambling problems after controlling for other factors. The control variables explained 7.4% of the variance in youth gambling problems (p < .001). After taking the influence of all of these other predictors in the model into account, family member gambling problems still displayed a statistically significant relationship with youth gambling problems and explained an additional 0.8% of the variance in youth gambling problems (p = .04).

Table 6.6
Pearson's correlations between family member problem gambling, youth problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Any family member problem gambling	—											
2. DSM-IV-MR-J scores	.11*	—										
3. Gender	.01	.08	—									
4. Age	-.03	.03	-.08*	—								
5. Australian born status	.03	-.02	-.05	.05	—							
6. Any family member problem drinking	.25**	.12**	-.08	.03	.04	—						
7. Parental unemployment	.01	.02	-.03	.02	.01	.16**	—					
8. Parental separation/divorce	.22**	.10*	.02	-.00	.02	.16**	.10*	—				
9. Family member illness	.14**	.11**	-.06	.03	.03	.17**	.04	.15**	—			
10. Family member emotional problems	.14**	.08	-.08*	.06	.08*	.22**	.17**	.11**	.29**	—		
11. Financial debts	.15**	.13**	-.04	-.03	.09*	.20**	.17**	.10*	.19**	.33**	—	
12. Family member imprisonment	.01	.22**	.02	.08	.04	.16**	.06	.27**	.21**	.09*	.16**	—

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

6.2.2.3 Risk factors for the familial transmission of problem gambling behaviour

The formal testing of mediation for the familial transmission of problem gambling behaviour requires three conditions to be met: 1) family member gambling problems must be significantly related to youth gambling problems (*path c*); 2) family member gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to youth gambling problems (*path b*). Table 6.7 displays the Pearson's bivariate correlations between family member problem gambling, youth problem gambling, and possible risk factors.

Testing Path C: An examination of Table 6.7 reveals that there is a statistically significant relationship between family member gambling problems and youth gambling problems.

Testing Path A: An examination of Table 6.7 reveals that family member gambling problems are significantly related to several potential mediating risk factors, including gambling attitudes, parental separation/divorce, family member emotional problems, financial debts, family dissatisfaction, living situation dissatisfaction, life dissatisfaction, marijuana use, and other drug use. The remaining variables displayed no significant association with family member gambling problems.

Testing Path B: An examination of Table 6.7 also reveals that several potential mediating risk factors are significantly associated with youth gambling problems, including the number of gambling friends, age of first gamble, gambling attitudes, non-productive coping, inconsistent discipline, parental separation/divorce, financial debts, family dissatisfaction, living situation dissatisfaction, money dissatisfaction, alcohol use, marijuana use, and other drug use. The remaining variables displayed no statistically significant relationship with youth gambling problems.

Taken together, these findings imply that seven of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the familial transmission of gambling problems: gambling attitudes, parental separation/divorce, financial debts, family dissatisfaction, living situation dissatisfaction, marijuana use, and other drug use. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, familial problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in youth gambling problems and reduced the strength of the association between family member and youth gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Table 6.7
Pearson's correlations between family member problem gambling, youth problem gambling, and possible risk factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Any family member PG	__															
2. DSM-IV-MR-J scores	.11*	__														
3. Number of gambling friends	-.00	.31**	__													
4. Age of first gamble	.01	-.12*	.08	__												
5. Gambling attitudes	-.09*	.25**	.31**	-.14*	__											
6. Non-productive coping	.06	.16**	.12*	-.03	.07	__										
7. Inconsistent discipline	.07	.17**	.13*	.02	.12**	.31**	__									
8. Parental separation/divorce	.22**	.10*	.08	.05	-.08	.09*	.03	__								
9. Family emotional problems	.14**	.08	.05	-.01	.04	.22**	.03	.11**	__							
10. Financial debts	.15**	.13**	.02	-.07	-.00	.18**	.06	.10*	.33**	__						
11. Family dissatisfaction	.15**	.10*	.07	-.09	.08	.28**	.10*	.05	.25**	.22**	__					
12. Living situation dissatisfaction	.10*	.08*	.24	-.01	.02	.25**	.06	.09*	.21**	.18**	.59**	__				
13. Money dissatisfaction	-.02	.17**	.20**	-.02	.12**	.26**	.09*	.05	.20**	.30**	.23**	.31**	__			
14. Life dissatisfaction	.12**	.05	.00	-.05	.09*	.26**	.03	.06	.28**	.18**	.47**	.47**	.25**	__		
15. Alcohol use	.05	.20**	.30**	.08	.27**	.12**	.21**	.12**	.12**	.07	.13**	.13**	.15*	.09*	__	
16. Marijuana use	.13**	.20**	.25**	-.01	.19**	.08	.11**	.18**	.21**	.10*	.13**	.08	.18**	.11**	.42**	__
17. Other drugs	.09*	.24**	.14**	-.11	.12**	.11*	.16**	.07	.18**	.15**	.21**	.15**	.18**	.12**	.22**	.37**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Gambling attitudes. Table E.2 (Appendix E) provides the results from a hierarchical regression analysis examining whether gambling attitudes mediated the relationship between family member and youth gambling problems. In step 1, family member gambling problems significantly predicted youth gambling problems (p = .01). The addition of gambling attitudes in step 2 significantly increased the proportion of variance accounted for in youth gambling problems ($p < .001$), but did not reduce the strength of the association between family member and youth gambling problems. Gambling attitudes therefore did not serve to explain the relationship between family member and youth gambling problems.

Parental separation/divorce. Table E.3 (Appendix E) provides the results from a hierarchical regression analysis examining whether parental separation/divorce mediated the relationship between family member and youth gambling problems. In step 1, family member gambling problems significantly predicted youth gambling problems (p = .006). The addition of parental separation/divorce in step 2 did not significantly increase the proportion of variance accounted for in youth gambling problems (p = .10). Parental separation/divorce therefore did not serve to explain the relationship between family member and youth gambling problems.

Financial debts. Table E.4 (Appendix E) provides the results from a hierarchical regression analysis examining whether financial debts mediated the relationship between family member and youth gambling problems. In step 1, family member gambling problems significantly predicted youth gambling problems (p = .01). The addition of financial debts in step 2 significantly increased the proportion of variance accounted for in youth gambling problems (p = .003) and reduced the strength of the association between family member and youth gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 1.94, p = .05. Financial debts therefore served to explain, in part, the relationship between family member and youth gambling problems.

Family dissatisfaction. Table E.5 (Appendix E) provides the results from a hierarchical regression analysis examining whether family dissatisfaction mediated the relationship between family member and youth gambling problems. In step 1, family member gambling problems significantly predicted youth gambling problems (p = .01). The addition of family dissatisfaction in step 2 did not significantly increase the proportion of variance accounted for in youth gambling problems (p = .11). Family dissatisfaction therefore did not serve to explain the relationship between family member and youth gambling problems.

Living situation dissatisfaction. Table E.6 (Appendix E) provides the results from a hierarchical regression analysis examining whether living situation dissatisfaction mediated the relationship between family member and youth gambling problems. In step 1, family member gambling problems significantly predicted youth gambling problems (p = .008). The addition of living situation dissatisfaction in step 2 did not significantly increase the proportion of variance accounted for in youth gambling problems (p = .07). Living situation dissatisfaction therefore did not serve to explain the relationship between family member and youth gambling problems.

Marijuana use. Table E.7 (Appendix E) provides the results from a hierarchical regression analysis examining whether marijuana use mediated the

relationship between family member and youth gambling problems. In step 1, family member gambling problems significantly predicted youth gambling problems (p = .01). The addition of marijuana use in step 2 significantly increased the proportion of variance accounted for in youth gambling problems (p < .001) and reduced the strength of the association between family member and youth gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 2.57, p = .01. Marijuana use therefore served to explain, in part, the relationship between family member and youth gambling problems.

Other drug use. Table E.8 (Appendix E) provides the results from a hierarchical regression analysis examining whether other drug use mediated the relationship between family member and youth gambling problems. In step 1, family member gambling problems significantly predicted youth gambling problems (p = .01). The addition of other drug use in step 2 significantly increased the proportion of variance accounted for in youth gambling problems (p < .001) and reduced the strength of the association between family member and youth gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 2.07, p = .04. Other drug use therefore served to explain, in part, the relationship between family member and youth gambling problems.

6.2.2.4 Protective factors for the familial transmission of problem gambling behaviour

The formal testing of moderation for the familial transmission of problem gambling behaviour requires a significant interaction between family member problem gambling and the proposed protective factor to predict youth problem gambling. A series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between family gambling problems and youth gambling problems. In these analyses, family member problem gambling and the potential protective factor were entered in the first step. The interaction of family member problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender, younger age, being born in Australia, and a greater number of siblings as protective factors for the familial transmission of problem gambling (Table E.9 in Appendix E). There was no significant interaction between family member gambling problems and gender (p = .07), age (p = .46), or Australian born status (p = .91). There was, however, a significant interaction between family member gambling problems and number of siblings (p = .04). An examination of the regression equation using the interaction viewer revealed that the association between family member and youth gambling problems was stronger when participants reported lower numbers of siblings. This finding indicates that a greater number of siblings serve as a protective factor for the familial transmission of problem gambling.

Parental employment. Hierarchical multiple regression analyses were conducted to examine the role of paternal and maternal employment as protective factors for the familial transmission of problem gambling (Table E.10 in Appendix E).

There was no significant interaction between family member gambling problems and either index of parental employment: paternal employment (p = .21) and maternal employment (p = .28). Parental employment therefore does not serve as a protective factor for the familial transmission of problem gambling.

Coping. Hierarchical multiple regression analyses were employed to examine the role of productive coping and reference to others coping as protective factors for the familial transmission of problem gambling (Table E.11 in Appendix E). There was no significant interaction between familial gambling problems and productive coping (p = .18). There was, however, a significant interaction between family member gambling problems and reference to others (p = .04). An examination of the regression equation using the interaction viewer revealed that the relationship between family member and youth gambling problems was stronger when participants reported lower levels of reference to others coping. This finding indicates that referring to others in a bid to deal with the concern serves to buffer the effect of the familial transmission of problem gambling.

Coping resources. A hierarchical multiple regression analysis was employed to examine the role of coping resources as a protective factor for the familial transmission of problem gambling (Table E.12 in Appendix E). There was no significant interaction between family member gambling problems and coping resources (p = .36). These findings reveal that coping resources do not serve as a protective factor for the familial transmission of problem gambling.

Parenting practices. Hierarchical multiple regression analyses were conducted to examine the role of positive parenting and parental involvement as protective factors for the familial transmission of problem gambling (Table E.13 in Appendix E). There was no significant interaction between family member gambling problems and either index of parenting practices: positive parenting (p = .25) and parental involvement (p = .92). These findings indicate that neither positive parenting (i.e., the use of positive reinforcement) nor parental involvement serve to buffer the effect of the familial transmission of problem gambling.

Physical health. A hierarchical multiple regression analysis was conducted to examine the role of physical health as a protective factor for the familial transmission of problem gambling (Table E.14 in Appendix E). There was no significant interaction between family member gambling problems and physical health (p = .95), suggesting that physical health does not buffer the effect of the familial transmission of problem gambling.

6.2.3 Paternal transmission of problem gambling behaviour

Overall, 6.4% of the sample reported that their father or male guardian had a gambling problem. These participants reported that their fathers/male guardians were most likely to gamble on EGMs (50.0%), horse/dog race betting at the TAB/track (44.4%), casino tables (36.1%), and card games at home (19.4%). Some participants indicated that their father/male guardian gambled on other activities (27.8%) or that they did not know what their father/male guardian gambled on (5.6%).

6.2.3.1 Magnitude of risk for the paternal transmission of problem gambling behaviour

Table 6.8 displays the cross-tabulation of paternal problem gambling and youth problem gambling risk categories. The data in this table indicate that youth with problem gambling fathers are 3.6 times more likely to display at-risk gambling and 13.5 times more likely to display problem gambling than their peers, χ^2 (2) = 20.98, p < .001.

Table 6.8
Cross-tabulation of paternal problem gambling and youth problem gambling risk categories

DSM-IV-MR-J risk category	No paternal problem gambling	Paternal problem gambling
No problem	525 (95.8%)	30 (81.1%)
At-risk	21 (3.8%)	5 (13.5%)
Problem	2 (0.4%)	2 (5.4%)

Table 6.9 displays the Pearson's bivariate correlations between paternal problem gambling, youth problem gambling, and control variables. An examination of this table reveals that there is a weak but significant positive correlation between paternal gambling problems and youth gambling problems and that paternal gambling problems account for 2.1% of the variance in youth gambling problems.

6.2.3.2 Specificity of risk for the paternal transmission of problem gambling behaviour

Table E.15 (Appendix E) provides the results from a hierarchical regression analysis examining the prediction of youth gambling problems by paternal gambling problems after controlling for other factors. The control variables explained 7.4% of the variance in youth gambling problems (p < .001). After taking these variables into account, paternal gambling problems did not still display a statistically significant relationship with youth gambling problems (p = .06).

6.2.3.3 Risk factors for the paternal transmission of problem gambling behaviour

The formal testing of mediation for the paternal transmission of problem gambling behaviour requires three conditions to be met: 1) paternal gambling problems must be significantly related to youth gambling problems (*path c*); 2) paternal gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to youth gambling problems (*path b*). Table 6.10 displays the Pearson's bivariate correlations between paternal problem gambling, youth problem gambling, and possible risk factors.

Table 6.9
Pearson's correlations between paternal problem gambling, youth problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Paternal problem gambling	__											
2. DSM-IV-MR-J scores	.15**	__										
3. Gender	-.01	.08	__									
4. Age	.01	.03	-.08*	__								
5. Australian born status	.01	-.02	-.05	.05	__							
6. Any family member problem drinking	.20**	.12**	-.08	.03	.04	__						
7. Parental unemployment	-.04	.02	-.03	.02	.01	.16**	__					
8. Parental separation/divorce	.12**	.10*	.02	-.00	.02	.16**	.10*	__				
9. Family member illness	.15**	.11**	-.06	.03	.03	.17**	.04	.15**	__			
10. Family member emotional problems	.14**	.08	-.08*	.06	.08*	.22**	.17**	.11**	.29**	__		
11. Financial debts	.12**	.13**	-.04	-.03	.09*	.20**	.17**	.10*	.19**	.33**	__	
12. Family member imprisonment	.03	.22**	.02	.08	.04	.16**	.06	.27**	.21**	.09*	.16**	__

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Testing Path C: An examination of Table 6.10 reveals that there is a statistically significant relationship between paternal gambling problems and youth gambling problems.

Testing Path A: An examination of Table 6.10 reveals that paternal gambling problems are significantly related to several potential mediating risk factors, including non-productive coping, parental separation/divorce, family member emotional problems, financial debts, family dissatisfaction, marijuana use, and maternal problem drinking. The remaining variables displayed no significant association with family member gambling problems.

Testing Path B: An examination of Table 6.10 also reveals that several potential mediating risk factors are significantly associated with youth gambling problems, including the number of gambling friends, age of first gamble, gambling attitudes, non-productive coping, inconsistent discipline, parental separation/divorce, financial debts, family dissatisfaction, living situation dissatisfaction, money dissatisfaction, alcohol use, marijuana use, and other drug use. The remaining variables displayed no statistically significant relationship with youth gambling problems.

Taken together, these findings imply that five of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the paternal transmission of gambling problems: non-productive coping, parental separation/divorce, financial debts, family dissatisfaction, and marijuana use. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, paternal problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in youth gambling problems and reduced the strength of the association between paternal and youth gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Non-productive coping. Table E.16 (Appendix E) provides the results from a hierarchical regression analysis examining whether non-productive coping mediated the relationship between paternal and youth gambling problems. In step 1, paternal gambling problems significantly predicted youth gambling problems ($p < .001$). The addition of non-productive coping in step 2 significantly increased the proportion of variance accounted for in youth gambling problems ($p = .001$) and reduced the strength of the association between paternal and youth gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.19$, $p = .03$. Non-productive coping therefore served to explain, in part, the relationship between paternal and youth gambling problems.

Table 6.10
Pearson's correlations between paternal problem gambling, youth problem gambling, and possible risk factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Paternal problem gambling	__																
2. DSM-IV-MR-J scores	.15**	__															
3. Number of gambling friends	.07	.31**	__														
4. Age of first gamble	-.02	-.12*	.08	__													
5. Gambling attitudes	-.06	.25**	.31**	-.14*	__												
6. Non-productive coping	.11**	.16**	.12*	-.03	.07	__											
7. Inconsistent discipline	.07	.17**	.13*	.02	.12**	.31**	__										
8. Parental separation/divorce	.12**	.10*	.08	.05	-.08	.09*	.03	__									
9. Family emotional problems	.14**	.08	.05	-.01	.04	.22**	.03	.11**	__								
10. Financial debts	.12**	.13**	.02	-.07	-.00	.18**	.06	.10*	.33**	__							
11. Family dissatisfaction	.15**	.10*	.07	-.09	.08	.28**	.10*	.05	.25**	.22**	__						
12. Living situation dissatisfaction	.03	.08*	.02	-.01	.02	.25**	.06	.09*	.21**	.18**	.59**	__					
13. Money dissatisfaction	-.04	.17**	.20**	-.02	.12**	.26**	.09*	.05	.20**	.30**	.23**	.31**	__				
14. Life dissatisfaction	.07	.05	.00	-.05	.09*	.26**	.03	.06	.28**	.18**	.47**	.47**	.25**	__			
15. Alcohol use	.03	.20**	.30**	.08	.27**	.12**	.21**	.12**	.12**	.07	.13**	.13**	.15**	.09*	__		
16. Marijuana use	.09*	.20**	.25**	-.01	.19**	.08	.11**	.18**	.21**	.10*	.13**	.08	.18**	.11**	.42**	__	
17. Other drug use	.07	.24**	.14**	-.11	.12**	.11*	.16**	.07	.18**	.15**	.21**	.15**	.18**	.12**	.22**	.37**	__
18. Maternal problem drinking	.19**	.04	-.02	-.07	-.01	.12**	.07	.06	.13**	.13**	.15**	.08*	.08	.13**	.11**	.10**	.15**

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Parental separation/divorce. Table E.17 (Appendix E) provides the results from a hierarchical regression analysis examining whether parental separation/divorce mediated the relationship between paternal and youth gambling problems. In step 1, paternal gambling problems significantly predicted youth gambling problems ($p <$ .001). The addition of parental separation/divorce in step 2 significantly increased the proportion of variance accounted for in youth gambling problems ($p = .05$) and reduced the strength of the association between paternal and youth gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.02$, $p = .04$. Parental separation/divorce therefore served to explain, in part, the relationship between paternal and youth gambling problems.

Financial debts. Table E.18 (Appendix E) provides the results from a hierarchical regression analysis examining whether financial debts mediated the relationship between paternal and youth gambling problems. In step 1, paternal gambling problems significantly predicted youth gambling problems ($p < .001$). The addition of financial debts in step 2 significantly increased the proportion of variance accounted for in youth gambling problems ($p = .007$) and reduced the strength of the association between paternal and youth gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.34$, $p =$ .02. Financial debts therefore served to explain, in part, the relationship between paternal and youth gambling problems.

Family dissatisfaction. Table E.19 (Appendix E) provides the results from a hierarchical regression analysis examining whether family dissatisfaction mediated the relationship between paternal and youth gambling problems. In step 1, paternal gambling problems significantly predicted youth gambling problems ($p = .001$). The addition of family dissatisfaction in step 2 did not significantly increase the proportion of variance accounted for in youth gambling problems ($p = .06$). Family dissatisfaction therefore did not serve to explain the relationship between paternal and youth gambling problems.

Marijuana use. Table E.20 (Appendix E) provides the results from a hierarchical regression analysis examining whether marijuana use mediated the relationship between paternal and youth gambling problems. In step 1, paternal gambling problems significantly predicted youth gambling problems ($p < .001$). The addition of marijuana use in step 2 significantly increased the proportion of variance accounted for in youth gambling problems ($p < .001$) and reduced the strength of the association between paternal and youth gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.07$, $p =$ .04. Marijuana use therefore served to explain, in part, the relationship between paternal and youth gambling problems.

6.2.3.4 Protective factors for the paternal transmission of problem gambling behaviour

The formal testing of moderation for the paternal transmission of problem gambling behaviour requires a significant interaction between paternal problem gambling and the proposed protective factor to predict youth problem gambling. A

series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between paternal gambling problems and youth gambling problems. In these analyses, paternal problem gambling and the potential protective factor were entered in the first step. The interaction of paternal problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender, younger age, being born in Australia, and a greater number of siblings as protective factors for the paternal transmission of problem gambling (Table E.21 in Appendix E). There was no significant interaction between paternal gambling problems and age (p = .08) or Australian born status (p = .96). There was, however, a significant interaction between paternal gambling problems and gender (p = .03) and number of siblings (p < .001). Using the split file procedure, separate regression analyses and visual analysis of the scatterplot revealed that the relationship between paternal and youth problem gambling was stronger for female youth. An examination of the regression equation using the interaction viewer revealed that the relationship between paternal and youth gambling problems was stronger when participants reported a smaller number of siblings. These findings indicate that being male and having a greater number of siblings serve as protective factors for the paternal transmission of problem gambling.

Parental employment. Hierarchical multiple regression analyses were conducted to examine the role of paternal and maternal employment as protective factors for the paternal transmission of problem gambling (Table E.22 in Appendix E). There was no significant interaction between paternal gambling problems and either index of parental employment: paternal employment (p = .08) and maternal employment (p = .53). Parental employment therefore does not serve as a protective factor for the paternal transmission of problem gambling.

Coping. Hierarchical multiple regression analyses were employed to examine the role of productive coping and reference to others coping as protective factors for the paternal transmission of problem gambling (Table E.23 in Appendix E). There was no significant interaction between paternal gambling problems and reference to others (p = .53). There was, however, a significant interaction between paternal gambling problems and productive coping (p = .03). An examination of the regression equation using the interaction viewer revealed that the relationship between paternal and youth gambling problems was stronger when participants reported lower levels of productive coping. This finding indicates that attempting to solve the problem whilst remaining physically fit and socially connected serves to buffer the effect of the paternal transmission of problem gambling.

Coping resources. A hierarchical multiple regression analysis was employed to examine the role of coping resources as a protective factor for the paternal transmission of problem gambling (Table E.24 in Appendix E). There was no significant interaction between paternal gambling problems and coping resources (p = .11). This finding indicates that coping resources do not serve as a protective factor for the paternal transmission of problem gambling.

Parenting practices. Hierarchical multiple regression analyses were conducted to examine the role of positive parenting and parental involvement for the paternal transmission of problem gambling (Table E.25 in Appendix E). There was no significant interaction between paternal gambling problems and either index of parenting practices: positive parenting (p = .12) and parental involvement (p = .92). These findings indicate that neither positive parenting (i.e., the use of positive reinforcement) nor parental involvement serve to buffer the effect of the paternal transmission of problem gambling.

Physical health. A hierarchical multiple regression analysis was conducted to examine the role of physical health as a protective factor for the paternal transmission of problem gambling (Table E.26 in Appendix E). There was no significant interaction between paternal gambling problems and physical health (p = .95), suggesting that physical health does not buffer the effect of the paternal transmission of problem gambling.

6.2.4 Maternal transmission of problem gambling behaviour

Overall, 4.1% of the sample reported that their mother or female guardian had a gambling problem. These participants overwhelmingly reported that their mothers/female guardians were most likely to gamble on EGMs (58.3%), followed by horse/dog race betting at the TAB/track (12.5%), casino tables (8.3%), and card games at home (4.2%). Some participants indicated that that they that their mother/female guardian gambled on other activities (20.8%) or that they did not know what their mother/female guardian gambled on (12.5%).

6.2.4.1 Magnitude of risk for the maternal transmission of problem gambling behaviour

Table 6.11 displays the cross-tabulation of maternal problem gambling and youth problem gambling risk categories. The data in this table indicate that although youth with problem gambling mothers are 1.9 times more likely to display at-risk gambling than their peers, no youth with problem gambling mothers displayed problem gambling on the DSM-IV-MR-J, χ^2 (2) = 0.96, p = .62.

Table 6.11
Cross-tabulation of maternal problem gambling and youth problem gambling risk categories

DSM-IV-MR-J risk category	No maternal problem gambling	Maternal problem gambling
No problem	524 (95.1%)	22 (91.7%)
At-risk	24 (4.4%)	2 (8.3%)
Problem	3 (0.5%)	0 (0.0%)

Table 6.12 displays the Pearson's bivariate correlations between maternal problem gambling, youth problem gambling, and control variables. An examination of this table confirms that there is no significant association between maternal gambling problems and youth gambling problems.

Table 6.12
Pearson's correlations between maternal problem gambling, youth problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Maternal problem gambling	__											
2. DSM-IV-MR-J scores	.01	__										
3. Gender	.03	.08	__									
4. Age	-.03	.03	-.08*	__								
5. Australian born status	-.02	-.02	-.05	.05	__							
6. Any family member problem drinking	.19**	.12**	-.08	.03	.04	__						
7. Parental unemployment	.00	.02	-.03	.02	.01	.16**	__					
8. Parental separation/divorce	.19**	.10**	.02	.00	.02	.16**	.10*	__				
9. Family member illness	.14**	.11**	-.06	.03	.03	.17**	.04	.15**	__			
10. Family member emotional problems	.09*	.08	-.08*	.06	.08*	.22**	.19**	.11**	.29**	__		
11. Financial debts	.14**	.13**	-.04	-.03	.09*	.20**	.17**	.10*	.19**	.33**	__	
12. Family member imprisonment	.11**	.22**	.02	.08	.04	.16**	.06	.27**	.21**	.09*	.16**	__

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

6.2.4.2 Specificity of risk for the maternal transmission of problem gambling behaviour

Table 6.12 reveals that there is no statistically significant relationship between maternal and youth gambling problems. Therefore no further statistical analyses were conducted.

6.2.4.3 Risk and protective factors for the maternal transmission of problem gambling behaviour

Table 6.12 reveals that there is no statistically significant relationship between maternal and youth gambling problems. Therefore no further statistical analyses were conducted to identify risk and protective factors associated with the maternal transmission of gambling problems.

6.2.5 Sibling transmission of problem gambling behaviour

Overall, 1.2% of the sample reported that their sibling(s) or step-sibling(s) had a gambling problem. These participants reported that their siblings were most likely to gamble on card games at home (28.6%), horse/dog race betting at the TAB/track (14.3%), EGMs (42.9%), and casino tables (28.6%). Some participants indicated that their siblings gambled on other activities (42.9%).

6.2.5.1 Magnitude of risk for the sibling transmission of problem gambling behaviour

Table 6.13 displays the cross-tabulation of sibling problem gambling and youth problem gambling risk categories. The data in this table indicate that although no youth with problem gambling siblings displayed problem gambling on the DSM-IV-MR-J, youth with problem gambling siblings are 11 times more likely to display at-risk gambling than their peers, χ^2 (2) = 25.13, $p < .001$.

Table 6.13
Cross-tabulation of sibling problem gambling and youth problem gambling risk categories

DSM-IV-MR-J risk category	No sibling problem gambling	Sibling problem gambling
No problem	539 (95.4%)	4 (57.1%)
At-risk	22 (3.9%)	3 (42.9%)
Problem	4 (0.7%)	0 (0.0%)

Table 6.14 displays the Pearson's bivariate correlations between sibling problem gambling, youth problem gambling, and control variables. An examination of table confirms that there is a weak but significant positive correlation between sibling gambling problems and youth gambling problems and that sibling gambling problems account for 1.5% of the variance in sibling gambling problems.

Table 6.14
Pearson's correlations between sibling problem gambling, youth problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Sibling problem gambling	__											
2. DSM-IV-MR-J scores	.12**	__										
3. Gender	.01	.08	__									
4. Age	-.04	.03	-.08*	__								
5. Australian born status	.01	-.02	-.05	.05	__							
6. Any family member problem drinking	.14**	.12**	-.08	.03	.04	__						
7. Parental unemployment	.07	.02	-.03	.02	.01	.16**	__					
8. Parental separation/divorce	.03	.10*	.02	-.00	.02	.16**	.10*	__				
9. Family member illness	.01	.11**	-.06	.03	.03	.17**	.04	.15**	__			
10. Family member emotional problems	.05	.08	-.08*	.06	.08*	.22**	.17**	.11**	.29**	__		
11. Financial debts	.03	.13**	-.04	-.03	.09*	.20**	.17**	.10*	.19**	.33**	__	
12. Family member imprisonment	-.02	.22**	.02	.08	.04	.16**	.06	.27**	.21**	.09**	.16**	__

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

6.2.5.2 Specificity of risk for the sibling transmission of problem gambling behaviour

Table E.27 (Appendix E) provides the results from a hierarchical regression analysis examining the prediction of youth gambling problems by sibling gambling problems after controlling for other factors. The control variables explained 7.4% of the variance in youth gambling problems ($p < .001$). After taking the influence of all of these other predictors in the model into account, sibling gambling problems still displayed a statistically significant relationship with youth gambling problems and explained an additional 1.6% of the variance in youth gambling problems ($p = .003$).

6.2.5.3 Risk factors for the sibling transmission of problem gambling behaviour

The formal testing of mediation for the sibling transmission of problem gambling behaviour requires three conditions to be met: 1) sibling gambling problems must be significantly related to youth gambling problems (*path c*); 2) sibling gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to youth gambling problems (*path b*). Table 6.15 displays the Pearson's bivariate correlations between sibling problem gambling, youth problem gambling, and possible risk factors.

Testing Path C: An examination of Table 6.15 reveals that there is a statistically significant relationship between sibling gambling problems and youth gambling problems.

Testing Path A: An examination of Table 6.15 reveals that sibling gambling problems are significantly related to only four potential mediating risk factors: family dissatisfaction, living situation dissatisfaction, life dissatisfaction, and other drug use. The remaining variables displayed no significant association with family member gambling problems.

Testing Path B: An examination of Table 6.15 also reveals that almost all the potential mediating risk factors are significantly associated with youth gambling problems, including the number of gambling friends, age of first gamble, gambling attitudes, non-productive coping, inconsistent discipline, parental separation/divorce, financial debts, family dissatisfaction, living situation dissatisfaction, money dissatisfaction, alcohol use, marijuana use, and other drug use. Family member emotional problems displayed no statistically significant relationship with youth gambling problems.

Table 6.15
Pearson's correlations between sibling problem gambling, youth problem gambling, and possible risk factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Sibling problem gambling	__															
2. DSM-IV-MR-J scores	.12**	__														
3. Number of gambling friends	-.03	.31**	__													
4. Age of first gamble	-.03	.12*	.08	__												
5. Gambling attitudes	.03	.25**	.31**	-.14*	__											
6. Non-productive coping	.04	.16**	.12*	-.03	.07	__										
7. Inconsistent discipline	.00	.17**	.13*	.02	.12**	.31**	__									
8. Parental separation/divorce	.03	.10*	.08	.05	-.08	.09*	.03	__								
9. Family member emotional problems	.05	.08	.05	-.01	.04	.22**	.03	.11**	__							
10. Financial debts	.03	.13**	.02	-.07	-.00	.18**	.06	.10*	.33**	__						
11. Family dissatisfaction	.11*	.10*	.07	-.09	.08	.28**	.10*	.05	.25**	.22**	__					
12. Living situation dissatisfaction	.16**	.08*	.02	-.01	.02	.25**	.06	.09*	.21*	.18**	.59**	__				
13. Money dissatisfaction	.03	.17**	.20**	-.02	.12**	.26**	.09*	.05	.20**	.30**	.23**	.31**	__			
14. Life dissatisfaction	.15**	.05	.00	-.05	.09*	.26**	.03	.06	.28**	.18**	.47**	.47**	.25**	__		
15. Alcohol use	.03	.20**	.30**	.08	.27**	.12**	.21**	.12**	.12**	.07	.13**	.13**	.15**	.09*	__	
16. Marijuana use	-.00	.20**	.25**	-.01	.19**	.08	.11**	.18**	.21**	.10*	.13**	.08	.18**	.11**	.42**	__
17. Other drug use	.08*	.24**	.14**	-.11	.12**	.11*	.16**	.07	.18**	.15**	.21**	.15**	.18**	.12**	.22**	.37**

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Taken together, these findings imply that only three of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the sibling transmission of gambling problems: family dissatisfaction, living situation dissatisfaction, and other drug use. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, sibling problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in youth gambling problems and reduced the strength of the association between sibling and youth gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Family dissatisfaction. Table E.28 (Appendix E) provides the results from a hierarchical regression analysis examining whether family dissatisfaction mediated the relationship between sibling and youth gambling problems. In step 1, sibling gambling problems significantly predicted youth gambling problems (p = .003). The addition of family dissatisfaction in step 2 significantly increased the proportion of variance accounted for in youth gambling problems (p = .049) and reduced the strength of the association between sibling and youth gambling problems. However, the Sobel test indicated that that this reduction in the strength of the association was not significant, z = 1.83, p = .07.

Living situation dissatisfaction. Table E.29 (Appendix E) provides the results from a hierarchical regression analysis examining whether living situation dissatisfaction mediates the relationship between sibling and youth gambling problems. In step 1, sibling gambling problems significantly predicted youth gambling problems (p = .002). The addition of living situation dissatisfaction in step 2 did not significantly increase the proportion of variance accounted for in youth gambling problems (p = .15). Living situation dissatisfaction therefore did not serve to explain the relationship between sibling and youth gambling problems.

Other drug use. Table E.30 (Appendix E) provides the results from a hierarchical regression analysis examining whether other drug use mediated the relationship between sibling and youth gambling problems. In step 1, sibling gambling problems significantly predicted youth gambling problems (p = .003). The addition of other drug use in step 2 significantly increased the proportion of variance accounted for in youth gambling problems (p < .001) and reduced the strength of the association between sibling and youth gambling problems. However, the Sobel test indicated that that this reduction in the strength of the association was not significant, z = 1.88, p = .06.

6.2.5.4 Protective factors for the sibling transmission of problem gambling behaviour

Applied to the sibling transmission of gambling problems, the formal testing of moderation requires a significant interaction between sibling problem gambling and the proposed protective factor to predict offspring problem gambling. A series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between sibling gambling

problems and youth gambling problems. In these analyses, sibling problem gambling and the potential protective factor were entered in the first step. The interaction of sibling problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender, younger age, being born in Australia, and a greater number of siblings as protective factors for the sibling transmission of problem gambling (Table E.31 in Appendix E). There was no significant interaction between sibling gambling problems and age (p = .15), Australian born status (p = .12), or number of siblings (p = .34). There was, however, a significant interaction between sibling gambling problems and youth gender (p = .045). Using the split file procedure, separate regression analyses and visual analysis of the scatterplot revealed that the relationship between sibling and youth problem gambling was stronger for male youth. Being female therefore serves as a protective factor for the sibling transmission of problem gambling.

Parental employment. Hierarchical multiple regression analyses were conducted to examine the role of paternal and maternal employment as protective factors for the sibling transmission of problem gambling (Table E.32 in Appendix E). Examination of these tables reveals that there was no significant interaction between sibling gambling problems and either index of parental employment: paternal employment (p = .09) and maternal employment (p = .06). Parental employment therefore does not serve as a protective factor for the sibling transmission of problem gambling.

Coping. Hierarchical multiple regression analyses were employed to examine the role of productive coping and reference to others coping as protective factors for the familial transmission of problem gambling (Table E.33 in Appendix E). There was no significant interaction between sibling gambling problems and reference to others (p = .99). There was, however, a significant interaction between sibling gambling problems and productive coping (p = .03). An examination of the regression equation using the interaction viewer revealed that the relationship between sibling and youth gambling problems was stronger when participants reported lower levels of productive coping. This finding indicates that attempting to solve the problem whilst remaining physically fit and socially connected serves to buffer the effect of the sibling transmission of problem gambling.

Coping resources. A hierarchical multiple regression analysis was employed to examine the role of coping resources as a protective factor for the sibling transmission of problem gambling (Table E.34 in Appendix E). There was no significant interaction between sibling gambling problems and coping resources (p = .12). This finding indicates that coping resources do not serve as a protective factor for the sibling transmission of problem gambling.

Parenting practices. Hierarchical multiple regression analyses were conducted to examine the role of positive parenting and parental involvement for the sibling transmission of problem gambling (Table E.35 in Appendix E). There was a significant interaction between sibling gambling problems and both indices of

parenting practices: positive parenting (p = .04) and parental involvement (p = .01). An examination of each regression equation using the interaction viewer revealed that unexpectedly, the relationship between sibling and youth gambling problems was stronger when participants reported higher levels of positive parenting and parental involvement. These findings indicate that low use of positive reinforcement (positive parenting) and parental involvement serve to buffer the effect of the sibling transmission of problem gambling.

Physical health. A hierarchical multiple regression analysis was conducted to examine the role of physical health as a protective factor for the sibling transmission of problem gambling (Table E.36 in Appendix E). There was no significant interaction between sibling gambling problems and physical health (p = .19), suggesting that physical health does not buffer the effect of the sibling transmission of problem gambling.

6.3 Summary of Findings

- Overall, 67.5% of participants reported that they had gambling at least once in the previous 12 months. The most frequent gambling activity was playing card games at home or school, with smaller proportions of participants reporting gambling on scratch tickets or lottery and sports (not including horse or dog racing). Participants gambled on all forms of gambling most often with their friends and parents.

- Within this sample, 95% of participants were classified as non-problem gamblers, 4.4% were classified as at-risk gamblers, and 0.7% were classified as problem gamblers on the DSM-IV-MR-J.

- Overall, 10.0% of the sample reported that any family member (parents or siblings) had a gambling problem, 6.4% reported that their father or male guardian had a gambling problem, 4.1% reported that their mother or female guardian had a gambling problem, and 1.2% reported that their sibling(s) or step-sibling(s) had a gambling problem.

- There was no association between family density of problem gambling and youth problem gambling outcomes.

- There was a weak but statistically significant relationship between family member (parents or siblings) and youth problem gambling that remained significant after controlling for other factors. Youth with a family history of problem gambling (parents or siblings) were 3.5 times more likely to display at-risk gambling and 4.5 times more likely to display problem gambling than their peers.

- There was a weak but statistically significant relationship between paternal and youth problem gambling that failed to remain statistically significant after controlling for other factors. Youth with problem gambling fathers were 3.6 times more likely to display at-risk gambling and 13.5 times more likely to display problem gambling than their peers.

- There was no statistically significant relationship between maternal and youth gambling problems. Although youth with problem gambling mothers were 1.9 times more likely to display at-risk gambling than their peers, no youth with problem gambling mothers displayed problem gambling.

- There was a weak but statistically significant relationship between sibling and youth problem gambling that remained significant after controlling for other factors. Although no youth with problem gambling siblings displayed problem gambling, youth with problem gambling siblings were 11 times more likely to display at-risk gambling than their peers.

- A summary of the risk and protective factors identified in Study 2 are displayed in Table 6.16. In this table, we prioritised the risk and protective factors according to which most contributed to, and buffered, the familial transmission of gambling problems.

- Formal tests of mediation allow us to identify risk factors that *explain* why individuals raised in problem gambling families are more likely to develop problem gambling than their peers. Two other possible risk factors that were associated with both family member problem gambling and youth problem gambling, but that did not formally mediate the relationship between them, were gambling attitudes and living situation dissatisfaction. These factors are worthy of further study in the familial transmission of gambling problems.

Table 6.16
Summary of the risk and protective factors identified in Study 2

Family member transmission	Risk factors	Protective factors
Any family member	1. Marijuana use 2. Other drug use 3. Financial debts	1. Greater number of siblings 2. Reference to others coping style
Paternal	1. Financial debts 2. Non-productive coping 3. Marijuana use 4. Parental separation/ divorce	1. Greater number of siblings 2. Male gender 3. Productive coping
Sibling	1. Other drug use [a] 2. Family dissatisfaction [a]	1. Low parental involvement 2. Productive coping 3. Low positive parenting 4. Female gender

[a] Risk factor but reduction in strength of association not significant

CHAPTER 7
STUDY 3: YOUNG ADULT SURVEY

The data from the large scale national community telephone survey of adults (Study 1), and survey of adolescents aged 12 to 18 years sampled from secondary schools (Study 2), were supplemented by the results of a survey of young adults sampled from tertiary institutions (Study 3).

7.1 Method

7.1.1 Participants

The sample consisted of 823 students (401 males, 422 females) aged between 18 and 25 years (*M* = 21.1, *SD* = 2.2, *median* = 21) from tertiary institutions in Victoria. Approximately half of the participants (55.7%) were born in Australia and few (1.2%) considered themselves as being of Aboriginal or Torres Straight Islander descent. Two-thirds of participants (71.6%) reported that they were usually in paid employment.

Participants most often lived with their mother (64.5%), father (55.9%), sisters (35.7%), and brothers (34.4%). Much smaller proportions of participants lived with housemates (16.2%), spouses/partners (9.6%), other adults (5.0%), grandmothers (4.8%), and grandfathers (3.1%). A small proportion of participants also lived alone (5.5%). Other demographic characteristics of the sample are displayed in Table 7.1.

Table 7.1
Demographic characteristics of Study 3 participants

	Total Sample [a] (*n* = 823)	**Males (*n* = 401)**	**Females (*n* = 422)**
Language spoken at home			
English	448 (54.6%)	233 (58.3%)	215 (51.1%)
Another language	62 (7.6%)	29 (7.3%)	33 (7.8%)
English and another language	311 (37.9%)	138 (34.5%)	173 (41.1%)
Relationship status			
Single	496 (60.6%)	245 (61.7%)	251 (59.6%)
In a relationship	276 (33.7%)	134 (33.8%)	142 (33.7%)
Married/defacto	43 (5.3%)	16 (4.0%)	27 (6.4%)
Other	3 (0.4%)	2 (0.5%)	1 (0.2%)

[a] Variation in sample size is due to missing data

7.1.2 Measures

Participants completed self-report measures evaluating family history of problem gambling (paternal, maternal, and sibling), gambling participation and problem gambling, control variables, possible risk factors, and possible protective factors. Refer to Table 7.2 for a summary of the variables examined in Study 3.

7.1.2.1 Family history of problem gambling

The perceived presence of paternal (father/male guardian), maternal (mother/female guardian), and sibling (sister/brother) problem gambling was assessed using a single screening item: *To your knowledge, do any of these people have a gambling problem?*

7.1.2.2 Young adult gambling participation

Participants were asked to indicate whether they had gambled or bet in the last 12 months even just once, with examples of gambling activities provided. Participants endorsing the 12-month gambling participation question were asked how often they gambled on a range of gambling activities during the previous 12 months. Response options were: *Never, 1-2 times a year, Every few months or once a month, 2-3 times a month, About once a week,* and *At least 2 or 3 times a week*. In reporting these outcomes, the two response options indicating the most frequent gambling were collapsed. Gambling activity types included: *Scratch cards (scratchies); Bet on professional sports (i.e., sports pools) with friends/family (not the races); Buy sports lottery tickets; Bet on your own games of sports, pool, bowling, other games of skills with family or friends; Horse or dog racing at the TAB; Horse or dog racing at the racetrack; Buy lottery tickets (e.g., Tattslotto, Powerball, Super 66); Bet on video games for money; Bingo; Poker machines (poker) at a casino; Poker machines (pokies) at hotels/clubs; Keno; Gamble/bet on the Internet; Table or card games at a casino; Play cards at a house (e.g., poker, blackjack).* Participants who had gambled in the previous 12 months were asked who they usually gambled or bet with. Response options were: *Alone, My friends, Strangers, My parents, My brother(s) or sister(s), My grandparents, Other relatives*. Finally, participants who had gambled in the previous 12 months were asked where they usually gambled or bet. Response options were: *At home, At a shop that sells lottery tickets and scratchies (e.g., newsagency, chemist), At home on the Internet, On the Internet somewhere else, At friends' homes, Bingo halls, At the TAB or race track, the casino, At a gaming venue (e.g., a pub or sports club with a pokies section).*

Table 7.2
Summary of variables examined in Study 3

Family history of problem gambling	Control variables	Possible risk factors	Possible protective factors	Outcome variable
• Any family member problem gambling • Paternal problem gambling • Maternal problem gambling • Sibling problem gambling	• Demographic characteristics (gender, age, Australian born status, ATSI status, employment status, relationship status, living alone)	• Gambling with others (gambling with parents, gambling with siblings, gambling with friends) • Gambling at home (gambling at home, gambling at home on the internet, gambling at friends' homes) • Age of first gamble • Number of gambling friends • Positive gambling expectancies (*Enjoyment/Arousal, Self-Enhancement, Money*) • Gambling motives (*Enhancement, Coping, Social*) • Sensation seeking • Depression • Alcohol use • Drug use • Antisocial behaviours	• Demographic factors (female gender, younger age, Australian born status) • Negative gambling expectancies (*Overinvolvement, Emotional Impact*)	• Young adult problem gambling

7.1.2.3 Young adult problem gambling

The nine-item Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI) [235] was employed to evaluate problem gambling severity. Respondents indicated how often each item applied to them in the last 12 months on a four-point scale: (0) *never,* (1) *sometimes,* (2) *most of the time, and* (3) a*lmost always*. Scores range from 0 to 27 and higher scores indicate higher problem severity. Scores on the PGSI can be used to classify individuals as non-problem gamblers (score of 0), low risk gamblers (scores of 1 or 2), moderate risk gamblers (scores between 3 and 7), or problem gamblers (scores of 8 or higher). The PGSI has been adopted as the preferred measurement tool for population-level research in Australia [1]. The PGSI has displayed good internal consistency, test-retest reliability, criterion validity with measures of gambling involvement, unitary dimensional structure, item variability, and concurrent validity with measures of problem gambling [1, 12, 235, 234]. It has been validated in many jurisdictions, including Canada, Europe, and Australia. Several studies suggest that the PGSI outperforms other measures of problem gambling severity in population-level research in terms of overall rationale, internal consistency, item difficulty, construct validity, classification validity, and factor structure [1, 12, 235-237]. The PGSI has displayed very good sensitivity (the rate of positive test results among those with the disorder) and specificity (the rate of negative test results among those without the disorder) [235]. The PGSI tends to be slightly more conservative in estimating prevalence of problem gambling than the South Oaks Gambling Screen, but higher than the DSM-IV [1, 235]. A description of the psychometric properties of the PGSI in Study 3 is displayed in Table G.1 (Appendix G).

7.1.2.4 Control variables

Demographic factors. Several demographic factors were employed as possible control variables, including gender, age, country of birth, Aboriginal or Torres Straight Islander (ATSI) status, employment status, relationship status, and living alone.

7.1.2.5 Possible risk factors

Gambling with others. A single item was employed to evaluate who participants usually gambled or bet with. Response options were: *Alone, My friends, Strangers, My parents, My brother(s) or sister(s), My grandparents, Other relatives*. Gambling with parents, gambling with siblings, and gambling with friends were employed as separate possible risk factors for the familial transmission of problem gambling.

Location of gambling. A single item was employed to evaluate where participants usually gambled or bet. Response options were: *At home, At a shop that sells lottery tickets and scratchies (e.g., newsagency, chemist), At home on the internet, On the internet somewhere else, At friends' homes, Bingo halls, At the TAB or race track, the casino, At a gaming venue (e.g., a pub or sports club with a pokies section).* Gambling at home, gambling at home on the internet, and gambling at friends' homes were employed as separate possible risk factors for the familial transmission of problem gambling.

Age of first gamble. An open-ended question was employed to evaluate the age at which participants started to gamble or bet for money.

Number of gambling friends. A single item was employed to evaluate how many of participants' friends and acquaintances gambled. Response options included *None of them, A few of them, About half of them, Most of them,* and *All of them*.

***Positive gambling expectancies (Enjoyment/Arousal, Self-Enhancement, Money*).** The Gambling Expectancy Questionnaire (GEQ) [186] was employed to assess the perceived benefits of gambling. It includes three positive expectancies subscales: the 8-item Enjoyment/Arousal subscale (the gambling benefits of enjoyment, arousal, and entertainment), the 4-item Self-Enhancement subscale (the gambling benefits of feeling in control, feeling powerful, and feeling more accepted by peers), and the 3-item Money subscale (the benefit of financial gain as a result of gambling). Respondents indicate how likely they believe each outcome will happen to them if they gamble on a 7 point scale from (1) *no chance* to (7) *certain to happen*, with a neutral middle point (4) *neither likely nor unlikely*. In the scale validation with secondary school students, each of these three subscales displayed good to high internal consistencies: Enjoyment/Arousal (α = .86), Self-Enhancement (α = .81), and Money (α = .78) [186]. Problem and at-risk gamblers endorse items on each of the three positive expectancy subscales more highly than social gamblers and non-gamblers [187]. A description of the psychometric properties of the positive gambling expectancy subscales in Study 3 is displayed in Table G.1 (Appendix G).

Gambling motives (Enhancement, Coping, Social). The Gambling Motivation Questionnaire (GMQ) [256] was employed to evaluate several dimensions of gambling motivations. The GMQ is a motivation scale adapted from the Drinking Motivation Questionnaire (DMQ) [257]. It comprises 15 items evenly distributed over 3 subscales: Enhancement motives (internal positive reinforcement; i.e., gambling to increase positive emotions), Coping motives (internal negative reinforcement; i.e., gambling to reduce or avoid negative emotions), and Social motives (external positive reinforcement motives; i.e., gambling to increase social affiliation). Respondents indicate how often they think they gamble (or would gamble) for each reason on a four point scale from (1) *Almost never/never* to (4) *Almost always*. Each subscale has demonstrated very good reliability: Enhancement motives (α = .91), Coping motives (α = .86), and Social motives (α = .81). Problem gamblers have scored higher on all three subscales than non-problem gamblers and the GMQ has demonstrated very good concurrent validity (subscales predicting greater gambling behaviour or more severe gambling problems) [256]. A description of the psychometric properties of the GMQ subscales in Study 3 is displayed in Table G.1 (Appendix G).

Sensation seeking (Intensity). The 10-item Intensity subscale of Arnett's Inventory of Sensation Seeking (AISS) [258] was employed to evaluate sensation seeking. The Intensity subscale measures the need for intensity of stimulation. Respondents indicate how well each statement describes them on a four point scale ranging from (1) d*escribes me very well* to (4) *does not describe me at all*. Scores can range from 10 to 50 and higher scores indicate higher sensation seeking after reverse scoring of some items. The internal reliability coefficient for the Intensity subscale is adequate (α = .64). The Intensity subscale has also been shown to strongly correlate with risky behaviours of young people, arousal, and problem gambling severity [171,

[258, 259]. A description of the psychometric properties of the AISS Intensity subscale in Study 3 is displayed in Table G.1 (Appendix G).

Depression. The Kutcher Adolescent Depression Scale (KADS-6) [260] is a 6-item self-report scale specifically designed to diagnose and assess the severity of youth depression. Participants rate each item according to how often they have been "on average" or "usually" over the previous week, from (0) *hardly ever* to (3) *all of the time*. Scores range from 0 to 18, with higher scores indicating higher depression. The internal consistency of the KADS-6 is very good ($\alpha = .80$). Using a cut-off score of 6, the KADS-6 achieves sensitivity and specificity rates of 92% and 71%. The overall diagnostic ability of the KADS-6 is at least as good as that of the Beck Depression Inventory. A description of the psychometric properties of the KADS-6 in Study 3 is displayed in Table G.1 (Appendix G).

Alcohol use. A single item (*How often have you drunk alcohol/beer (including with family) in the past 12 months?)* was employed to evaluate alcohol use. Response options were *never, occasionally, about once a month, 1-2 days a week (e.g., on weekends), 3 or more days a week but not every day,* and *every day*.

Drug use. Three items were combined to evaluate drug use. These questions ask how often participants had used "downer" drugs (e.g., marijuana, hash, tranquillisers), "upper" drugs (e.g., speed, cocaine, ecstasy, MDMA, PCP), and hallucinatory drugs (e.g., acid, LSD, magic mushrooms) in the previous 12 months. Response options were *never, occasionally, about once a month, 1-2 days a week (e.g., on weekends), 3 or more days a week but not every day,* and *every day*. Responses were recoded to indicate a positive or negative endorsement of drug use in the previous 12 months.

Antisocial behaviour. Three questions from the Adolescent Health and Wellbeing Survey conducted by the Centre for Adolescent Health [261, 262] were employed to evaluate antisocial behaviour. Participants were required to indicate whether they had ever been suspended from school, stolen something worth more than $5 or $10 (including money), or attacked someone with the idea of seriously hurting them. Participants scored between 0 and 3 according to the number of these behaviours they had ever engaged in.

7.1.2.6 Possible protective factors

Demographic factors: Several demographic factors were employed as possible protective factors, including female gender, younger age, and Australian born status.

Negative gambling expectancies (Overinvolvement, Emotional Impact). The Gambling Expectancy Questionnaire (GEQ) [186] was employed to assess the perceived risks of gambling. It includes two negative expectancies subscales: the 5-item Overinvolvement subscale (the risks of cognitive, affective, and social preoccupation with gambling) and the 3-item Emotional Impact subscale (negative emotions such as guilt, shame, loss of control as a result of gambling). Respondents answer how likely they believe the outcome will happen to them if they gamble on a 7 point scale from (1) *no chance* to (7) *certain to happen,* with a neutral middle point

(4) *neither likely nor unlikely*. In the scale validation with secondary school students, each of these subscales displayed good to high internal consistencies: Overinvolvement (α = .91) and Emotional Impact (α = .85) [186]. Non-gamblers have endorsed the Emotional Impact subscale more highly than social gamblers, at-risk gamblers, and problem gamblers [187]. Problem gamblers have endorsed the Overinvolvement subscale more highly than social gamblers and at-risk gamblers but did not differ significantly on their endorsement of this subscale from non-gamblers [187]. Gillespie et al. [187] explain that the negative outcome expectancies of problem gamblers may have developed as a result of personal experience, while the similar negative outcome expectancies of non-gamblers may be a deterrent to experimentation. A description of the psychometric properties of the negative gambling expectancy subscales in Study 3 is displayed in Table G.1 (Appendix G).

7.1.3 Procedure

Ethics approval was obtained from the University of Melbourne Human Research Ethics Committee (No. 0931741), Chisholm Institute of TAFE (October 28, 2009), and Holmesglen TAFE (October 14, 2009). Approval was obtained from the Faculty of Medicine, Nursing and Health Sciences of Monash University and the Centre for Adult Education to display posters in high student traffic areas of their campuses, and by the SYN youth radio station to display a poster in a high staff traffic area.

This study administered a quantitative survey to young adults (aged 18 to 25 years) predominantly sampled from tertiary institutions in metropolitan areas of Melbourne. The education institutions were selected because they collectively had campuses in different geographic locations in Melbourne and students of diverse socio-demographic backgrounds. All institutions with whom contact was established agreed to participate. A summary of the participating institutions is displayed in Appendix F. The participating institutions included two TAFEs, two universities, one adult education institution, and a youth community radio station. The campuses were located in the northern, eastern and south-eastern regions of Melbourne and in the Melbourne CBD.

Data was collected over a period of four weeks from mid October to early November 2009. Several recruitment strategies were employed, including (a) the display of posters on campuses and distribution of flyers to students advertising the online version of the survey; (b) the distribution of hard copy versions of the surveys to students on campuses; (c) the publication of a brief article in an edition of the University of Melbourne *StaffNews* electronic newsletter, which is emailed to all University staff on a weekly basis; (d) the display of a poster on the staff noticeboard of the Student Youth Network (SYN) community radio station; and (e) snowball sampling, whereby students informed friends, family, or co-workers about the survey. The anonymity of participation precludes an estimation of the proportion of participants who were recruited using each strategy.

The participating organisations were initially contacted by telephone. Where required, a formal application to administer the survey was submitted to the appropriate institution. The researchers negotiated with each institution individually regarding their preferred administration of the questionnaire. All institutions permitted

the display of the poster, on which there was a brief explanation of the topic, rationale of the project, and conditions of participation. Tags with the URL of the webpage where the survey could be found could be torn off the poster. Several institutions also permitted the distribution of a flyer to their students. Flyers, which presented the same information as the posters, were distributed by the research team to students in high traffic areas such as cafeterias and campus gates between the hours of 11am and 4pm. The flyers were distributed at each campus on no more than two occasions. Approximately 800 flyers were distributed.

The flyers and posters instructed participants to the home webpage of the University of Melbourne Problem Gambling Research and Treatment Centre (www.edfac.unimelb.edu.au/problemgambling). On the webpage was a brief description of the project, conditions of participation, and an explanation of confidentiality, anonymity, voluntary participation, and compensation for participation. Participants were informed that their participation was voluntary, that their responses were anonymous and confidential, and that they were free to withdraw during the data collection procedure. There were also instructions to click on a link for a copy of the plain language statement and to enter the online survey. The online survey was constructed using the University of Melbourne's recommended survey tool (http://www.surveymonkey.com). It is estimated that the average amount of time required to complete the questionnaire was approximately 15-20 minutes.

Two TAFE institutions gave permission for the distribution of a hard copy version of the survey to students. This survey was identical in content to the online version. Students from these institutions were given the option of completing the online or hard copy version. The hard copy questionnaires were also distributed by the research team in high traffic areas such as cafeterias and campus gates between the hours of 11am and 4pm. Students completed and returned the hard copy survey to the researcher on the same day of administration. Approximately one-quarter (n = 217, 26.4%) of participants included in the final sample completed a hard copy survey.

A movie ticket was given to all participants in compensation for their time. Students who completed the hard copy survey received a movie ticket when they returned the questionnaire to the researcher. Participants who completed the survey online provided their email address or a contact telephone number at the end of the questionnaire. Participants were then contacted and requested to provide their postal address and whether they required a student or adult movie ticket. This information was stored separately from their responses and movie tickets were mailed to participants.

7.1.4 Data analyses

Of the 904 participants who commenced the survey, 40 cases were removed because they withdrew their participation before completing any questions other than demographic questions. A further 41 cases were removed due to a systematic inconsistent response on the 12-month gambling participation questions. The resulting sample of 823 cases was retained for analysis of gambling participation and problem gambling behaviour. However, the analyses relating to the familial transmission of gambling problems were based on the sample of 531 participants who reported that they had gambled in the previous 12 months.

Detailed information relating to the psychometric properties of each variable, data preparation, and assumption testing for Study 3 is displayed in Appendix G.

7.1.4.1 Magnitude of risk

The relationships between familial (any family member, paternal, maternal, sibling) and young adult gambling problems were examined using a series of (1) cross-tabulations of familial problem gambling and young adult problem gambling risk categories, and (2) a series of Pearson's bivariate correlations.

7.1.4.2 Specificity of risk

A series of Pearson's bivariate correlations and hierarchical multiple regression analyses were employed to evaluate the degree to which each measure of familial gambling problems (any family member, paternal, maternal, sibling) predicted young adult gambling problems, after controlling for other factors. The dependent variable was PGSI scores and variables were entered into each multiple regression analysis in two steps. The control factors, which were simultaneously entered in the first step, served as covariates to eliminate potential "third variable" explanations for the results. Each measure of familial problem gambling, which served as the independent variable, was entered in the second step of each regression analysis.

7.1.4.3 Risk factors

The formal testing of mediation in this study requires three conditions to be met: 1) family member gambling problems must be significantly related to young adult gambling problems (*path c*); 2) family member gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to young adult gambling problems (*path b*) [66, 69, 70]. A series of Pearson's bivariate correlations were employed to test each of the three requisite conditions. Those possible risk factors that satisfied the three requisite conditions were formally tested as mediating risk factors using a series of hierarchical regression analyses. The dependent variable was PGSI scores and factors were entered into each multiple regression analysis in two steps. In these analyses, the measure of familial problem gambling (any family member, paternal, maternal, sibling), which served as the independent variable, was entered in the first step. The potential risk factor, which served as a possible mediator, was entered in the second step. A factor was considered to be a mediating risk factor when its addition in the second step significantly increased the proportion of variance accounted for in young adult gambling problems and reduced the strength of the association between family member and young adult gambling problems. The Sobel test, which uses the unstandardised regression coefficients and the standard errors of the unstandardised regression coefficients for *paths a* and *b*, was employed to determine the significance of the reduction in association.

7.1.4.4 Protective factors

The formal testing of moderation in this study requires a significant interaction between familial problem gambling and the proposed protective factor to predict young adult problem gambling [66, 69, 70, 72, 73]. A series of hierarchical multiple regression analyses were employed to evaluate whether the potential protective factors moderated the relationships between familial and young adult gambling problems. As commonly recommended, each continuous variable was centred using the mean-deviation method, whereby a new score is produced by subtracting the variable mean from each individual score before fitting each regression model [238]. A series of new variables (interactions) were then created by computing the product of each measure of familial gambling problems and each potential protective factor. The dependent variable was PGSI scores and variables were entered into each multiple regression analysis in two steps. In these analyses, the measure of familial problem gambling and the potential protective factor were simultaneously entered in the first step. The newly created interaction term between the measure of familial problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a moderator if the interaction in the second step was statistically significant. The split file procedure was employed to visually analyse scatterplots and conduct separate regression analyses to determine whether categorical moderator variables were protective. Each regression equation was examined using the ITALASSI interaction viewer (version 1.2) (http://www.provalisresearch.com/ITALASSI/ITALdownload.html) to determine whether continuous moderator variables were protective. This program graphs the effect of different levels of each moderator on the relationship between familial and young adult gambling problems.

7.2 Results

7.2.1 Young adult gambling and problem gambling behaviour

Approximately two-thirds of participants (64.8%) indicated that they had gambled or bet in the previous 12 months. Table 7.3 displays the frequency of gambling reported by participants on a range of gambling activities in the previous 12 months. An examination of this table reveals that the most frequent gambling activities were:

- gambling on horse or dog racing at the TAB
- playing cards at a house (e.g., poker, blackjack)
- betting on professional sports (i.e., sports pools with friends/family [not the races])
- betting on their own games of sports, pool, bowling, other games of skill with family or friends
- gambling or betting on the internet
- poker machines (pokies) at hotels/clubs
- gambling on table or card games at a casino

Table 7.3
Current (12-month) gambling activity participation for Study 3 participants

	n	Never	1-2 times a year	Every few months or once a month	2-3 times a month	Once a week or more often
Scratch cards (scratchies)	793	526 (66.3%)	194 (24.5%)	60 (7.6%)	6 (0.8%)	7 (0.9%)
Bet on professional sports (i.e., sports pools with friends/family (not the races)	786	581 (73.9%)	120 (15.3%)	45 (5.7%)	16 (2.0%)	24 (3.1%)
Buy sports lottery tickets	794	696 (87.7%)	62 (7.8%)	20 (2.5%)	9 (1.1%)	7 (0.9%)
Bet on your own games of sports, pool, bowling, other games of skill with family or friends	789	600 (76.0%)	103 (13.1%)	51 (6.5%)	14 (1.8%)	21 (2.7%)
Horse or dog racing at the TAB	794	596 (75.1%)	125 (15.7%)	26 (3.3%)	19 (2.4%)	28 (3.5%)
Horse or dog racing at the racetrack	785	636 (81.0%)	109 (13.9%)	22 (2.8%)	9 (1.1%)	9 (1.1%)
Buy lottery tickets (e.g., Tattslotto, Powerball, Super 66)	802	523 (65.2%)	172 (21.4%)	68 (8.5%)	26 (3.2%)	13 (1.6%)
Bet on video games for money	789	733 (92.9%)	30 (3.8%)	13 (1.6%)	9 (1.1%)	4 (0.5%)
Bingo	783	723 (92.3%)	44 (5.6%)	9 (1.1%)	5 (0.6%)	2 (0.3%)
Poker machines (pokies) at a casino	794	548 (69.0%)	162 (20.4%)	55 (6.9%)	18 (2.3%)	11 (1.4%)
Poker machines (pokies) at hotels/clubs	792	582 (73.5%)	121 (15.3%)	54 (6.8%)	18 (2.3%)	17 (2.1%)
Keno	788	746 (94.7%)	22 (2.8%)	11 (1.4%)	4 (0.5%)	5 (0.6%)
Gamble/bet on the Internet	789	719 (91.1%)	21 (2.7%)	19 (2.4%)	8 (1.0%)	21 (2.7%)
Table or card games at a casino	796	560 (70.4%)	132 (16.6%)	63 (7.9%)	25 (3.1%)	16 (2.0%)
Play cards at a house (e.g., poker, blackjack)	795	505 (63.5%)	148 (18.6%)	90 (11.3%)	26 (3.3%)	26 (3.3%)

Participants indicated that when they gambled or bet, they usually gambled or bet with their friends (82.2%). A substantial proportion of current gamblers also gambled with their parents (17.4%), their brothers or sisters (15.9%), and other relatives (7.1%). A small proportion of current gamblers gambled with their grandparents (2.8%) or with strangers (2.4%). Many current gamblers also reported that they gambled alone (18.6%).

Participants reported that they usually gambled or bet at the casino (50.8%), shops that sell lottery tickets and scratch tickets (e.g., newsagencies, chemists) (28.9%), home (27.2%), the TAB or race track (32.1%), friends' homes (23.5%), a gaming venue (e.g., a pub or sports club with a pokies section (23.5%), and home on the internet (9.8%). Smaller proportions of current gamblers reported that they gambled at bingo halls (2.1%) and on the internet somewhere else (0.8%).

Within this sample, 70.3% of participants were classified as non-problem gamblers (PGSI score of 0), 15.0% were classified as low risk gamblers (PGSI scores of 1 or 2), 11.3% were classified as moderate risk gamblers (PGSI scores between 3 and 7), and 3.4% were classified as problem gamblers (PGSI scores of 8 or higher).

7.2.2 Familial transmission of problem gambling behaviour

Overall, 8.8% of participants who had gambled in the previous 12 months reported that any family member (including fathers, mothers, or siblings) had a gambling problem.

7.2.2.1 Magnitude of risk for the familial transmission of problem gambling behaviour

Table 7.4 displays the cross-tabulation of family member problem gambling and young adult problem gambling risk categories. The data in this table reveal that young adults with a family history of problem gambling (parents or siblings) are only 1.3 times more likely to report moderate risk gambling but 2.3 times more likely to display problem gambling than their peers, χ^2 (3) = 7.16, p = .07.

Table 7.4
Cross-tabulation of family member problem gambling and young adult problem gambling risk categories

PGSI risk category	No family member problem gambling	Family member problem gambling
No problem	265 (55.4%)	17 (37.0%)
Low risk	108 (22.6%)	14 (30.4%)
Moderate risk	82 (17.2%)	10 (21.7%)
Problem	23 (4.8%)	5 (10.9%)

Table 7.5 displays the Pearson's bivariate correlations between family member problem gambling, young adult problem gambling, and control variables. An examination of this table reveals that there is a weak but significant positive correlation between family member gambling problems and young adult gambling

problems and that family member gambling problems account for 1.9% of the variance in young adult gambling problems.

Table 7.5
Pearson's bivariate correlations between family member problem gambling, young adult problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8
1. Family member PG	__							
2. PGSI scores	.14**	__						
3. Gender	-.12**	.21**	__					
4. Age	.01	.02	-.05	__				
5. Australian born status	-.05	-.05	.08	-.15**	__			
6. ATSI status	-.04	.01	.06	.03	-.03	__		
7. Employment status	-.01	.04	.04	.02	-.03	-.01	__	
8. Relationship status	-.01	-.06	-.04	.07	.12**	-.02	-.02	__
9. Living alone	.06	-.01	-.06	.09*	-.10*	-.03	-.02	-.05

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Of those participants reporting a family history of problem gambling, most reported problem gambling in only one family member (89.4%) but a small proportion reported gambling problems in two (10.6%) family members. There was no difference in PGSI scores for participants reporting one (M = 2.4, SD = 3.2) or two (M = 3.3, SD = 6.3) family members with gambling problems, Levene's F = 0.42, p = .52, t (44) = 0.33, p = .75.

7.2.2.2 Specificity of risk for the familial transmission of problem gambling behaviour

Table H.1 (Appendix H) provides the results from a hierarchical regression analysis examining the prediction of young adult gambling problems by family member gambling problems after controlling for other factors. The control variables explained 5.4% of the variance in young adult gambling problems ($p < .001$). After taking the influence of all of these other predictors in the model into account, family member gambling problems still displayed a statistically significant relationship with young adult gambling problems and explained an additional 2.8% of the variance in young adult gambling problems ($p < .001$).

7.2.2.3 Risk factors for the familial transmission of problem gambling behaviour

The formal testing of mediation for the familial transmission of problem gambling behaviour requires three conditions to be met: 1) family member gambling problems must be significantly related to young adult gambling problems (*path c*); 2) family member gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to young adult gambling problems (*path b*). Table 7.6 displays the Pearson's bivariate correlations between family member problem gambling, young adult problem gambling, and possible risk factors.

Table 7.6
Pearson's correlations between family member problem gambling, young adult problem gambling, and possible risk factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Family member PG	__																			
2. PGSI scores	.14**	__																		
3. Gambling with parents	.07	-.02	__																	
4. Gambling with siblings	-.01	-.10*	.30**	__																
5. Gambling with friends	-.08	-.12**	-.08**	-.01	__															
6. Gambling at home	.09*	.02	.27**	.24**	.09*	__														
7. Gambling at home on internet	.03	.19**	-.05	-.06	-.05	.08	__													
8. Gambling at friends home	-.03	-.03	.11*	.12**	.24**	.34**	.00	__												
9. Age of first gamble	-.03	-.08	-.07	-.07	-.12**	-.19**	.06	-.19**	__											
10. Number of gambling friends	.03	-.05	-.01	.04	-.08**	-.03	-.01	-.05	.12**	__										
11. Enjoyment expectancies	.00	.32**	.03	.05	.15**	.10*	.13**	.17**	-.16**	-.03	__									
12. Self-enhancement expectancies	.10*	.29**	-.02	-.06	.05	.09*	.15**	.08	-.04	-.04	.60**	__								
13. Money expectancies	.13**	.40**	.02	.02	-.03	.15**	.17**	.13**	-.14**	-.12**	.55**	.43**	__							
14. Enhancement motives	.16**	.44**	.00	-.04	.08	.14**	.17**	.09	-.13**	-.08	.55**	.40**	.44**	__						
15. Coping motives	.19**	.48**	-.01	-.08	-.01	.10*	.13**	.00	-.10*	-.09	.31**	.36**	.38**	.69**	__					
16. Social motives	.09*	.30**	.11*	.02	.24**	.17**	.07	.16**	-.17**	-.10*	.46**	.39**	.32**	.65**	.58**	__				
17. Sensation seeking	-.09	.09*	-.09*	.06	.16**	-.08	.01	.02	-.03	-.12**	.17**	.13**	.12**	.13**	.06	.08	__			
18. Depression	.09*	.25**	.02	-.03	-.10*	.05	-.01	.00	-.06	.03	.09*	.10**	.12**	.17**	.23**	.15**	-.09*	__		
19. Alcohol use	-.12**	.10*	-.02	-.04	.22**	-.06	.02	.01	-.18**	-.04	.08	.00	-.02	.01	-.03	.07	.19**	-.05	__	
20. Drug use	-.03	.17**	-.09*	-.13**	.14**	-.14**	.00	-.05	-.09	-.08	.00	-.01	-.01	.08	.04	.07	.14**	.05	.39**	__
21. Antisocial behaviours	.04	.24**	-.08	-.12**	.03	-.08	-.01	-.04	-.11*	-.16**	.12**	.15**	.12**	.20**	.22**	.15**	.22**	.18	.26**	.37**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Testing Path C: An examination of Table 7.6 reveals that there is a statistically significant relationship between family member gambling problems and young adult gambling problems.

Testing Path A: An examination of Table 7.6 reveals that family member gambling problems are significantly related to several potential mediating risk factors, including gambling at home, self-enhancement expectancies, money expectancies, enhancement motives, coping motives, social motives, depression, and alcohol use. The remaining variables displayed no significant association with family member gambling problems.

Testing Path B: An examination of Table 7.6 also reveals that several potential mediating risk factors are significantly associated with young adult gambling problems, including gambling with siblings, gambling with friends, gambling at home on the internet, enjoyment/arousal expectancies, self-enhancement expectancies, money expectancies, enhancement motives, coping motives, social motives, sensation-seeking, depression, alcohol use, drug use, and antisocial behaviours. The remaining variables displayed no statistically significant relationship with young adult gambling problems.

Taken together, these findings imply that seven of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the familial transmission of gambling problems: self-enhancement expectancies, money expectancies, enhancement motives, coping motives, social motives, depression, and alcohol use. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, family member problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in young adult gambling problems and reduced the strength of the association between family member and young adult gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Self-enhancement expectancies. Table H.2 (Appendix H) provides the results from a hierarchical regression analysis examining whether self-enhancement expectancies mediated the relationship between family member and young adult gambling problems. In step 1, family member gambling problems significantly predicted young adult gambling problems (p = .002). The addition of self-enhancement expectancies in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems (p < .001) and reduced the strength of the association between family member and young adult gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 2.16, p = .03. Expectancies about the gambling benefits of feeling in control, feeling powerful, and feeling more accepted by peers therefore served to explain, in part, the relationship between family member and young adult gambling problems.

Money expectancies. Table H.3 (Appendix H) provides the results from a hierarchical regression analysis examining whether money expectancies mediated the relationship between family member and young adult gambling problems. In step 1,

family member gambling problems significantly predicted young adult gambling problems (p = .005). The addition of money expectancies in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems (p < .001) and reduced the strength of the association between family member and young adult gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 2.82, p = .005. The expectation of financial gain as a result of gambling therefore served to explain, in part, the relationship between family member and young adult gambling problems.

Enhancement motives. Table H.4 (Appendix H) provides the results from a hierarchical regression analysis examining whether enhancement motives mediated the relationship between family member and young adult gambling problems. In step 1, family member gambling problems significantly predicted young adult gambling problems (p = .002). The addition of enhancement motives in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems (p < .001) and decreased the strength of the association between family member and young adult gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 3.45, p < .001. Gambling for internal positive reinforcement (i.e., to increase positive emotions) therefore served to explain, in part, the relationship between family member and young adult gambling problems.

Coping motives. Table H.5 (Appendix H) provides the results from a hierarchical regression analysis examining whether coping motives mediated the relationship between family member and young adult gambling problems. In step 1, family member gambling problems significantly predicted young adult gambling problems (p = .003). The addition of coping motives in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems (p < .001) and decreased the strength of the association between family member and young adult gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 4.18, p < .001. Gambling for internal negative reinforcement (i.e., to reduce or avoid negative emotions) therefore served to explain, in part, the relationship between family member and young adult gambling problems.

Social motives. Table H.6 (Appendix H) provides the results from a hierarchical regression analysis examining whether social motives mediated the relationship between family member and young adult gambling problems. In step 1, family member gambling problems significantly predicted young adult gambling problems (p = .002). The addition of social motives in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems (p < .001) and decreased the strength of the association between family member and young adult gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, z = 1.97, p = .049. Gambling for external positive reinforcement (i.e., gambling to increase social affiliation) therefore served to explain, in part, the relationship between family member and young adult gambling problems.

Depression. Table H.7 (Appendix H) provides the results from a hierarchical regression analysis examining whether depression mediated the relationship between family member and young adult gambling problems. In step 1, family member gambling problems significantly predicted young adult gambling problems (p = .002). The addition of depression in step 2 significantly increased the proportion of variance

accounted for in young adult gambling problems ($p < .001$) and decreased the strength of the association between family member and young adult gambling problems. However, the Sobel test indicated that that this reduction in the strength of the association just failed to be significant, $z = 1.86$, $p = .06$.

Alcohol use. Table H.8 (Appendix H) provides the results from a hierarchical regression analysis examining whether alcohol use mediated the relationship between family member and young adult gambling problems. In step 1, family member gambling problems significantly predicted young adult gambling problems ($p = .002$). The addition of alcohol use in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems ($p = .008$) but did not decrease the strength of the association between family member and young adult gambling problems. Adolescent alcohol use therefore did not serve to explain the relationship between family member and young adult gambling problems.

7.2.2.4 Protective factors for the familial transmission of problem gambling behaviour

The formal testing of moderation for the familial transmission of problem gambling behaviour requires a significant interaction between familial problem gambling and the proposed protective variable to predict child problem gambling. A series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between family gambling problems and young adult gambling problems. In these analyses, family member problem gambling and the potential protective factor were entered in the first step. The interaction of family member problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender, younger age, and being born in Australia as protective factors for the familial transmission of problem gambling (Table H.9 in Appendix H). There was no significant interaction between family member gambling problems and age ($p = .66$) or Australian born status ($p = .50$). There was, however, a significant interaction between family member problem gambling and gender ($p < .001$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between family member and young adult problem gambling was stronger for males. Female gender therefore serves as a protective factor for the familial transmission of gambling problems.

Negative gambling expectancies. Hierarchical multiple regression analyses were conducted to examine the role of the negative gambling expectancies of overinvolvement and emotional impact as protective factors for the familial transmission of problem gambling (Table H.10 in Appendix H). There was a significant interaction between family member gambling problems and both negative gambling expectancies: overinvolvement ($p < .001$) and emotional impact ($p < .001$). An examination of each regression equation using the interaction viewer revealed that the relationship between family member and young adult gambling problems was stronger when participants reported lower levels of overinvolvement and emotional

impact gambling expectancies. These findings indicate that expectancies of the gambling risks of cognitive, affective, and social preoccupation with gambling (overinvolvement) and negative emotions such as guilt, shame, loss of control as a result of gambling (emotional impact) serve to buffer the effect of the familial transmission of problem gambling.

7.2.3 Paternal transmission of problem gambling behaviour

Overall, 6.0% of those participants reporting that they had gambled in the previous 12 months reported that their father had a gambling problem.

7.2.3.1 Magnitude of risk for the paternal transmission of problem gambling behaviour

Table 7.7 displays the cross-tabulation of paternal problem gambling and young adult problem gambling risk categories. The data in this table indicate that young adults with problem gambling fathers are 1.1 times less likely to display moderate risk gambling but 1.8 times more likely to display problem gambling than their peers, χ^2 (3) = 2.68, p = .44.

Table 7.7
Cross-tabulation of paternal problem gambling and young adult problem gambling risk categories

PGSI risk category	No paternal problem gambling	Paternal problem gambling
No problem	268 (54.5%)	14 (43.8%)
Low risk	112 (22.8%)	10 (31.3%)
Moderate risk	87 (17.7%)	5 (15.6%)
Problem	25 (5.1%)	3 (9.4%)

Table 7.8 displays the Pearson's bivariate correlations between paternal problem gambling, young adult problem gambling, and control variables. An examination of this table confirms that there is no significant association between paternal gambling problems and young adult gambling problems.

7.2.3.2 Specificity of risk for the paternal transmission of problem gambling behaviour

Table 7.8 reveals that there is no statistically significant relationship between paternal and young adult gambling problems. Therefore no further statistical analyses were conducted.

7.2.3.3 Risk and protective factors for the paternal transmission of problem gambling behaviour

Table 7.8 reveals that there is no statistically significant relationship between paternal and young adult gambling problems. Therefore no further statistical analyses

were conducted to identify risk and protective factors associated with the paternal transmission of gambling problems.

Table 7.8
Pearson's correlations between paternal problem gambling, young adult problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8
1. Paternal problem gambling	__							
2. PGSI scores	.04	__						
3. Gender	-.11**	.21**	__					
4. Age	-.05	.02	-.05	__				
5. Australian born status	-.02	-.05	.08	-.15**	__			
6. ATSI status	-.03	.01	.06	.03	-.03	__		
7. Employment status	-.01	.04	.04	.02	-.03	-.01	__	
8. Relationship status	-.07	-.06	-.04	.07	.12**	-.02	-.02	__
9. Living alone	-.02	-.01	-.06	.09*	-.14**	-.03	-.02	-.05

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

7.2.4 Maternal transmission of problem gambling behaviour

Overall, only 1.1% of participants who had gambled in the previous 12 months reported that their mother had a gambling problem.

7.2.4.1 Magnitude of risk for the maternal transmission of problem gambling behaviour

Table 7.9 displays the cross-tabulation of maternal problem gambling and young adult problem gambling risk categories. The data in the table indicate that young adults with problem gambling mothers are 1.1 times less likely to display moderate risk gambling, and 6.7 times more likely to display problem gambling, χ^2 (3) = 10.72, p = .01.

Table 7.9
Cross-tabulation of maternal problem gambling and young adult problem gambling risk categories

PGSI risk category	No maternal problem gambling	Maternal problem gambling
No problem	281 (54.2%)	1 (16.7%)
Low risk	120 (23.2%)	2 (33.3%)
Moderate risk	91 (17.6%)	1 (16.7%)
Problem	26 (5.0%)	2 (33.3%)

Table 7.10 displays the Pearson's bivariate correlations between maternal problem gambling, young adult problem gambling, and control variables. An examination of this table reveals that there is a weak but significant positive

correlation between maternal gambling problems and young adult gambling problems and that maternal gambling problems account for 7.1% of the variance in young adult gambling problems.

Table 7.10
Pearson's correlations between maternal problem gambling, young adult problem gambling, and control variables

Variable	1	2	3	4	5	6	7	8
1. Maternal PG	__							
2. PGSI scores	.27**	__						
3. Gender	-.01	.21**	__					
4. Age	.13**	.02	-.05	__				
5. Australian born status	.00	-.05	.08	-.15**	__			
6. ATSI status	-.01	.01	.06	.03	-.03	__		
7. Employment status	.00	.04	.04	.02	-.03	-.01	__	
8. Relationship status	.09*	-.06	-.04	.07	.12**	-.02	-.02	__
9. Living alone	-.02	-.01	-.06	.09*	-.10*	-.03	-.02	.05

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

7.2.4.2 Specificity of risk for the maternal transmission of problem gambling behaviour

Table H.11 (Appendix H) provides the results from a hierarchical regression analysis examining the prediction of young adult gambling problems by maternal gambling problems after controlling for other factors. The control variables explained 5.4% of the variance in young adult gambling problems ($p < .001$). After taking the influence of all of these other predictors in the model into account, maternal gambling problems still displayed a statistically significant relationship with young adult gambling problems and explained an additional 7.7% of the variance in young adult gambling problems ($p < .001$).

7.2.4.3 Risk factors for the maternal transmission of problem gambling behaviour

The formal testing of mediation for the maternal transmission of problem gambling behaviour requires three conditions to be met: 1) maternal gambling problems must be significantly related to young adult gambling problems (*path c*); 2) maternal gambling problems must be significantly related to the potential mediating risk factor (*path a*); and 3) the potential mediating risk factor must be significantly related to young adult gambling problems (*path b*). Table 7.11 displays the Pearson's bivariate correlations between maternal problem gambling, young adult problem gambling, and possible risk factors.

Testing Path C: An examination of Table 7.11 reveals that there is a statistically significant relationship between maternal gambling problems and young adult gambling problems.

Table 7.11
Pearson's correlations between maternal problem gambling, young adult problem gambling, and possible risk factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Maternal problem gambling	__																			
2. PGSI scores	.27**	__																		
3. Gambling with parents	.14**	-.02	__																	
4. Gambling with siblings	-.05	-.10*	.30**	__																
5. Gambling with friends	-.04	-.12**	-.08	-.01	__															
6. Gambling at home	.02	.02	.27**	.24**	.09*	__														
7. Gambling at home on internet	.03	.19**	-.05	-.06	-.05	.08	__													
8. Gambling at friends home	.03	-.03	.11*	.12**	.24**	.34**	.00	__												
9. Age of first gamble	-.11*	-.08	-.07	-.07	-.12**	-.19**	.06	-.19**	__											
10. Number of gambling friends	.02	-.05	-.01	.04	-.08	-.03	-.01	-.05	.12**	__										
11. Enjoyment expectancies	.06	.32**	.03	.05	.15**	.10*	.13**	.17**	-.16**	-.03	__									
12. Self-enhancement expectancies	.02	.29**	-.02	-.06	.05	.09*	.15**	.08	-.05	-.04	.60**	__								
13. Money expectancies	.08	.40**	.02	.02	-.03	.15**	.17**	.13**	-.14**	-.12**	.55**	.43**	__							
14. Enhancement motives	.09*	.44**	.00	-.04	.08	.14**	.17**	.09	-.13**	-.08	.55**	.40**	.44**	__						
15. Coping motives	.08	.48**	-.01	-.08	.01	.10*	.13**	.00	-.10*	-.09	.31**	.36**	.38**	.69**	__					
16. Social motives	.03	.30**	.11*	.02	.24**	.17**	.07	.16**	-.17**	-.10*	.46**	.39**	.32**	.65**	.58**	__				
17. Sensation seeking	-.05	.09*	-.09*	.06	.16**	-.08	.01	.02	-.03	-.12**	.17**	.12**	.12**	.13**	.06	.08	__			
18. Depression	.14**	.25**	.02	-.03	-.10*	.05	-.01	.00	-.06	.03	.09*	.10*	.12**	.17**	.23**	.15**	-.09*	__		
19. Alcohol use	-.02	.10*	-.02	-.04	.22**	-.06	.02	.01	-.18**	-.04	.08	.00	-.02	.01	-.03	.07	.19**	-.05	__	
20. Drug use	.04	.17**	-.09*	-.13**	.14**	-.14**	.00	-.05	-.09	-.08	.00	-.01	-.01	.08	.04	.07	.14**	.05	.39**	__
21. Antisocial behaviours	.06	.24**	-.08	-.12**	.03	-.08	-.01	-.04	-.11*	-.16**	.12**	.15**	.12**	.20**	.22**	.15**	.22**	.18**	.26**	.37**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Testing Path A: An examination of Table 7.11 reveals that maternal gambling problems are significantly related to five potential mediating risk factors: gambling with parents, age of first gamble, enhancement motives, and depression. The remaining variables displayed no significant association with family member gambling problems.

Testing Path B: An examination of Table 7.11 also reveals that several potential mediating risk factors are significantly associated with young adult gambling problems, including gambling with siblings, gambling with friends, gambling at home on the internet, enjoyment/arousal expectancies, self-enhancement expectancies, money expectancies, enhancement motives, coping motives, social motives, sensation-seeking, depression, alcohol use, drug use, and antisocial behaviours. The remaining variables displayed no statistically significant relationship with young adult gambling problems.

Taken together, these findings imply that two of the possible risk factors satisfy the three requisite conditions to be formally tested as mediating risk factors for the maternal transmission of gambling problems: enhancement motives and depression. A series of hierarchical regression analyses were employed to formally test these factors as mediating risk factors. In these analyses, maternal problem gambling was entered in the first step and the potential risk factor was entered in the second step. A factor was considered to be a risk factor when its addition in the second step significantly increased the proportion of variance accounted for in young adult gambling problems and reduced the strength of the association between maternal and young adult gambling problems. The Sobel test was employed to determine the significance of any reduction in association.

Enhancement motives. Table H.12 (Appendix H) provides the results from a hierarchical regression analysis examining whether enhancement motives mediated the relationship between maternal and young adult gambling problems. In step 1, maternal gambling problems significantly predicted young adult gambling problems ($p < .001$). The addition of enhancement motives in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems ($p < .001$) and decreased the strength of the association between maternal and young adult gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.04$, $p = .04$. Gambling for internal positive reinforcement (i.e., to increase positive emotions) therefore served to explain, in part, the relationship between maternal and young adult gambling problems.

Depression. Table H.13 (Appendix H) provides the results from a hierarchical regression analysis examining whether depression mediated the relationship between maternal and young adult gambling problems. In step 1, maternal gambling problems significantly predicted young adult gambling problems ($p < .001$). The addition of depression in step 2 significantly increased the proportion of variance accounted for in young adult gambling problems ($p < .001$) and decreased the strength of the association between maternal and young adult gambling problems. The Sobel test indicated that that this reduction in the strength of the association was significant, $z = 2.78$, $p = .005$. Depression therefore served to explain, in part, the relationship between maternal and young adult gambling problems.

7.2.4.4 Protective factors for the maternal transmission of problem gambling behaviour

The formal testing of moderation for the maternal transmission of problem gambling behaviour requires a significant interaction between maternal problem gambling and the proposed protective factor to predict young adult problem gambling. A series of hierarchical multiple regression analyses were employed to examine the role of the possible protective factors as moderators of the relationship between maternal gambling problems and young adult gambling problems. In these analyses, maternal problem gambling and the potential protective factor were entered in the first step. The interaction of maternal problem gambling and the potential protective factor was entered in the second step. A factor was considered to be a protective factor if the interaction in the second step was statistically significant.

Demographic factors. A series of hierarchical multiple regression analyses were employed to examine the role of female gender, younger age, and being born in Australia as protective factors for the maternal transmission of problem gambling (Table H.14 in Appendix H). There was a significant interaction between maternal gambling problems and all demographic factors: gender ($p < .001$), age ($p < .001$), and Australian born status ($p = .004$). Using the split file procedure, separate regression analyses and visual analysis of scatterplots revealed that the relationship between maternal and young adult problem gambling was stronger for males and those who were not born in Australia. An examination of the regression equation using the interaction viewer revealed that the relationship between maternal and young adult gambling problems was stronger for younger participants and non-Australian born participants. Female gender, older age, and Australian born status therefore serve as protective factors for the maternal transmission of gambling problems.

Negative gambling expectancies. Hierarchical multiple regression analyses were conducted to examine the role of the negative gambling expectancies of overinvolvement and emotional impact as protective factors for the maternal transmission of problem gambling (Table H.15 in Appendix H). Examination of this table reveals that there was a significant interaction between maternal gambling problems and both negative gambling expectancies: overinvolvement ($p < .001$) and emotional impact ($p < .001$). An examination of each regression equation using the interaction viewer revealed that the relationship between maternal and young adult gambling problems was stronger for participants who reported lower levels of overinvolvement and emotional impact gambling expectancies. These findings indicate that expectations of the gambling risks of cognitive, affective, and social preoccupation with gambling (overinvolvement) and negative emotions such as guilt, shame, loss of control as a result of gambling (emotional impact) serve to buffer the effect of the maternal transmission of problem gambling.

7.2.5 Sibling transmission of problem gambling behaviour

Only 2.6% of participants who had gambled in the previous 12 months reported that their sibling(s) had a gambling problem.

7.2.5.1 Magnitude of risk for the sibling transmission of problem gambling behaviour

Table 7.12 displays the cross-tabulation of sibling problem gambling and young adult problem gambling risk categories. The data in this table indicate that young adults with problem gambling siblings are 1.8 times more likely to display moderate risk gambling, and 1.5 times more likely to display problem gambling than their peers, χ^2 (3) = 5.12, p = .16.

Table 7.12
Cross-tabulation of sibling problem gambling and young adult problem gambling risk categories

PGSI risk category	No sibling problem gambling	Sibling problem gambling
No problem	279 (54.6%)	3 (23.1%)
Low risk	117 (22.9%)	5 (38.5%)
Moderate risk	88 (17.2%)	4 (30.8%)
Problem	27 (5.3%)	1 (7.7%)

Table 7.13 displays the Pearson's bivariate correlations between sibling problem gambling, young adult problem gambling, and control variables. An examination of this table revealed that there was no significant correlation between sibling gambling problems and young adult gambling problems.

Table 7.13
Pearson's correlations between sibling problem gambling, young adult problem gambling, and control variables

	1	2	3	4	5	6	7	8
1. Sibling problem gambling	__							
2. PGSI scores	.03	__						
3. Gender	-.09*	.21**	__					
4. Age	.00	.02	-.05	__				
5. Australian born status	-.06	-.05	.09	-.15**	__			
6. ATSI status	-.02	.01	.06	.03	-.03	__		
7. Employment status	.00	.04	.04	.02	-.03	-.01	__	
8. Relationship status	.03	-.06	-.04	.07	.12**	-.02	-.02	__
9. Living alone	.14**	-.01	-.06	.09*	-.10**	-.03	-.02	-.05

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

7.2.5.2 Specificity of risk for the sibling transmission of problem gambling behaviour

Table 7.13 reveals that there is no significant correlation between sibling and young adult gambling problems. Therefore no further statistical analyses were conducted.

7.2.5.3 Risk and protective factors for the sibling transmission of problem gambling behaviour

Table 7.13 reveals that there is no significant correlation between sibling and young adult gambling problems. Therefore no further statistical analyses were conducted to identify risk and protective factors associated with the sibling transmission of gambling problems.

7.3 Summary of Findings

- Approximately two-thirds of participants (64.8%) indicated that they had gambled or bet in the previous 12 months.

- Gambling participants reported they usually gambled or bet with their friends (82.2%), but a substantial proportion had also gambled with their parents (17.4%), brothers or sisters (15.9%), and other relatives (7.1%).

- A substantial proportion of gambling participants gambled at home (27.2%), at friends' homes (23.5%), and at home on the internet (9.8%).

- Within this sample, 70.3% of participants were classified as non-problem gamblers, 15.0% were classified as low risk gamblers, 11.3% were classified as moderate risk gamblers, and 3.4% were classified as problem gamblers on the PGSI.

- Overall, 8.8% of participants who had gambled in the previous 12 months reported that any family member (parents or siblings) had a gambling problem, 6.0% reported that their father had a gambling problem, 1.1% reported that their mother had a gambling problem, and 2.6% reported that their sibling(s) had a gambling problem.

- There was no association between family density of problem gambling and participant problem gambling outcomes.

- There was a weak but statistically significant relationship between family member (parents or siblings) and young adult problem gambling that remained significant after controlling for other factors. Young adults with a family history of problem gambling (parents or siblings) were only 1.3 times more likely to report moderate risk gambling but 2.3 times more likely to display problem gambling than their peers.

- There was no statistically significant relationship between paternal and young adult gambling problems. Young adults with problem gambling fathers were 1.1 times less likely to display moderate risk gambling and 1.8 times more likely to display problem gambling than their peers.

- There was a weak but statistically significant relationship between maternal and young adult problem gambling that remained statistically significant after

controlling for other factors. Young adults with problem gambling mothers were 1.1 times more likely to display moderate risk gambling but 6.7 times more likely to display problem gambling than their peers.

- There was no statistically significant relationship between sibling and young adult gambling problems. Young adults with problem gambling siblings were 1.8 times more likely to display moderate risk gambling and 1.5 times more likely to display problem gambling than their peers.

- A summary of the risk and protective factors identified in Study 3 are displayed in Table 7.14. In this table, we prioritised the risk and protective factors according to which most contributed to, and buffered, the familial transmission of gambling problems.

Table 7.14
Summary of the risk and protective factors identified in Study 3

Family member transmission	Risk factors	Protective factors
Any family member	1. Coping motives 2. Enhancement motives 3. Money expectancies 4. Self-enhancement expectancies 5. Social motives 6. Depression [a]	1. Emotional impact expectancies 2. Female gender 3. Overinvolvement expectancies
Maternal	1. Depression 2. Enhancement motives	1. Female gender 2. Older age 3. Emotional impact expectancies 4. Overinvolvement expectancies 5. Australian born status

[a] Risk factor but reduction in strength of association not significant

CHAPTER 8
STUDY 4: SURVEY OF TREATMENT SEEKING PROBLEM GAMBLERS

The data from the large scale national community telephone survey of adults (Study 1), the survey of adolescents aged 12 to 18 years sampled from secondary schools (Study 2), and the survey of young adults (Study 3) were supplemented with results from a survey of individuals seeking problem gambling counselling retrospectively reporting on the gambling behaviour of their family members during their childhoods and prospectively reporting on the gambling behaviour of their children (Study 4).

8.1 Method

8.1.1 Participants

Participants were 98 English-speaking adults (aged 18 years or older) who had independently sought treatment for their own gambling problems at specialist gambling treatment services in Victoria, Tasmania, and South Australia. Each of these services are government-funded treatment agencies that provide counselling and support to people with gambling problems and their significant others.

Participants (56 males, 42 females) ranged in age from 23 to 75 years, with an average age of 48.3 years (*SD* = 12.3 years, median = 47.5 years). Gross family yearly income ranged from AUD$350 to $400,000 with an average of AUD$61,790 (*SD* = $59, 618, median = AUD$44,000). The majority were born in Australia (62.2%), with the remainder being born in Europe (17.3%), Asia (6.1%), Africa (3.1%), Oceania (2.0%), and North America (1%). Just over a quarter (27.6%) reported that they had biological or step-children under the age of 18 years currently living with them on a full-time or part-time basis. Other demographic information for the sample is displayed in Table 1.

Nearly all participants (94.8%) reported scores in the problem gambling category of the Problem Gambling Severity Index; the remainder of participants reported scores classified in the moderate risk category [213]. Examination of Table 1 reveals that more than three-quarters of participants reported problems related to EGMs. Most of the sample (77.6%) reported experiencing problems with a single form of gambling, with only 19.4% reporting problems with two or more forms of gambling activity. Problem duration ranged from 0.2 to 30 years (*M* = 8.6 years, *SD* = 6.8, *median* = 8.0). On average, participants reported that they had gambled 4.5 times per week prior to counselling (*SD* = 2.8, *median* = 4.0) and that they spent AUD$854 per week on gambling prior to counselling (*SD* = $1384.78, *median* = AUD$450).

Table 8.1
Demographic characteristics of Study 4 participants

	Total sample [a] **(*n* = 98)**	**Males (*n* = 56)**	**Females (*n* = 42)**
Employment status			
Full-time	41 (41.8%)	32 (57.1%)	9 (21.4%)
Part-time/casual	14 (14.3%)	4 (7.1%)	10 (23.8%)
Sick/disability pension	17 (17.3%)	8 (14.3%)	9 (21.4%)
Retired	10 (10.2%)	3 (5.4%)	7 (16.7%)
Unemployed	8 (8.2%)	6 (10.7%)	2 (4.8%)
Full time home duties	5 (5.1%)	2 (3.6%)	3 (7.1%)
Other	2 (2.0%)	0 (0.0%)	2 (4.8%)
Full-time Student	1.0 (1.0%)	1 (1.8%)	0 (0.0%)
Relationship status			
Divorced	30 (30.6%)	43 (76.8%)	17 (40.5%)
Currently married	31 (31.6%)	21 (37.5%)	10 (23.8%)
Never married	23 (23.5%)	16 (28.6%)	7 (16.7%)
Other live-in (defacto)	11 (11.2%)	5 (8.9%)	6 (14.3%)
Separated not divorced	12 (12.2%)	6 (10.7%)	6 (14.3%)
Widowed	5 (5.1%)	2 (3.6%)	3 (7.1%)
Household arrangement			
Single person	38 (38.8%)	23 (41.1%)	15 (35.7%)
Two-parent, dependent children	21 (21.4%)	18 (32.1%)	3 (7.1%)
Other	23 (23.5%)	10 (17.9%)	13 (31.0%)
Couple, no children	6 (6.1%)	2 (3.6%)	4 (9.5%)
Two-parent, no children at home	7 (7.1%)	2 (3.6%)	5 (11.9%)
Single parent, dependent children	3 (3.1%)	1 (1.8%)	2 (4.8%)
Type of gambling problem			
Electronic Gaming Machines	76 (77.6%)	36 (64.3%)	40 (95.2%)
Horse/Dog Betting	26 (26.5%)	23 (41.1%)	3 (7.1%)
Casino/Table Games	13 (13.3%)	13 (23.2%)	0 (0.0%)
Sports	10 (10.2%)	8 (14.3%)	2 (4.8%)
Other	6 (6.1%)	5 (8.9%)	1 (2.4%)

a Variation in sample size is due to missing data

8.1.2 Measures

Participants completed self-report measures designed to evaluate the familial transmission of problem gambling using both a retrospective methodology and prospective methodology.

Participants also completed the nine-item Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI) [(235)]. Respondents indicated how often each item applied to them in the last 12 months on a four-point scale: (0) *never,* (1) *sometimes,* (2) *most of the time, and* (3) *almost always*. Scores range from 0 to 27 and higher scores indicate higher problem severity. Scores on the PGSI can be used to classify individuals as non-problem gamblers (score of 0), low risk gamblers (scores of 1 or 2), moderate risk gamblers (scores between 3 and 7), or problem

gamblers (scores of 8 or higher). The PGSI has been adopted as the preferred measurement tool for population-level research in Australia [1]. The PGSI has displayed good internal consistency, test-retest reliability, criterion validity with measures of gambling involvement, unitary dimensional structure, item variability, and concurrent validity with measures of problem gambling [1, 12, 235, 236]. It has been validated in many jurisdictions, including Canada, Europe, and Australia. Several studies suggest that the PGSI outperforms other measures of problem gambling severity in population-level research in terms of overall rationale, internal consistency, item difficulty, construct validity, classification validity, and factor structure [12, 235-237]. The PGSI has displayed very good sensitivity (the rate of positive test results among those with the disorder) and specificity (the rate of negative test results among those without the disorder) [235]. The PGSI tends to be slightly more conservative in estimating prevalence of problem gambling than the South Oaks Gambling Screen, but higher than the DSM-IV [1, 235].

8.1.2.1 Retrospective methodology

The retrospective methodology required participants to respond from the perspective of an adult child. The participants were instructed to answer the measures in relation to when they were "growing up" (defined as when they were younger than 18 years of age and living at home). Participants completed self-report measures evaluating family history of problem gambling (paternal, maternal, and sibling), possible risk factors, and possible protective factors. Refer to Table 8.2 for a summary of variables examined in the retrospective methodology of Study 4.

Table 8.2
Summary of variables examined in Study 4 (Retrospective)

Family history of problem gambling	Possible risk factors	Possible protective factors
• Any family member problem gambling • Paternal problem gambling • Maternal problem gambling • Sibling problem gambling	• Family of origin conflict • Parenting style (*Paternal/maternal authoritarian, Paternal/maternal permissive*) • Family of origin stressors (parental psychological problems, parental unemployment, parental separation, parental divorce, extreme family financial problems)	• Female gender • Family of origin functioning • Parenting style (*Paternal/maternal authoritative*)

Family history of problem gambling

The perceived presence of paternal, maternal, and sibling problem gambling when participants were growing up was assessed using a series of single screening items based on the national definition of problem gambling [1]. These items were *Did you ever think that the [male parent/female parent/one of the siblings] living with you when you were growing up had a gambling problem?* These questions were prefaced with the following instruction: *The following questions ask about gambling problems in the family members (biological, step or foster) living with you when you were growing up. This means gambling that is characterised by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others or for the community.* Response options for each item were: *I did not have [a male parent/a female parent/any siblings] living at home when I was growing up*; *No, I don't think that my [male parent/female parent/siblings] had a gambling problem*; and *Yes, I think that my [male parent/female parent/ siblings] had a gambling problem*. In this study, responses were recoded into: (1) a negative endorsement of problem gambling (*I did not have [a male parent/a female parent/any siblings] living at home when I was growing up*; *No, I don't think that my [male parent/female parent/siblings] had a gambling problem*) and (2) a positive endorsement of family member problem gambling (*Yes, I think that my [male parent/female parent/ siblings] had a gambling problem*). Participants who positively endorsed the screening item for a given family member were required to indicate: (a) whether they were referring to their biological or step-/foster family member; (b) whether they lived with the family member full-time or part-time; and (c) the type of gambling with which their family member seemed to have problems; (d) how old they were when their family member started having problems; and (e) how long their family member seemed to have problems.

Possible risk factors

Family of origin conflict. Conflict in the family of origin was measured using the Conflict subscale of the Family Environment Scale (FES) [263] modified for a retrospective evaluation of family surroundings when participants were growing up. The FES is one of the most widely employed measures of perceptions of familial social environment. The 9-item Conflict subscale evaluates the amount of openly expressed anger and conflict among family members using a dichotomous response format: (0) *False* and (1) *True*. Item examples include: *We fought a lot in our family* and *In our family, we believed you didn't ever get anywhere by raising your voice*. With reverse scoring, total scores range from 0 to 9, with higher scores indicative of a greater level of conflict within the family. The Conflict subscale has displayed good internal consistency ($\alpha = .75$). The items have good content and face validity and an extensive body of research supports the construct, concurrent and predictive validity of the FES [263, 264]. A description of the psychometric properties of the Conflict subscale in Study 4 is displayed in Table J.1 (Appendix J).

Parenting style (Authoritarian, Permissive). Authoritarian and permissive parenting styles for each parent were measured using a modified version of the Authoritarian and Permissive subscales of the Parental Authority Questionnaire (PAQ) [246]. The Authoritarian parenting style is high in control and maturity demands and low in responsiveness and communication, while the Permissive parenting style is

low in control and maturity demands and high in communication and responsiveness. The PAQ was designed to assess parenting style based on retrospective adolescent and adult ratings. There are two forms of this questionnaire: one to evaluate maternal parenting style and one to evaluate paternal parenting style. Responses are made on a 5-point scale ranging from (1) *strongly disagree* to (5) *strongly agree*. Higher scale scores indicate greater appraisal of the level of the parental style prototype measured. The items were derived from a theoretical underpinning and were subjected to multidisciplinary expert review. The original Authoritarian subscale displayed good internal consistency (α = .87 for paternal and .85 for maternal) and test-retest reliability (*r* = .85 for paternal and .86 for maternal) [246, 265]. The original Permissive subscale also displayed good internal consistency (α = .74 for paternal and .75 for maternal) and test-retest reliability (*r* = .77 for paternal and .81 for maternal) [246, 265]. Furthermore, PAQ scores are not vulnerable to social desirability response bias. In the current study, five items from each of the original 10-item subscales were selected based on their factor loadings from a validation study by Reitman, Rhode, Hupp, and Altobello [266]. Those items with the highest factor loadings were retained to provide a brief but psychometrically sound measure of each parenting style. A description of the psychometric properties of the Authoritarian and Permissive subscales in Study 4 is displayed in Table J.1 (Appendix J).

Family of origin stressors. A series of single items was employed to evaluate a range of stressors associated with parents (biological, step- or foster) living with participants when they were growing up (parental psychological problem, parental unemployment and looking for work for a long time, parental separation, parental divorce, extreme family financial problems). The response options for each item, which were *No*; *Yes*; and *Unsure* were recoded to a dichotomous *No* and *Yes* response.

Possible protective factors

Client female gender. Client female gender was employed as a possible protective factor in the retrospective methodology of Study 4.

Family of origin functioning. A version of the General Functioning subscale of the McMaster Family Assessment Device (FAD) [267] modified to retrospectively evaluate family of origin family functioning was employed. This subscale consisted of 12 statements measuring a family's overall functioning that were reworded to reflect the past. Responses involve rating each item on a 4-point scale from (1) s*trongly agree* to (4) s*trongly disagree*. Example items include *Individuals were accepted for what they were* and *We avoided discussing our fears and concerns*. Total scores range from 0 to 48, with lower scores indicating healthier levels of general family functioning. The FAD has been shown to discriminate between healthy and poorly functioning families and the internal consistency of the General Functioning subscale is good (α = .92) [267]. A confirmatory factor analysis applied to the subscales provided strong support for the hypothesised structure of the instrument and use of the General Functioning subscale as a means of measuring overall family functioning [268]. A description of the psychometric properties of the FAD in Study 4 is displayed in Table J.1 (Appendix J).

Parenting style (Authoritative). Authoritative parenting styles for each parent were measured using a modified version of the Authoritative subscale of the Parental Authority Questionnaire (PAQ) [246]. The Authoritative subscale evaluates parenting styles that are high in control, responsiveness, communication and maturity demands. The PAQ was designed to assess parenting style based on retrospective adolescent and adult ratings. There are two forms of this questionnaire: one to evaluate maternal parenting style and one to evaluate paternal parenting style. Responses are made on a 5-point scale ranging from (1) *strongly disagree* to (5) *strongly agree*. Higher scale scores indicate greater appraisal of the level of the parental style prototype measured. The items were derived from a theoretical underpinning and were subjected to multidisciplinary expert review. The original Authoritative subscale of the PAQ has displayed good internal consistency (α = .85 for paternal and .82 for maternal) and test-retest reliability (r = .92 for paternal and .78 for maternal) [246, 265]. Furthermore, PAQ scores are not vulnerable to social desirability response bias. In the current study, five items from each of the original 10-item Authoritative subscale were selected based on their factor loadings from a validation study by Reitman et al. [266]. Those items with the highest factor loadings were retained to provide a brief but psychometrically sound measure of authoritative parenting. A description of the psychometric properties of the Authoritative subscale in Study 4 is displayed in Table J.1 (Appendix J).

Open-ended questions

Participants were asked four open-ended questions on which qualitative analyses were conducted. Participants were instructed to answer these questions in relation to family members (biological, step or foster) living with them when they were growing up (i.e., when they were younger than 18 years of age and living at home). These questions were:

(a) What was your involvement in gambling when you were growing up?
(b) Please describe the gambling behaviour of your family members when you were growing up?
(c) How did you feel about the gambling behaviour of your family members when you were growing up?
(d) How did you think the gambling behaviour of your family members might have influenced your gambling behaviour when you were growing up?

8.1.2.2 Prospective methodology

The prospective methodology required participants to respond from the perspective of being a parent. Participants were instructed to answer the measures in relation to their biological or step-children under the age of 18 years who currently lived with them on a full-time or part-time basis. Participants completed self-report measures evaluating child problem gambling, psychological distress as a possible risk factor, and family functioning as a possible protective factor.

Child problem gambling

The perceived presence of child problem gambling was assessed using a single screening item based on the national definition of problem gambling [1]. Participants

who indicated that they had biological or step-children under the age of 18 who currently lived with them on a full- or part-time basis were required to answer the screening item. This item was *Did you ever think that any of these children had a gambling problem? This means gambling that is characterised by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others or for the community.* Response options for this item were: *No, I don't think that any of my children have had a gambling problem*; and *Yes, I think that my child/ren has had a gambling problem.* Participants who positively endorsed the screening item were required to indicate: (a) the gender of the child/ren; (b) the type of gambling the child/ren participated in; (c) the age of the child/ren they started experiencing difficulties with gambling; and (d) how long the problem lasted.

Psychological distress

The General Health Questionnaire (GHQ) [269] was employed to evaluate client psychological distress. The GHQ is a self-administered screening measure for the detection of minor psychiatric disorder (i.e., nonpsychotic psychological impairment) in community and nonpsychiatric clinical settings. The 12 items measure feelings of strain, depression, inability to cope, anxiety-based insomnia, and lack of confidence. Each of the 12 items asks whether the respondent has recently experienced a particular symptom or behavior, rated on a 4-point scale from (0) *not at all* to (3) *more than usual* for negative items (e.g., lost much sleep over worry), or from (0) *much more than usual* to (3) *much less than usual* for positive items (e.g., felt capable of making decisions). The GHQ yields only an overall total score. Scores range from 0 to 36, whereby scores greater than 15 are considered as evidence of distress and scores greater than 20 are considered to indicate severe problems and psychological distress. The GHQ-12 has been validated and used in a number of countries and in different languages. These studies have confirmed the high levels of reliability and validity for the GHQ-12. For example, Goldberg and Williams [269] reported median estimates of sensitivity (86%) and specificity (80%) across six validity studies of the GHQ-12. A description of the psychometric properties of the GHQ in Study 4 is displayed in Table J.1 (Appendix J).

Family functioning

The12-item General Functioning subscale of the McMaster Family Assessment Device (FAD) [267] was employed to evaluate current overall family functioning. Responses involve rating each item on a 4-point scale from (1) s*trongly agree* to (4) s*trongly disagree*. Example items include *Individuals are accepted for what they are* and *We avoid discussing our fears and concerns*. Total scores range from 0 to 48, with lower scores indicating healthier levels of general family functioning. The FAD has been shown to discriminate between healthy and poorly functioning families and the internal consistency of the General Functioning subscale is good (α = .92) [267]. A confirmatory factor analysis applied to the subscales provided strong support for the hypothesised structure of the instrument and use of the General Functioning subscale as a means of measuring overall family functioning [268]. A description of the psychometric properties of the FAD in Study 4 is displayed in Table J.1 (Appendix J).

Open-ended questions

Participants who indicated that they had biological or step-children under the age of 18 who currently lived with them on a full- or part-time basis were required to answer two open-ended questions on which qualitative analyses were conducted. These questions were:

(a) How do you think your gambling has influenced these children?
(b) How do you think your own gambling might influence the gambling of your child/ren (now or in the future)?

8.1.3 Procedure

Ethics approval was obtained from Monash University Standing Committee on Ethics in Research Involving Humans (SCERH) (CF07/1346). Ethical approval was also obtained from the Human Research Ethics Committee at the University of Tasmania (H10366) This study administered a quantitative and qualitative survey to adults seeking assistance for their own gambling problems from the government-funded gambling-specific treatment services across metropolitan and rural regions of three Australian states (Victoria, South Australia, and Tasmania). Data was collected over a 27 month period between July 2007 and October 2009.

Service managers from fifteen gambling-specific treatment services were contacted by telephone and informed about the study. These services were twelve Gambler's Help agencies in Victoria, the Statewide Gambling Therapy Service in South Australia, and the two Break Even Problem Gambling Services in Tasmania. Of these services, thirteen agreed to be sent further information detailing the study aims and method and a sample pack of the materials. Consenting managers were then contacted again and all services accepted the invitation to participate in the study. Each participating service was sent the survey materials and members of the research team attended several team meetings to present further details and answer any questions from agency staff.

Surveys were provided to problem gambling counsellors who were asked to distribute them to new English-speaking clients aged over 18 years to complete at their leisure. Posters advertising the study were also sent to services for display in reception areas. For one service, surveys were distributed with a quarterly evaluation survey.

Participants were provided with the survey and an explanatory statement in a reply-paid envelope. In the explanatory statement, participants were informed that their participation was voluntary and that their responses were anonymous and confidential. Participants were also informed that return of the questionnaire implied consent and that their data could not be withdrawn after return because the anonymity of responses precluded the identification of any particular survey. The explanatory materials also explained that declining to participate would not compromise their treatment at the counselling service and provided contact numbers for additional support services. Participants generally returned completed surveys to the research team using the reply paid envelopes. Although an offer was made, no participants contacted the research team for assistance to complete the survey.

Service managers were contacted periodically during the data collection phase in an attempt to maximise return rates. Completed questionnaires were returned from 8 of the 13 original participating services and collated in preparation for data analysis. Reasons for non-participation and non-return included: changes in service management and re-tendering processes, staff and eligible client shortages, clients failing to complete or return surveys after agreeing to participate, lack of questionnaire distribution, and the perceived burden of a research project on limited resources. A summary of the participating agencies is displayed in Appendix I.

8.1.4 Data analyses

Detailed information relating to the psychometric properties of each variable, data preparation, and assumption testing for Study 4 is displayed in Appendix J. In Study 4, it was not appropriate to employ the hierarchical regression analytic strategies evaluating the relationship between familial and child problem gambling that were employed in the first three studies. This is because treatment-seeking samples constitute a highly selected and biased group of the sample required to adequately understand the familial transmission of problem gambling behaviour. In order to demonstrate an association between family member problem gambling and child problem gambling, it is necessary to study individuals across the continuum of gambling behaviours. The study of a clinical treatment-seeking population alone provides very weak evidence of the association as there is no variability in the range of problem gambling severity scores (i.e., all participants are problem gamblers) and because this group does not represent all problem gamblers (i.e., only a small proportion of problem gamblers seek treatment).

There are four possible categories of individuals formed by the presence or absence of problem gambling and the presence and absence of family member problem gambling. These are:

- Those who have both problem gambling and family member problem gambling
- Those who have family member problem gambling but not problem gambling
- Those who have problem gambling but not family member problem gambling
- Those who have neither problem gambling nor family member problem gambling

In order to calculate the association between family member problem gambling and the development of problem gambling and to determine the associated risk and protective factors, representation from all four categories is required. In Study 4, however, we only have limited subgroups of the two problem gambling categories.

For these reasons, we did not test the relationship between family member and child problem gambling in Study 4. Therefore, unlike the other three studies in this report, Study 4 does not provide formal tests of mediation and moderation in order to test for an explanatory or buffering effect for the presence of family member problem gambling. Instead, in this study, we evaluated environmental factors that characterise problem gambling families in an attempt to provide some insight into some of the possible risk and protective factors for the familial transmission of problem gambling behaviour. In the retrospective methodology, participants who did and did not endorse

the screening item for paternal problem gambling were compared on the possible risk and protective factors using a series of independent samples *t*-tests and chi-square analyses. In the prospective methodology, we planned to compare participants who did and did not endorse the screening item for child problem gambling on the possible risk and protective factors using a series of independent samples *t*-tests and chi-square analyses.

More importantly, Study 4 provides some qualitative analyses that explore participant beliefs about the nature of the familial transmission of problem gambling behaviour according to their own personal experiences. Open ended questions allowed the participants to put experiences in their own words and were not confined by set answers. The open-ended questions in the retrospective methodology explored the gambling involvement of participants and their family members as they were growing up and their perceptions of the impact of family member gambling on their own gambling behaviour. The open-ended questions in the prospective methodology explored participant perceptions relating to how their gambling may have influenced the gambling of their own children. The data were coded by two researchers with experience in qualitative research and problem gambling research. Content analysis was then conducted on each question. Content analysis involves examining the responses systematically to determine the trends or categories within the responses. The frequency of responses for each of the determined categories is reported. Participant responses were then analysed according to gender, length of time that gambling had been a problem, whether they were seeking counselling for one or multiple types of gambling, and whether the respondent believed they had grown up with a problem gambling parent or guardian. No follow-up evaluation was conducted to assess why participants did not answer the open-ended questions.

8.2 Results

8.2.1 Retrospective methodology

The retrospective methodology required participants to respond from the perspective of an adult child. The participants were instructed to answer the measures in relation to when they were "growing up" (defined as when they were younger than 18 years of age and living at home).

8.2.1.1 Magnitude of risk for the familial transmission of problem gambling behaviour

Overall, 23.8% of participants reported that any family member (parents, siblings) living with them when they were growing up had a gambling problem. Most of these reported problem gambling in only one family member (85.0%) but a small proportion of these participants reported gambling problems in either two (10.0%) or three (5.0%) family members. Specifically, 16.3% (n = 14) of the sample endorsed the screening item for paternal problem gambling, 6.8% (n = 6) of the sample endorsed the screening item for maternal problem gambling, and 6.9% (n = 6) endorsed the screening item for sibling problem gambling. Overall, 48% of participants reported gambling problems on the same gambling activity or activities as their family members.

Of those who endorsed the screening item for paternal problem gambling (*n* = 14), all reported that they were referring to their biological father and most reported that they lived with their father on a full-time basis (*n* = 12). They indicated that the most common type of gambling their fathers seemed to have problems with were horse/dog race betting (*n* = 6) followed by cards/casino gambling (*n* = 4) and electronic gaming machines (*n* = 2). Nearly half (46%) of participants reported gambling problems on the same gambling activity or activities as their fathers. Participants generally indicated that they were very young when their fathers started having gambling problems: three indicated that they were younger than 12 years of age, two indicated that they were babies, three indicated that their father had "always" had a problem, and an additional two did not remember or did not know. Participants generally indicated that their fathers had experienced long-term difficulties with gambling: five participants provided a specific number of years ranging from 2 to 45 years and six participants indicated that their father had "always" had a gambling problem, often until he died.

"Life – he died in 1989 at a TAB."

Of those who endorsed the screening item for maternal problem gambling (*n* = 6), all reported that they were referring to their biological mother and that they lived with their mother on a full-time basis. They indicated that the most common type of gambling their mothers seemed to have problems with were EGMs (*n* = 3), followed by bingo (*n* = 2), horse/dog race betting (*n* = 1), card gambling (*n* = 1), and scratch tickets (*n* = 1). Two-thirds (67%) of participants reported gambling problems on the same gambling activity or activities as their mothers. Participants generally indicated that they were very young when their mothers started having gambling problems: two indicated that they were younger than 12 years of age, one indicated that they were a baby, and three did not remember or did not know. Participants generally indicated that their mothers had experienced long-term difficulties with gambling: half of the participants provided a specific number of years ranging from 10 to 40 years (*n* = 3) and the other half indicated that their mother had "always" had a gambling problem (*n* = 3).

Of those who endorsed the screening item for sibling problem gambling (*n* = 6), all reported that they were referring to their biological sibling and most (*n* = 5) reported that they lived with their sibling on a full-time basis. They indicated that the most common type of gambling their siblings seemed to have problems with were horse/dog race betting (*n* = 6) followed by card gambling (*n* = 2). Only 17% of participants reported gambling problems on the same gambling activity or activities as their siblings. All participants endorsing the screening item were able to indicate their age when their sibling started having problems (from 9 to 17 years) and almost all indicated that their sibling had "always" had a gambling problem (*n* = 4).

8.2.1.2 Risk and protective factors for the familial transmission of problem gambling behaviour

The sample sizes of those endorsing any family member problem gambling were large enough to allow for a comparison to participants who did not report any family member problem gambling. Participants who did and did not endorse the

screening item for family member problem gambling were therefore compared on the possible risk and protective factors (Table 8.3). Although there were no significant differences between the groups on most of the possible risk and protective factors, problem gamblers raised in problem gambling families were more likely to report parental separation, χ^2 (1) = 5.20, p = .02, and divorce, χ^2 (1) = 5.15, p = .02, than problem gamblers raised in non-problem gambling families. There was also a trend for problem gamblers raised in non-problem gambling families to report higher levels of paternal authoritative parenting than problem gamblers raised in problem gambling families, Levene's F = 0.14, p = .71, t (64) = 1.96, p = .054. These findings suggest that parental separation and divorce may be worthy of further study as risk factors for the familial transmission of problem gambling and that paternal authoritative parenting may be protective of such transmission.

Table 8.3
Comparison of participants with family member problem gambling on possible risk and protective factors

	No family member problem gambling			**Family member problem gambling**		
	n	***M***	***SD***	***n***	***M***	***SD***
Measure	**Possible risk factors**					
Family of origin conflict	64	3.8	3.0	19	5.1	3.1
Paternal authoritarian parenting	52	18.3	4.4	14	17.4	4.4
Maternal authoritarian parenting	51	16.7	4.1	15	16.8	4.9
Paternal permissive parenting	52	12.6	4.1	14	12.6	4.0
Maternal permissive parenting	51	13.2	3.8	15	13.8	4.8
Parental psychological problems	63	42.9%		20	45.0%	
Parental unemployment	63	9.5%		20	15.0%	
Parental separation	63	15.9%		20	40.0%	
Parental divorce	63	9.5%		20	30.0%	
Extreme family financial problems	63	33.3%		20	55.0%	
	Possible protective factors					
Female gender	64	40.6%		20	50.0%	
Family of origin functioning	64	29.6	8.2	19	32.2	8.4
Paternal authoritative parenting	52	14.8	5.0	14	11.8	5.4
Maternal authoritative parenting	50	15.6	4.6	15	14.4	5.8

8.2.1.3 Qualitative analyses

Participants were asked four open-ended questions on which qualitative analyses were conducted. Participants were instructed that these questions asked about gambling in the family members (biological, step or foster) living with them when they were growing up (i.e., when they were younger than 18 years of age and living at home).

What was your involvement in gambling when you were growing up? Please describe the gambling behaviour of your family members when you were growing up.

The first two questions required participants to describe their involvement in gambling and the gambling behaviour of their family members when they were growing up. Of the 98 participants, 54 (55%) completed these open-ended questions. Of the 54 respondents, 44% had no involvement with gambling when growing up.

"We had no gamblers in our family." (*Female, 63, EGMs*)

"My parents occasionally gambled on the races, otherwise none. I didn't gamble as a child." *(Female, 59, EGMs)*

Over one-third (37%) gambled when they were growing up (often with family) and 19% mentioned there was gambling by adults.

"Dad would often have a bet on the races of a Saturday. I would sometimes go along and watch. I used to sometimes bet a bit myself." *(Male, 23, multiple types)*

"Was exposed to it and allowed to have an interest on the horses. Went to races, owned greyhounds." *(Male, 45, multiple types)*

"My uncles and aunties all worked with horses. I used to go to every race meeting with Dad and get other people to put bets on for me. When we were at the local pub I would play the pokies at age 10 and no-one cared." *(Male, 25, multiple types)*

"Going to bingo with mum at night sometimes […] pretending to play bingo as well with old cards/tickets. Waiting in car for hours whilst she played pokies." *(Female, 30, race track)*

How did you feel about the gambling behaviour of your family members when you were growing up?

The third open-ended question required participants to describe how they felt about the gambling behaviour of their family members when they were growing up. Of the 54 participants, 20 indicated they had no involvement in, or exposure to, gambling while they were growing up, leaving responses from 34 participants for this question. The majority of respondents (n = 19) were neutral in how they felt about gambling in the family when growing up.

"Not much - I didn't think or care about it, since it never affected me." *(Female, 59, EGMs)*

"I was ok with it. It was only social." *(Male, 35, EGMs)*

When recalling their childhoods, seven participants mentioned having negative feelings about the gambling behaviour of their family members.

"I hated horse racing (the sound on the radio). Mum seemed to be able to contain it. My father was a violent drunk who gambled - we went with out and mum got beaten up when I was 10 years." *(Female, 55, EGMs)*

"Was scared when my father was gambling for those couple of years 'cos of the arguing when he got home." *(Male, 41, multiple types)*

"Ashamed of father who could get violent when he could not get money or lost. Took it out on family." *(Female, 56, EGMs)*

Seven participants mentioned having positive feelings about the gambling behaviour of their family members.

"Thought it was fun. Fish and chips when they won." *(Male, 48, multiple types)*

"Thought it was cool, glamorous, normal, and manly." *(Male, 28, casino)*

A further two participants recalled having positive feelings about the gambling behaviour of family members during their childhood but negative feelings as they became older.

"Excited me when I was young. As I got older it angered me." *(Male, 35, multiple types)*

Interestingly, the 11 participants who reported that a family member had a gambling problem indicated that they had negative feelings about the gambling behaviour of their family members.

All respondents who had positive feelings toward family member gambling reported gambling had been causing a problem in their own life for 6 or more years.

How did you think the gambling behaviour of your family members might have influenced your gambling behaviour when you were growing up?

The final open-ended question required participants to describe how they thought the gambling behaviour of their family members might have influenced their own gambling behaviour. Of the 34 participants, seven believed that the gambling of their family members had no impact on their own gambling behaviour.

"Had no influence." *(Male, 35, EGMs)*

"None whatsoever." *(Male, 40, multiple types)*

Nine participants thought the gambling behaviour of family members had a small or no impact on their own gambling behaviour because they gambled on a different gambling form.

"Don't think it did, I have no real interest in betting on horses." *(Male, 46, EGMs)*

"I'm not sure that it relates to my problem." *(Female, 61, EGMs)*

Nine participants indicated that the gambling behaviour of family members directly influenced their own gambling behaviour, often because they felt that problem gambling behaviour was transmitted genetically.

"I suppose once it runs in your family, it runs in your blood." *(Male, 44, multiple types)*

"Without question my families' involvement in racing and being around gambling has played a large part in my gambling problem." *(Male, 23, multiple types)*

"Main influence for my behaviour." *(Male, 35, multiple types)*

"Father has an addiction to gambling and as a result I think I may have inherited the addiction gene (if there is such a thing)." *(Female, 56, EGMs)*

Nine participants indicated that the gambling behaviour of family members influenced their own gambling behaviour because it made gambling a social norm or a way to interact with their parents.

"Learnt it as a coping mechanism - saw it as an opportunity to spend time with mum." *(Female, 30, race track)*

"It was never looked upon as bad so I still don't see it as a negative thing." *(Male, 25, multiple types)*

"The acceptance or that there is nothing wrong with it. Not aware that what could [be] down the track." *(Male, 44, casino)*

8.2.2 Prospective methodology

The prospective methodology required participants to respond from the perspective of being a parent. Participants were instructed to answer the measures in relation to their biological or step-children under the age of 18 years who currently lived with them on a full-time or part-time basis.

8.2.2.1 Magnitude of risk for the familial transmission of problem gambling behaviour

The findings revealed that only a quarter (28%) of participants had biological or step-children under the age of 18 years who currently lived with them on a full-time or part-time basis. Of these, no participants endorsed the child problem gambling screening question. Therefore, no further quantitative analyses relating to the prospective methodology were conducted.

8.2.2.2 Qualitative analyses

Participants who indicated that they had biological or step-children under the age of 18 who currently lived with them on a full- or part-time basis were also required to answer two open-ended questions on which qualitative analyses were conducted. Of the 27 participants reporting that they had children under the age of 18 years in the household, 15 (56%) answered these open-ended questions.

How do you think your gambling has influenced these children?

The first question required participants to indicate how they think their gambling has influenced their children. Three participants explained that their children have experienced stress as a result of their gambling behaviour.

"High stress levels causing some behavioural problems in children." *(Male, 42, other)*

"Due to gambling, financially in a terrible state. As a result stressed, anxious, angry at times. Worry my son who is 4 taking in my poor mental state." *(Male, 35, multiple types)*

Three participants also mentioned that they are physically absent from their family as a consequence of their gambling behaviour.

"Less time to spend on their needs/welfare." *(Male, 55, multiple types)*

"Mentally absent whilst physically present. Hanging out at the TAB is NOT a family outing!" *(Male, 45, multiple types)*

Two participants mentioned that their child dislikes their gambling or gambling in general.

"The 17½ year old hates my gambling a lot." *(Female, 43 EGMs)*

In contrast, two participants mentioned how they put bets on for their children.

"I have put bets on for them on Cup Day." *(Male, 47, EGMs)*

"I used to put a bet on for them but my wife asked me to stop - when I grew up it was the normal thing to do." *(Male, 47, EGMs)*

Only one participant mentioned that their children were not aware of their gambling.

"The young ones don't know." *(Female, 43 EGMs)*

How do you think your own gambling might influence the gambling of your child/ren (now or in the future)?

The second open-ended question asked participants to indicate how they think their own gambling might influence the gambling of their children (now or in the future). Two participants thought their gambling would influence the gambling of their children greatly, while five participants thought it might influence the gambling behaviour of their children, but were hoping it would not.

"Very private and secretive. Hopefully not at all." *(Male, 47, multiple types)*

"Hopefully it won't." *(Male, 44, other)*

"I got it from my mother so I suppose there is a chance they will." *(Male, 47, EGMs)*

One participant thought their own gambling behaviour would not influence their child's gambling.

"I don't think it will have an influence. They never see me gambling." *(Male, 55, multiple types)*

Interestingly, six participants indicated that they thought that their problem would serve as an example to influence their children not to gamble.

"I hope they see the negative influence it has brought to our family." *(Female, 40, EGMs)*

"Now I am talking to them about gambling I hope in a very positive way and they will resist and be overall mentally strong." *(Male, 45, multiple types)*

"I have vowed to educate my children on the damage it has done to 3 generations of my family. I will help ensure the cycle is broken." *(Male, 35, multiple types)*

"Hopefully they will recognise what is good about gambling and only do it for fun." *(Male, 47, EGMs)*

Responses to the open-ended questions did not appear to be influenced by participant gender, the length of time that gambling had been a problem, whether they were seeking counselling for one type of gambling or multiple types, or whether they believed they had grown up with a problem gambling parent.

8.3 Summary of Findings

- Nearly all participants (94.8%) reported scores in the problem gambling category of the PGSI. More than three-quarters (77.6%) reported problems related to electronic gaming machines.

Retrospective methodology

- The retrospective methodology required participants to respond from the perspective of an adult child. Overall, 23.8% of participants reported that any family member (parents, siblings) living with them when they were growing up had a gambling problem. Most of these reported problem gambling in only one family member (85.0%). Half (48%) of participants reported gambling problems on the same gambling activity or activities as their family members.

- 16.3% of the sample endorsed the screening item for paternal problem gambling. The most common types of paternal problem gambling were horse/dog race betting and cards/casino gambling. Nearly half (46%) reported gambling problems on the same gambling activity or activities as their fathers.

- 6.8% of the sample endorsed the screening item for maternal problem gambling. The most common types of maternal problem gambling were EGMs and bingo. Two-thirds (67%) reported gambling problems on the same gambling activity or activities as their mothers.

- 6.9% of the sample endorsed the screening item for sibling problem gambling. The most common type of sibling problem gambling was horse/dog race betting. Only 17% reported gambling problems on the same gambling activity or activities as their siblings.

- Family members with a positive history were generally biological relatives and lived with the participants full-time. Participants were very young when their parents started having problems but older when when their siblings started having problems. Participants generally indicated that all family members had experienced long-term difficulties with gambling.

- Problem gamblers raised in problem gambling families were more likely to report parental separation and divorce. There was also a trend for problem gamblers raised in non-problem gambling families to report higher levels of paternal authoritative parenting. These factors may therefore be worthy of further study as risk and protective factors for the familial transmission of problem gambling.

- In the qualitative analyses:

    - Nearly half of the participants stated that they had no involvement with gambling when growing up, over-one-third gambled when they were growing up, and one-fifth described the gambling behaviour of their family members when they were growing up.

    - Participants who reported involvement with gambling when they were growing up described how they felt about the gambling behaviour of their family members when they were growing up. Just over half were neutral in how they felt about gambling in the family when growing up. Smaller proportions mentioned having either negative or positive feelings. All participants who reported that their family member had a gambling problem reported negative feelings.

    - Participants who reported involvement with gambling when they were growing up described how they through the gambling behaviour of their family members might have influenced their own gambling behaviour. Approximately half of the participants thought that the gambling behaviour of their family members directly influenced their own gambling behaviour, either because it was transmitted genetically or because gambling had become a social norm or way to interact with their parents. The remainder of the sample believed that the gambling of their family members had little or no impact on their own gambling, primarily because they gambled on a different form of gambling.

Prospective methodology

- The prospective methodology required participants to respond from the perspective of being a parent. None of the problem gambling parents endorsed the child problem gambling screening question.

- In the qualitative analyses:
    - Many participants thought their gambling had influenced their children by causing stress and resulting in physical absences or that their children disliked their gambling.
    - Many participants thought that their gambling would influence the gambling of their children (now or in the future), but were hoping it would not. Similar proportions thought that their problem would serve as an example to influence their children not to gamble.

CHAPTER 9
DISCUSSION

The *Children at Risk Project* aimed to develop an appropriate methodology to conduct an analysis of the contribution of risk exposures towards the development of problem gambling in children raised in problem gambling families. In this project, four studies were conducted, with data being collected from:

1. a large scale national community telephone survey of adults retrospectively reporting on the gambling behaviour of family members during their childhoods (Study 1: Chapter 5)
2. a survey of adolescents aged 12 to 18 years sampled from secondary schools (Study 2: Chapter 6)
3. a survey of young adults sampled from tertiary institutions (Study 3: Chapter 7), and
4. a survey of individuals seeking counselling for their own gambling problems (Study 4: Chapter 8). In Study 4, participants retrospectively reported on the gambling behaviour of their family members during their childhoods and prospectively reported on the gambling behaviour of their children.

It is important to note that the *Children at Risk Project* was not designed to determine prevalence rates of problem and moderate risk gambling and that these rates were reported in the interests of describing the samples in each study. However, the findings of the project revealed that 2.6% of adult respondents from the general community, 5.1% of adolescents, and 14.7% of young people were classified as problem or moderate risk gamblers. The findings of Study 1 (0.9% problem gamblers, 1.7% moderate risk gamblers) are generally consistent with other Australian statewide studies employing the generally conservative PGSI [12-19, 270]. The findings of Study 2 (0.7% problem gamblers, 4.4% at-risk gamblers) revealed lower rates of both problem and at-risk gambling than other Australian studies of adolescents [271, 272]. These studies have reported that 3.5 to 4.4% of adolescents are classified as problem gamblers on the DSM-IV-J and that a further 6.2% could be classified as at-risk according to the definition employed in the current project. Finally, the findings of Study 3 (3.4% problem gambling, 11.3% moderate-risk gambling) are similar to, or somewhat higher than, other studies that have employed the PGSI in samples recruited from Australian universities [273, 274]. These rates are also much higher than those derived from a subgroup analysis of 18 to 24 year year olds in Study 1 of the *Children at Risk Project* (0.9% problem gamblers, 2.3% moderate risk gamblers) and other epidemiological community surveys that have conducted subgroup analyses of the 18 to 24 year old age group [e.g., 13, 15, 19]. The discrepancy in prevalence rates for Studies 2 and 3 relative to previous research is likely due to sampling biases inherent in these studies (refer to Section 9.6). Only Study 1 employed an epidemiological approach that sampled individuals representative of the national population for age, sex, and geographic location and is therefore the only study from which the reported prevalence rates are generalisable to the Australian population.

In the *Children at Risk Project*, we assessed a wide range of variables thought to be potentially etiologically relevant in the familial (parents and sibling) transmission of gambling problems. We applied Chassin and Belz's [67] research agenda to formulate the aims and hypotheses of the project.

9.1 Magnitude of Risk for the Familial Transmission of Problem Gambling Behaviour

The first aim of the *Children at Risk Project* was to determine the magnitude of risk associated with family member problem gambling for the development of child/adult child problem gambling. The findings of Studies 1 to 3 revealed that 7.3% to 10.0% of participants reported that a family member (parents or siblings) had a gambling problem when they were growing up. A much higher proportion of the problem gamblers in Study 4 (23.8%) reported that a family member had a gambling problem when they were growing up. All studies found a weak but statistically significant relationship between family member and participant problem gambling. Participants with a family history of problem gambling were 2.3 to 9.6 times more likely display problem gambling behaviour and 1.3 to 3.5 times more likely to display at-risk or moderate risk gambling than their peers. In Studies 2 and 3, gambling participants reported they usually gambled or bet with their friends, but a substantial proportion also gambled with their parents, brothers or sisters, and other relatives.

Up to 10% of people reported that their parents or siblings had a gambling problem when they were growing up

Participants with a family history of problem gambling were 2 to 10 times more likely to display problem gambling than their peers

There was a significant but weak association between parental and child/adult child problem gambling

The findings revealed that 4.0% to 6.4% of participants reported that they were raised in families with a problem gambling male parent. A much higher proportion of the problem gamblers in Study 4 (16.3%) reported that their male parent had a gambling problem when they were growing up. Although Study 3 failed to find evidence of a relationship between paternal and participant problem gambling, Studies 1 and 2 found a weak but statistically significant relationship. In these studies, participants with problem gambling fathers were 10.7 to 13.5 times more likely display problem gambling behaviour and 3.6 to 5.1 times more likely to display at-risk or moderate risk gambling than their peers.

People with problem gambling fathers were 11 to 14 times more likely to display problem gambling than their peers

In the *Children at Risk Project*, between 1.1 and 4.1% of participants reported that they were raised in families with a problem gambling female parent. A somewhat

higher proportion of the problem gamblers in Study 4 (6.8%) reported that their female parent had a gambling problem when they were growing up. Although Study 2 failed to find evidence of a relationship between maternal and participant problem gambling, Studies 1 and 3 found a weak but statistically significant relationship. In these studies, participants with problem gambling mothers were 6.7 to 10.6 times more likely display problem gambling behaviour and 1.1 to 1.7 times more likely to display at-risk or moderate risk gambling than their peers.

People with problem gambling mothers were 7 to 11 times more likely to display problem gambling than their peers

A smaller proportion of participants (1.2% to 2.6%) indicated that they were raised in families with a problem gambling sibling. A higher proportion of the problem gamblers in Study 4 (6.9%) reported that one of their siblings had a gambling problem when they were growing up. Only Study 2 found a significant (but weak) relationship between sibling and participant problem gambling. This finding is in contrast with emerging evidence from alcohol use literature that adolescent alcohol use problems are significantly associated with sibling alcohol use problems [192, 193]. In Study 2, youth with problem gambling siblings were no more likely to display problem gambling but 11 times more likely to display at-risk gambling than their peers. This contrasts with the findings of studies that have found that adolescent alcohol use and alcohol use problems are significantly associated with alcohol use by siblings [192-194, 198-202] and previous research that suggests that the odds of developing a gambling problem were approximately four times greater for an individual with a sibling with a gambling problem [63]. It is evident that further research is required to explore this form of "horizontal transmission" of problem gambling. Despite findings that a significant proportion of adolescents gamble with their siblings [40, 46, 118, 119, 181], it may be that the gambling behaviour of siblings does not influence child/adult child problem gambling to the same degree as the drinking practices of siblings influence adolescent alcohol use problems.

Gambling behaviour of siblings may not influence adolescent problem gambling to the same degree as the drinking practices of siblings influence adolescent alcohol use problems

The *Children at Risk Project* administered separate screening questions for fathers, mothers, and siblings in order to further explore the differential impacts on children of paternal and maternal forms of problem gambling [29]. Although the results of the *Children at Risk Project* support previous findings that paternal problem gambling raises the risk for the development of child/adult child problem gambling more than maternal problem gambling [42, 48, 109], the magnitude of risk associated with maternal problem gambling was also substantial. This is consistent with the view that female problem gambling may have a deleterious effect on the family given their increasing gambling participation and problem gambling [8] and their historically greater involvement with the family [20, 24, 29, 205, 228, 229].

The *Children at Risk Project* also examined the effect on problem gambling outcomes when one or more family members are problem gamblers. Most study participants across all studies reported problem gambling in only one family member, but a small proportion of these participants (10 to 14%) reported gambling problems in two or three family members. The findings of all studies found that there was no association between family density of problem gambling and problem gambling outcomes. Although this finding is consistent with previous findings that the number of alcohol dependent parents does not affect drinking severity [227], further research is required to investigate whether the number of problem gambling family members affects other gambling indices, such as age of first gamble and rate of progression from first gambling experience to problem gambling [227].

There was no association between family density of problem gambling and child/adult child problem gambling outcomes

Taken together, these findings support the hypothesis that parental and sibling problem gambling would be positively associated with child/adult child problem gambling. Although this finding is consistent with much of the problem gambling literature, the findings of the *Children at Risk Project* suggest that the individuals raised in problem gambling families were 2 to 10 times more likely to develop gambling problems themselves than their peers. This is in contrast to previous research findings that have generally indicated that children of problem gamblers are 2 to 4 times more likely to develop gambling problems themselves [35, 39, 40, 43-45, 52, 53, 57]. Taken together, the results from the *Children at Risk Project* indicate that the magnitude of risk associated with family member problem gambling for the development of child/adult child gambling problems is substantial enough to warrant clinical and policy responses.

The magnitude of risk associated with family member problem gambling appears substantial enough to warrant clinical and policy responses

9.2 Specificity of Risk for the Familial Transmission of Problem Gambling Behaviour

The second aim of the *Children at Risk Project* was to determine the specificity of risk associated with family member problem gambling for the development of child/adult child problem gambling independent of other "third-party" variables. The hypothesis that family member problem gambling would remain positively associated with child/adult child problem gambling after controlling for a range of relevant socio-demographic factors, family member psychopathology, and concurrent family stressors was generally supported. This finding is consistent with a study that has controlled for the effects of three covariates (socioeconomic status, gender, and impulsivity-hyperactivity problems) on the association between parent problem gambling severity and adolescent gambling frequency [42]. From these

findings, it can be inferred that the problem gambling behaviour of family members has a unique effect on child/adult child problem gambling and that the familial transmission of problem gambling behaviour is not due to relevant socio-demographic factors, family member psychopathology, or concurrent family stressors.

The familial transmission of problem gambling remains significant after controlling for a range of relevant socio-demographic factors, family member psychopathology, and concurrent family stressors

9.3 Risk Factors for the Familial Transmission of Problem Gambling Behaviour

The third aim of the *Children at Risk Project* was to identify the risk factors that explain why individuals raised in problem gambling families are more likely to develop problem gambling than individuals raised in non-problem gambling families.

Taken together, the *Children at Risk Project* identified a range of factors that were associated with problem gambling families. These variables are displayed in Table 9.1. These factors are generally consistent with the findings of other studies identifying environmental characteristics of problem gambling families, such as family dysfunction, ineffective parenting practices and styles, dyadic relationship dysfunction, co-occurring parental psychopathology, and gambling-related financial losses. Although many of these factors were not related to the development of child problem gambling, they may be related to child/adult child outcomes other than problem gambling. The *Children at Risk Project* was designed to specifically analyse the contribution of risk exposures towards the development of problem gambling outcomes and therefore did not analyse the contribution of such exposures to the development of other child difficulties. However, clinical and survey evidence suggests that children living in problem gambling families experience a range of psychological and behavioural problems, such as depressive and anxiety symptoms, conduct problems, alcohol abuse, and attempted suicide [24-27, 30-32, 34-37]. The variables associated with problem gambling families listed in Table 9.1 are worthy of further study as explanatory risk mechanisms underlying the relationship between family member problem gambling and these other child outcomes.

The factors that were associated with problem gambling families are worthy of further study as explanatory risk mechanisms underlying the relationship between family member problem gambling and child psychological or behavioural outcomes

Table 9.1
A summary of the factors associated with problem gambling families and child/adult child problem gambling in the Children at Risk Project

Factors associated with problem gambling families	Factors associated with child/adult child problem gambling
Psychological factors	
• gambling attitudes • life dissatisfaction • marijuana use • alcohol use • other drug use • non-productive coping • self-enhancement expectancies • money expectancies • enhancement motives • coping motives • social motives • depression	• gambling attitudes • non-productive coping • alcohol use • marijuana use • other drug use • enjoyment/arousal expectancies • self-enhancement expectancies • money expectancies • enhancement motives • coping motives • social motives • sensation-seeking • depression • antisocial behaviours
Family factors	
• paternal problem drinking • maternal problem drinking • sibling problem drinking • paternal drug problems • maternal drug problems • sibling drug problems • paternal mental health issues • maternal mental health issues • sibling mental health issues • family member emotional problems • parental separation/divorce • financial debts • family dissatisfaction • living situation dissatisfaction	• paternal problem drinking • maternal problem drinking • maternal drug problems • paternal mental health issues • inconsistent discipline • parental separation/divorce • financial debts • family dissatisfaction • living situation dissatisfaction • money dissatisfaction
Social factors	
• age of first gamble • gambling at home • gambling with parents	• number of gambling friends • age of first gamble • gambling with friends • gambling with siblings • gambling at home on the internet

The *Children at Risk Project* also identified a range of factors that were associated with participant (predominantly youth) problem gambling. These variables are also displayed in Table 9.1. These factors are generally consistent with the findings of studies examining the correlates of youth problem gambling, such as personality factors (e.g., sensation-seeking and impulsivity), emotional distress, impaired coping, alcohol and substance use, risk-taking behaviours, gambling attitudes and beliefs, gambling expectancies, and family problems. Although many of these factors were not related to the familial transmission of problem gambling, they have important implications for the development of primary, secondary, and tertiary prevention programs for adolescent problem gambling [175, 275].

The factors that were associated with youth problem gambling have important implications for prevention, early intervention, and treatment programs for adolescent gambling

In the *Children at Risk Project*, we employed stringent statistical tests to identify the factors *explained how or why* children raised in problem gambling families are more likely to develop problem gambling than children raised in non-problem gambling families. The mediating risk factors identified in each study of this project are listed, in order of relative importance, in Table 9.2. Although several variables (number of gambling friends, age of first gamble, family member emotional problems, and non-gambling parent problem drinking) were tested as mediating risk factors in multiple studies, none were identified as significant risk factors in more than one study. However, the identification of these risk factors is important in the design of targeted prevention and intervention strategies necessary to reduce the intergenerational cycle of transmission of problem gambling from one generation to the next (refer to Chapter 10). The remainder of Section 9.3 discusses the risk factors identified in the *Children at Risk Project*.

In the Children at Risk Project, we identified factors that explained how or why individuals raised in problem gambling families are more likely to develop problem gambling than individuals raised in non-problem gambling families

Table 9.2
A summary of the risk and protective factors identified in the Children at Risk Project

		Risk factors	Protective factors
Any family member	**Study 1**	1. Lower age of first gamble 2. Maternal drug problem 3. Paternal mental health issues [a]	1. Female gender 2. Social capital (feeling safe walking alone) 3. Social capital (help from friends, family or neighbours) 4. Single-parent family 5. Higher number of siblings 6. Australian born status 7. Younger age of leaving home
	Study 2	1. Marijuana use 2. Other drug use 3. Financial debts	1. Higher number of siblings 2. Reference to others coping style
	Study 3	1. Coping motives 2. Enhancement motives 3. Money expectancies 4. Self-enhancement expectancies 5. Social motives 6. Depression [a]	1. Emotional impact expectancies 2. Female gender 3. Overinvolvement expectancies
Paternal	**Study 1**	1. Maternal drug problem 2. Lower age of first gamble	1. Social capital (help from friends, family or neighbours) 2. Female gender 3. Single-parent family 4. Younger age of leaving home 5. Australian born status 6. Social capital (feeling safe walking alone)
	Study 2	1. Financial debts 2. Non-productive coping 3. Marijuana use 4. Parental separation/divorce	1. Higher number of siblings 2. Male gender 3. Productive coping
Maternal	**Study 1**	1. Paternal problem drinking 2. Paternal mental health issues [a]	1. Female gender 2. Higher number of siblings 3. Australian born status 4. Single-parent family
	Study 3	1. Depression 2. Enhancement motives	1. Female gender 2. Older age 3. Emotional impact expectancies 4. Overinvolvement expectancies 5. Australian born status
Sibling	**Study 2**	1. Other drug use [a] 2. Family dissatisfaction [a]	1. Low parental involvement 2. Productive coping 3. Low positive parenting 4. Female gender

[a] Risk factor but reduction in strength of association not significant

9.3.1 Expectancies and motives

Some of the most important risk factors that explained the familial transmission of problem gambling behaviour were gambling expectancies and motives. Specifically, Study 3 revealed that strong risk factors for the familial transmission of problem gambling were coping motives, enhancement motives, money expectancies, self-enhancement expectancies, and social motives. Enhancement motives were also a risk factor for the maternal transmission of problem gambling. Taken together, these findings suggest that individuals raised in problem gambling families are more strongly motivated to gamble for internal negative reinforcement (i.e., to reduce or avoid negative emotions) (coping motives), internal positive reinforcement (i.e., to increase positive emotions) (enhancement motives), and external positive reinforcement (i.e., gambling to increase social affiliation) (social motives). They also suggest that exposure to family member problem gambling teaches people about the gambling benefits of feeling in control, feeling powerful, and feeling more accepted by peers (self-enhancement expectancies) and to have a higher expectation of financial gain as a result of gambling (money expectancies).

These findings are consistent with several studies that suggest that problem gamblers more frequently endorse gambling motives and positive expectancies than non-problem gamblers [187, 256]. They are also consistent with the alcohol use literature, in which the central role of expectancies in the intergenerational transmission of alcohol use problems is emphasised. For instance, alcohol expectancies are emphasised in Sher's [66, 92] theoretical models that attempt to explain the intergenerational transmission of alcohol use problems. These models suggest that COAs have stronger expectancies for reinforcement from alcohol, especially in relation to enhanced cognitive and motor functioning. Taken together, the findings suggest that problem gamblers in the family act as significant models for gambling [20, 41, 42, 46, 48, 52, 100, 116-124], whereby they influence child/adult child problem gambling through modelling gambling for coping responses, mood enhancement, social affiliation, and financial gain.

9.3.2 Psychopathology of the non-problem gambling parent

The findings of Study 1 revealed that maternal drug problems were mediating risk factors for the familial and paternal transmission of gambling problems and that paternal problem drinking and mental health issues were risk factors for the maternal transmission of gambling problems. These findings imply that parental gambling problems are causally related to psychiatric problems in the non-problem gambling parent, which in turn are causally related to the development of offspring gambling problems. These findings are consistent with Seilhamer and Jacob's model [99] which posits that the pathways to child adjustment difficulties are buffered by environmental protective factors such as the psychiatric status of the non-dependent parent. There is also evidence that the non-gambling parents of children living in problem gambling families experience a high degree of psychological distress and engage in maladaptive behaviours such as excessive drinking [30, 31, 146, 148, 149] as a result of ineffective skills to repeatedly cope with the difficulties created by the gambling problem [157]. The children of problem gamblers may gamble in response to these emotional difficulties

for a range of reasons, including gambling as a coping response, because they have more unsupervised leisure time, or because they are more influenced by peers.

9.3.3 Financial debts

Financial debts were identified as an explanatory mechanism underlying family member and paternal transmission of gambling problems in Study 2. Financial strain has also been identified as a risk factor for the transmission of alcohol use problems [95, 96]. This finding is consistent with evidence that children living in problem gambling families are often exposed to financial deprivation [156, 166] and have a higher expectation of financial gain as a result of gambling (money expectancies) than their peers. Taken together, these findings suggest that children of problem gamblers may believe that gambling is an effective way to alleviate the financial stress caused by parental problem gambling. An alternative explanation is derived from findings that individuals tend to behave impulsively in deprived environments [276].

9.3.4 Substance use

Substance use was a risk factor that explained why adolescents raised in problem gambling families were more likely to develop problem gambling than adolescents raised in non-problem gambling families. In Study 2, marijuana use was a risk factor for familial and paternal transmission and other drug use was a risk factor for familial and sibling transmission. These findings imply that family member gambling problems are related to adolescent drug use, which in turn is causally related to the development of adolescent gambling problems. This finding is supported by previous research that has found that children of male pathological gamblers display high rates of behavioural problems such as alcohol abuse [24-27, 30, 32, 34, 35, 37] and that adolescents with gambling problems are at an increased risk for multiple risk behaviours such as alcohol or substance use [eg., 43, 46, 47, 49, 50, 122, 171, 172, 177-180].

9.3.5 Depression

The findings of Study 3 suggest that depression is a strong risk factor for the maternal transmission of problem gambling behaviour. This finding suggests that adolescents become depressed in response to the gambling problems displayed by their mothers, and that they, in turn, develop gambling problems. This finding is consistent with clinical and survey evidence that the children of problem gamblers experience a range of emotional reactions, including depression [24, 26, 27, 30-32, 34-36], a longitudinal study indicating that parental problem gambling significantly predicted offspring depressive symptoms [39], and an emerging literature indicating that adolescents with gambling-related problems report high rates of a range of mental health issues, including depression [e.g., 43, 50, 63, 171, 172, 173-175]. The finding that young adult depression mediated the intergenerational transmission of gambling problems is also consistent with the negative affect etiologic pathway for proposed by Sher [66, 92], which posits that the intergenerational transmission of alcohol use problems is mediated by high levels of life stress, the effectiveness of coping resources, and negative affective states, and effectiveness of coping resources. Application of Sher's model of individual differences in drinking motivation suggests that the children of female problem gamblers may gamble as self-medication for their predisposition to

experience negative mood states (such as dysphoria, neuroticism, anxiety and depression).

9.3.6 Non-productive coping

The findings of Study 2 suggest that non-productive coping is a risk factor for the paternal transmission of problem gambling. This finding indicates that children of male problem gamblers gamble as a coping strategy because they employ non-effective coping strategies, such as worrying, wishful thinking, avoiding the problem, blaming themselves, and "letting off steam". These findings are consistent with several studies that suggest that adolescent problem gambling is associated with unhelpful coping styles, such as emotion-based, avoidant, and distraction oriented coping styles [63, 122, 175-177]. They are also consistent with the alcohol use literature, in which impaired coping is emphasised in the intergenerational transmission of alcohol use problems. For instance, impaired coping is emphasised in Sher's [66, 92] theoretical models that attempt to explain the intergenerational transmission of alcohol use problems. These models suggest that COAs use alcohol as a coping strategy because they are less effective at controlling their stress reactions. The findings of the *Children at Risk Project* therefore suggest that paternal problem gambling affects offspring gambling problems though modelling of avoidant coping responses [41, 122].

9.3.7 Gambling as a social norm

Although not replicated in Studies 2 and 3, the findings of Study 1 suggest that age of first gamble was a risk factor for familial and paternal transmission of gambling problems. Early onset of gambling experiences has been implicated as a risk factor in the development of youth problem gambling [126, 188]. This relationship could occur through observation of parental gambling, exposure to gambling role models (including parents, parent's friends, other relatives), or increased access to gambling opportunities [41, 66, 92, 122]. It is likely that gambling is a socially normed behaviour for children living in problem gambling families. There is now considerable evidence that parents perceive that the gambling behaviour of their children is socially acceptable and that children and adolescents often become involved in gambling activities at an early age as part of their normal and accepted family social entertainment [40, 43, 116-118, 125-127, 277]. Children are often introduced to gambling by their parents and other family members [25, 43, 52, 118, 120, 123] and are taught the rules of gambling so that gambling is more accessible to them [41]. There is also evidence from previous research that problem gamblers are 3.1 times more likely to have problem gambling family members, 2.1 times more likely to have problem gambling friends, and 2.4 times more likely to have problem gambling workmates than their non-problem gambling peers [16]. These results suggest that children raised in problem gambling families may believe that gambling and excessive gambling are common behaviours. Interestingly, many problem gamblers surveyed in Study 4 thought that the gambling behaviour of their family members directly influenced their own gambling behaviour, either because it was transmitted genetically or because gambling had become a social norm or way to interact with their parents. Further research is required to clarify the conditions under which the age of first gamble is a risk factor for the development of gambling problems in children raised in problem gambling families.

9.4 Protective Factors for the Familial Transmission of Problem Gambling Behaviour

The final aim of the *Children at Risk Project* was to identify the protective factors that may buffer the risk associated with family member problem gambling. Several variables (female gender, Australian born status, higher number of siblings) were identified as significant protective factors in more than one study. The remainder of Section 9.4 discusses the more important protective factors identified in the project.

9.4.1 Demographic characteristics

The alcohol use literature suggests that the potential differential effects of problem gambling may vary as a function of child socio-demographic factors, such as gender, age, and ethnicity [66, 91, 100, 101]. The *Children at Risk Project* examined these child factors in the familial transmission of gambling problems. Several child/adult child demographic characteristics (gender, Australian born status, and age) served to buffer the risk associated with a family history of problem gambling. The strongest of these factors was gender. Although male gender was a protective factor for the paternal transmission of problem gambling behaviour in Study 2, female gender was a protective factor for any family member transmission in Studies 1 and 3, paternal transmission in Study 1, maternal transmission in Studies 1 and 3, and sibling transmission in Study 2. In these studies, problem gambling was more likely to be passed down to males, regardless of the gender of problem gambling parent. These findings are therefore generally consistent with the findings of a meta-analysis that indicates that the heritability of problem gambling is stronger for male offspring [109].

9.4.2 Gambling expectancies

Gambling motives and positive gambling expectancies were identified as possible risk factors for the familial transmission of problem gambling. The *Children at Risk Project* also found that negative gambling expectancies were strong protective factors for the familial transmission of problem gambling. Specifically, Study 3 revealed that strong protective factors for the familial transmission of problem gambling were emotional impact and overinvolvement expectancies. These findings suggest that individuals raised in problem gambling families expect negative emotions such as guilt, shame, loss of control as a result of gambling (emotional impact) and the risks of cognitive, affective, and social preoccupation with gambling (overinvolvement).

These findings are consistent with Sher's [66, 92] negative affect model of the intergenerational transmission of alcohol use problems, in which alcohol expectances are protective factors that buffer the relationship between emotional distress and alcohol use problems. They are also consistent with findings that non-gamblers have endorsed the emotional impacts of gambling more highly than social gamblers, at-risk gamblers, and problem gamblers [187]. Interestingly, problem gamblers in previous research have endorsed the Overinvolvement subscale of the Gambling Expectancies Questionnaire more highly than social gamblers and at-risk gamblers but have not differed significantly on their endorsement of this subscale from non-gamblers [187]. Gillespie et al. [187] explain that the negative outcome expectancies of problem gamblers may have developed as a result of personal experience. Applied to the

familial transmission of problem gambling, these findings suggest that individuals raised in problem gambling families develop negative gambling expectancies as a result of exposure to the problem gambling behaviour of family members. This perspective was endorsed by many problem gamblers surveyed in Study 4, who thought their gambling problem might serve as an example to influence their own children not to gamble.

9.4.3 Social capital

Social capital served as a protective factor for the family member and paternal transmission of gambling problems. The social capital items of feeling safe walking down the street after dark and being able to get help from friends, family or neighbours when growing up were identified as strong protective factors in Study 1. There is emerging evidence that social capital may serve as a protective factor for the development of adult problem gambling behaviour [16, 19]. Thomas and Jackson [16] found that 25.0% of problem gamblers could not get help from family, friends or neighbours compared with only 2.3% of non-problem gamblers, 39.3% of problem gamblers do not feel valued by society compared with 7.8% of non-problem gamblers, and 17.9% of problem gamblers did not like living in their community compared with 2.0% of non-problem gamblers. Similar differences have been reported in the Victorian Department of Justice survey [19]. The reduced social connectedness of problem gamblers may be exacerbated by the alienation of friends and family members or the isolating effects of mental health conditions or alcohol or drug use.

9.4.4 Family characteristics

Several family factors served to buffer the risk associated with a family history of problem gambling. The findings of Studies 1 and 2 suggest that protective factors for individuals raised in problem gambling homes (family member, paternal, and maternal) are being raised in a single-parent family, having a higher number of siblings, and leaving home at a younger age. A higher number of siblings may result in the children of problem gamblers having less exposure to the problem gambling parent and more exposure to siblings. In fact, older siblings may serve as mentors or role models in influencing appropriate behaviour of their younger siblings. Indeed, there is some evidence to suggest that the birth of another sibling within the first two years of life is a protective factor for the development of alcohol use problems [66, 92]. Leaving home at a younger age would also serve to reduce the exposure to a problem gambling parent. The finding that living in single-parent families is protective for family member, paternal, and maternal transmission of gambling problems in Study 1 is unexpected and counter-intuitive. The meaning of this finding requires further exploration in future research.

9.4.5 Coping

Although not as strong, coping styles were protective factors for the transmission of problem gambling behaviour. The findings of Study 2 revealed that referring to others in a bid to deal with the concern (reference to others) was a protective factor for family member transmission. Study 2 results also suggested that attempting to solve the problem whilst remaining physically fit and socially connected

(productive coping) was a protective factor for paternal transmission. These findings imply that certain coping strategies such as problem solving, working hard, optimistic thinking, keeping fit and healthy, and making time for leisure activities are protective in the face of family member gambling problems. Taken together, these findings are consistent with Sher's negative affect pathway for the intergenerational transmission of alcohol use problems that posits that coping buffers the relationship between emotional distress and offspring problem drinking. There is also empirical evidence that very low or high levels of cognitive coping buffers COA risk for alcohol or substance use initiation [105]. Although there are no similar studies in the problem gambling literature, the current findings suggest that adolescents living in problem gambling families who are able to cope productively are able to cope with parental problem gambling without employing gambling as a coping response.

9.5 Consideration of the Potential Sources of Heterogeneity

The COA literature raised a number of sources of heterogeneity to consider in studies examining the intergenerational or sibling transmission of problem gambling [66, 67, 96, 101]. These issues included cohabitation issues and relationship to the child/adult child, lifespan developmental factors, and type of gambling activity. An understanding of the heterogeneity relating to transmission can facilitate the development of targeted prevention and treatment strategies [101]. In the *Children at Risk Project*, these issues were explored using the larger sample of problem gamblers surveyed in Study 4.

9.5.1 Cohabitation issues and relationship to the child

Problem gambling outcomes associated with living in a problem gambling family may be associated with the level of direct exposure to family member gambling problems and associated difficulties [96]. Specifically, the degree of exposure is important for etiological theories that suggest that social learning is associated with the intergenerational transmission of gambling problems [96]. Some children may have relatively low contact with their biological parents and siblings [72]. Study 4 of the *Children at Risk Project* examined the nature of the relationship (biological or step-foster family members) and the degree of contact between the participant and family member (living with the family member on a full- or part-time basis) [72]. The results revealed that family members with a positive history of problem gambling were generally biological relatives and lived with the participants full-time.

Problem gamblers reported that most of their problem gambling family members were biological relatives who lived with them on a full-time basis

9.5.2 Lifespan developmental factors

Study 4 of the *Children at Risk Project* explored some lifespan development factors in considering the outcomes of family member problem gambling [66, 91, 96, 101, 208]. These factors include the child's age at the time of active problem gambling and the duration of family member gambling problems [66, 67, 91, 99, 208]. The findings

revealed that participants were very young when their parents started having problems but older when their siblings started having problems. Participants generally indicated that all family members had experienced long-term difficulties with gambling. An understanding of which factors are differentially important at different developmental stages will facilitate targeted preventive intervention [96].

Problem gamblers reported that they were very young when their parents started having gambling problems but that they were older when their siblings started having problems

Problem gamblers reported that their problem gambling family members generally experienced long-term difficulties

9.5.3 Predominant gambling problem

Until there is some consensus on the optimal way of subtyping problem gambling, it is reasonable to assume that the predominant form of problem gambling may have a differential effect on the experience of a family history of problem gambling. Study 4 of the *Children at Risk Project* explored the problem gambling activities for each family member. Half of the participants reported gambling problems on the same gambling activity/activities as their problem gambling family members. Interestingly, many problem gamblers surveyed in Study 4 believed that the gambling of their family members had no impact on their own gambling, primarily because they gambled on a different form of gambling.

About half of the problem gamblers gambled on the same activities as their problem gambling family members

Problem gambling fathers were most likely to have problems on horse/dog race betting and cards/casino gambling, problem gambling mothers were most likely to have problems on electronic gaming machines and bingo, and problem gambling siblings were most likely to have problems on horse/dog race betting. Participants were therefore most likely to report gambling problems on the same gambling activity as their mothers. It is unclear if this higher rate is a result of the higher addictive potential of electronic gaming machines [278] or the high proportion of problem gamblers that present to counselling with electronic gaming machine problems [8, 279, 280].

9.6 Methodological Limitations and Future Research Directions

Despite the analysis of the methodological issues raised by the COA literature in researching the familial transmission of problem gambling (Chapter 3), it is

important to note several methodological limitations in the *Children at Risk Project* when considering the practical implications of the project findings. First, although the *Children at Risk Project* evaluated many risk and protective factors in the familial transmission of gambling problems, only a small number of risk factors (number of gambling friends, age of first gamble, family member emotional problems, and non-gambling parent problem drinking) and protective factors (gender, Australian born, family structure, age, metropolitan/rural region, number of siblings) were evaluated in more than one study. Moreover, only the protective factors of female gender, Australian born status, and higher number of siblings were significant in more than one study. While these factors are strongly supported by the *Children at Risk Project*, those that were significant in only one study require replication and provide hypotheses for further research.

Although Study 1 employed a sample representative of the general community, the findings of the supplementary studies (Studies 2, 3, and 4) should be interpreted with caution as they may comprise sampling biases. These studies, which sampled participants from 17 secondary schools in Victoria (Study 1), five tertiary institutions in Victoria (Study 2), and eight clinical services across Victoria, South Australia, and Tasmania (Study 4), employed non-representative samples that were not selected via probability sampling methods. The findings of these studies may not be generalisable to all individuals across all jurisdictions of Australia as they comprise specific samples and there are jurisdictional differences in problem gambling prevalence rates, gambling regulations, gambling contexts, and service delivery. Moreover, with the exception of the survey of secondary school students (Study 2), the *Children at Risk Project* studies relied on retrospective reports of adult children that may be subject to memory biases. Only the findings of Study 2 can therefore be generalised to children and adolescents living in a problem gambling family rather than older individuals reporting that they were raised in problem gambling family. Different prevention and intervention strategies and programs for individuals raised in problem gambling families may need to be developed for individuals of different ages (children, adolescents, adults). Further systematic research using representative samples of children, adolescents, and adults would substantially advance this area of investigation.

Given the time constraints of the *Children at Risk Project*, each study employed family history methods that involved data collection from single family members regarding the presence of a gambling problem in their parents and siblings. Although the use of these methods may have accurately identified family members without gambling problems, they may have been less accurate in identifying those with gambling problems [66, 93, 207]. This underestimation of the proportion of family members with gambling problems may have contributed to the consistently weak relationship between family member and respondent gambling problems across the studies. Future research in this area would benefit from employing family study methods by directly assessing each available first-degree family member for the presence of gambling problems (such as parent-child dyads). Although more complicated and expensive, use of these methods in future research could potentially provide a more accurate and extensive assessment of the familial transmission of gambling problems [66, 93, 207, 209].

Although a range of instruments are available to assess the presence of parental alcohol use disorders, there are no such available instruments to identify parental problem gambling. The *Children at Risk Project* employed single items to identify family member gambling problems given evidence for the reliability and validity of single-item questions for identifying COAs [207, 209, 210, 220-225], the length of the surveys, and the absence of a validated measure for evaluating a family history of problem gambling. The advancement of this research area requires the development of a standardised instrument that evaluates the presence of parental gambling problems or the adaptation of an existing alcohol use measure, such as the CAST-6 [219].

Direct causal inferences regarding the direction of the relationship between family member problem gambling, mediating risk factors, moderating protective factors, and respondent problem gambling cannot be drawn due to the cross-sectional nature of all four empirical studies [66, 96, 101]. Although these cross-sectional evaluations provide an important first step in developing an understanding of the familial transmission of gambling problems, more refined modelling with prospective data from longitudinal research will be required to fully understand the interaction between risk and protective processes operating across different stages of development [66, 91, 96, 101].

Simple but formal statistical tests of mediation and moderation were employed in the *Children at Risk Project* given the infancy of the field. The findings from these tests form the groundwork for future research employing multivariate statistical modelling, such as covariate structure modelling, structural equation modelling, or bootstrapping methods [66, 69, 101, 232, 233]. These statistical analyses could be useful tools to expand on the findings of the *Children at Risk Project* by evaluating complex multivariate models that correspond to multiple hypothesised interrelationships among a broad range of risk and protective factors in the familial transmission of gambling problems.

The *Children at Risk Project* identified a range of factors that were associated with problem gambling families, adolescent problem gambling, and the familial transmission of gambling problems. The identification of risk and protective factors in this project has implications for the development of practice responses utilising a public health approach incorporating primary, secondary, and tertiary prevention to reduce the likelihood of familial transmission of gambling problems. However, there is almost no research evaluating prevention and intervention approaches for individuals raised in problem gambling families. Further research is required to develop and evaluate the efficacy of interventions specifically designed to reduce the familial transmission of problem gambling behaviour and reduce the other adverse outcomes associated with problem gambling families. These issues are discussed in further detail in Chapter 10. The identification of variables associated with problem gambling families listed in Table 9.1 are also worthy of further study as explanatory risk mechanisms underlying the relationship between family member problem gambling and other child/adult child psychological, physical, and behavioural outcomes.

Several other issues are worthy of further study. As previously discussed (Section 9.1), further research is also required to explore the sibling transmission of

gambling problems and whether the number of problem gambling family members affects other gambling indices, such as age of first gamble and rate of progression from first gambling experience to problem gambling, and other adverse psychological and behavioural outcomes. The meaning of unexpected findings (such as that living in single-parent families was protective for the intergenerational transmission of gambling problems in Study 1 and that low parental involvement and positive parenting were protective for the sibling transmission of gambling problems in Study 2) also require further exploration in future research. Finally, several sources of heterogeneity were considered in the *Children at Risk Project*. These issues included cohabitation issues and relationship to the child, lifespan developmental factors, and type of gambling activity. These factors were predominantly explored in Study 4 using the larger sample of problem gamblers surveyed in this study. Because these factors have the potential to facilitate the development of targeted prevention and treatment strategies [(101)], they are worthy of further study in future research studies.

9.7 Concluding Comments

Despite these methodological limitations, the *Children at Risk Project* provides the first dedicated empirical examination of the risk and protective factors related to the intergenerational and sibling transmission of problem gambling. The *Children at Risk Project* examines an extensive number of control variables, risk factors, and protective factors and the findings of this project form a solid foundation for future research investigating the familial transmission of gambling problems. The *Children at Risk Project* has many strengths, including triangulation of findings from multiple research methodologies across different samples, use of a large sample representative of the Australian general community (Study 1), use of at least one methodology that does not rely on retrospective recall of participants (Study 2), and recruitment of large samples that provide statistical power sufficient to detects effects of reasonable magnitude. The *Children at Risk Project* also employs stringent statistical tests to identify mediating risk factors and moderating protective factors for the familial transmission of problem gambling, use of statistical analyses that control for relevant socio-demographic factors, family member psychopathology, and concurrent family stressors, and use of multivariate statistics to control for Type 1 (false positive) errors. Finally, in the *Children at Risk Project*, we attempted to account for important sources of heterogeneity of problem gambling outcomes, such as the nature of the relationship, the degree of contact between the participant and family member, the density of gambling problems in the family, lifespan developmental factors, gender of the problem gambling parent, predominant gambling form, child socio-demographic factors, and family structure.

The studies undertaken in the *Children at Risk Project* suggest that children raised in problem gambling families were more likely to develop gambling problems themselves than children raised in non-problem gambling families, even after controlling for other factors, such as demographic factors, family member psychopathology, and concurrent family stressors. The magnitude of risk associated with family member problem gambling for the development of child gambling problems is substantial enough to warrant both clinical and policy responses. Potentially relevant risk and protective factors for study of the familial transmission of problem gambling were identified from studies that have identified the environmental

characteristics of problem gambling families, studies that have examined the correlates of youth problem gambling, and studies that have examined the risk and protective factors for the familial transfer of alcohol use problems. Using stringent tests of mediation, the project identified a range of factors that explain how and why children raised in problem gambling families are more likely to develop problem gambling (refer to Section 9.3). Using stringent tests of moderation, the project also identified a range of factors that buffer the effects of family member problem gambling (refer to Section 9.4). The *Children at Risk Project* has therefore identified a wide range of variables thought to be potentially etiologically relevant in the familial transmission of gambling problems and employed statistical analyses to identify the relative strength of these factors in each study. The identification of these risk and protective factors enables us to consider policy and practice responses to reduce the likelihood and impacts of familial transmission of problem gambling behaviour. Some of these policy and practice responses are detailed in Chapter 10.

CHAPTER 10
GUIDELINES FOR THE DEVELOPMENT OF INTERVENTION STRATEGIES/PROGRAMS FOR CHILDREN AT RISK OF DEVELOPING PROBLEM GAMBLING

The *Children at Risk Project* has clearly identified that individuals raised in gambling families are more likely to develop gambling problems themselves than individuals raised in non-problem gambling families, even after controlling for other factors such as demographic factors, family member psychopathology, and concurrent family stressors. The findings reveal that up to 10% of individuals reported that their parents or siblings had a gambling problem when they were growing up. Moreover, participants with a family history of problem gambling were up to 10 times more likely to display problem gambling behaviour and 3.5 times more likely to display at-risk or moderate risk gambling than their peers.

The magnitude of the risk associated with family member problem gambling for the development of child gambling problems appears substantial enough to warrant both clinical and policy responses. The project identified a wide range of variables thought to be potentially etiologically relevant in the familial transmission of gambling problems as well as a range of factors that buffer the effects of family member problem gambling. The identification of these risk and protective factors has implications for policy and practice responses utilising a public health approach incorporating primary, secondary, and tertiary prevention to reduce the likelihood of the familial transmission of gambling problems.

The identification of risk and protective factors in the Children at Risk Project has implications for the development of policy and practice responses for individuals raised in problem gambling families

A public health approach is useful in facilitating the design of policy and programmatic responses for individuals raised in problem gambling families [(281)]. Primary prevention aims to prevent people from developing gambling problems by targeting individuals in the general population before they begin to gamble or display any evidence of gambling problems. Secondary prevention aims to interrupt or reverse problems by targeting individuals displaying early gambling-related symptoms. Tertiary prevention aims to prevent further deterioration and dysfunction in individuals who display serious gambling-related problems. Although primary, secondary, and tertiary prevention can employ similar strategies (e.g., education, individual, group, and family sessions, skills building, values clarification), the content and purpose of each is different. This chapter, which outlines some of these responses, addresses the task specified in the project brief: *To develop guidelines for the development of intervention strategies/programs for children at risk of developing problem gambling. These guidelines are intended for use at a targeted population level, not on an individual therapeutic level.*

A public health approach incorporating primary, secondary, and tertiary prevention is useful for exploring the policy and practice responses for individuals raised in problem gambling families

10.1 Primary Prevention Programs

Primary prevention programs for individuals raised in problem gambling families aim to prevent the development of gambling problems and antecedent risk factors associated with the subsequent development of gambling problems or other problems [(281)]. Williams [(281)] describes two models of prevention: the distribution of consumption model and the sociocultural model. The distribution of consumption model suggests that reductions in problem gambling (and therefore the number of children adversely affected by gambling-related problems in their families) are effected through societal control of gambling availability using strategies such as setting a minimum gambling age, reducing the hours of venue opening, and caps on electronic gaming machine numbers.

The distribution of consumption model of primary prevention suggests that reductions in the number of children affected by family member problem gambling are produced through societal control of gambling availability

In contrast, the sociocultural model emphasises education and increasing resilience through information, values clarification, and skill-building strategies. Primary prevention programs educate all individuals regardless of whether they have an identified problem gambling family member or whether they are displaying symptoms. Parents and other family members are also educated to recognise that children and adolescents living in problem gambling families are at increased risk. Relevant education messages of such programs include awareness of the risks facing children raised in problem gambling families, knowledge of symptoms of dysfunction, prevention measures that can be employed, and referral for additional information or professional assistance. Media and community-based primary prevention programs can be delivered in specific settings such as schools, work, physicians' offices, and recreational or social clubs.

The sociocultural model of primary prevention emphasises education and increasing resilience through information, values clarification, and skill-building strategies

10.1.1 Community-based prevention

Components of community-based prevention programs include mass media campaigns, adult education, youth education, health professional education, and mass screening of health medical services [281]. To date, there have been no documented community-based primary prevention campaigns targeting the familial transmission of gambling behaviour. However, the findings of the *Children at Risk Project* provide a conceptual basis of risk and protective factors for framing messages for developing education interventions to prevent the development of problem gambling in children raised in problem gambling families. The findings of the *Children at Risk Project* suggest that gambling is a socially normed behaviour for children living in problem gambling families. Studies 2 and 3 indicate that a substantial proportion of gambling participants gambled with their friends, parents, brothers or sisters, and other relatives. The findings of Study 1 suggest that children raised in problem gambling families are more likely to develop gambling problems because they start gambling at a younger age. In Study 4, many problem gamblers surveyed thought that the gambling behaviour of their family members directly influenced their own gambling behaviour by becoming a social norm or a way to interact with their parents. These findings support the proposition that parental problem gambling can affect offspring gambling problems through observation of parental gambling, exposure to gambling role models (including parents, parent's friends, other relatives), increased access to gambling opportunities, and peer influence [41, 66, 92, 122].

Moreover, the findings of Study 3 suggest that problem gamblers in the family also act as significant models for gambling [20, 41, 42, 46, 48, 52, 100, 116-124] by influencing child problem gambling through gambling expectancies and motives. Specifically, strong risk factors for the familial transmission of problem gambling were gambling for internal negative reinforcement (i.e., to reduce or avoid negative emotions) (coping motives), internal positive reinforcement (i.e., to increase positive emotions) (enhancement motives), and external positive reinforcement (i.e., gambling to increase social affiliation) (social motives). Strong risk factors also included expectancies related to the gambling benefits of feeling in control, feeling powerful, and feeling more accepted by peers (self-enhancement expectancies) and financial gain as a result of gambling (money expectancies). The findings of Study 3 also found, however, that negative gambling expectancies, such as emotional impact (guilt, shame, loss of control as a result of gambling) and overinvolvement (the risks of cognitive, affective, and social preoccupation with gambling were strong protective factors for the familial transmission of problem gambling. This perspective was endorsed by many problem gamblers surveyed in Study 4, who thought their gambling problem might serve as an example to influence their own children not to gamble.

Taken together, these findings imply that it would be appropriate for community-based prevention strategies to attempt to reduce the social normalisation of gambling, reduce positive gambling expectancies, and increase negative gambling expectancies for individuals raised in problem gambling families. Parents and other family members may benefit from education and information that contains messages such as:

- You may be placing your children at risk of developing gambling problems by introducing them to gambling, teaching them to gamble, allowing them to gamble at home or with friends, or gambling with them
- The younger your children are when they first gamble, the more at risk for developing gambling problems they will be
- The way you gamble now will influence how your children will gamble in the future
- Your gambling behaviour will affect what your children think they will get out of gambling in future
- Seeing you gamble may put your children at risk of developing gambling problems by teaching them that gambling might make them feel better, that gambling might help them be accepted by their peers, or that they might be able to win from gambling
- Teaching your children that gambling can have many negative consequences may reduce the risk of your children developing gambling problems

Appropriate targets for community-based primary prevention initiatives for individuals raised in problem gambling families are the social normalisation of gambling and gambling motivations and expectancies

In addition to providing an empirical basis to identify appropriate messages for parents and other family members, the findings of the *Children at Risk Project* also provide a basis for determining potential target populations for developing education interventions. Although the results of the project support previous findings that paternal problem gambling raises the risk for the development of child problem gambling more than maternal problem gambling [42, 48, 109], the magnitude of risk associated with maternal problem gambling was also substantial. However, the finding of relatively weak transmission from siblings in the *Children at Risk Project* contrasts with the findings of previous research [63]. Accordingly, it appears that mothers and fathers, but not siblings, are the most appropriate targets for key messages relating to the prevention of gambling problems in children and adolescents raised in problem gambling families.

Mothers and fathers (not siblings) are the most appropriate targets of primary prevention initiatives

The alcohol use literature also emphasises the central role of social learning [66, 71, 92, 96, 99, 102] and alcohol expectancies [66, 92] in the familial transmission of alcohol use problems. A multi-media campaign designed to influence generational change in attitudes to alcohol consumption is the *Kids Absorb Your Drinking* campaign. This campaign, which was jointly funded by DrinkWise Australia and the Australian Government's Department of Health and Ageing, ran from June 2008 to June 2009. The campaign was targeted toward parents of children aged up to six years with an

aim for them to recognise their role as significant models for the future drinking behaviours of their children. The campaign was based on family socialisation theoretical models that emphasise the importance of family dynamics in drinking behaviours and a benchmark study by Quantum Market Research that examined Australian behaviours and attitudes in relation to alcohol. The findings of this benchmark study suggested that parents should become the key target group of a social change campaign [282]. The efficacy of this program was evaluated in an update of the benchmark study with an emphasis on parents in March 2009 [282]. National campaign tracking involving 512 online interviews with a sample of nationally representative Australian parents revealed that a significant proportion of parents reported having reduced (28%) or stopped (3%) drinking alcohol in front of their children since the beginning of the campaign [282]. This campaign provides a model for the development of mass media campaigns designed to prevent the intergenerational transmission of gambling problems.

The empirically-supported Kids Absorb Your Drinking campaign provides a model for the development of mass media campaigns to prevent the intergenerational transmission of gambling problems

10.1.2 School-based prevention

Child-focused primary prevention programs for COAs are often based in schools because of easy access to children [281]. These programs are often universal programs designed for all youth regardless of risk or need [283]. Other school-based programs comprise both a primary prevention component (such as providing alcohol education that addresses familial alcohol use problems to all students through the school curricula) and a secondary prevention component (such as targeted information or support to vulnerable children who identify that they live with an alcohol dependent family member) [281, 284]. In this Section, we will briefly discuss the potential applicability of universal school-based programs to prevent the familial transmission of gambling problems (refer to Section 10.2.2 for a more detailed discussion of school-based secondary prevention approaches).

School-based primary prevention programs are designed for all youth regardless of risk or need

To date, there have been no documented school-based primary prevention programs targeting the familial transmission of gambling behaviour. Risk factors identified in the *Children at Risk Project* that could potentially be modified by school-based primary and secondary prevention include gambling as a social norm (Studies 1 and 3), the positive gambling expectancies and motives of gambling for coping, mood enhancement, social affiliation, and financial gain (Study 3), adolescent substance use (Study 2), depression (Study 3), and adolescent non-productive coping (Study 2). Moreover, protective factors identified in the *Children at Risk Project* that could potentially be modified by school-based primary and secondary prevention include

the negative gambling expectancies of emotional impact and overinvolvement (Study 3) and productive coping (Study 2).

Taken together, these findings imply that school-based primary and secondary prevention for children and adolescents raised in problem gambling families comprise strategies that attempt to:

- reduce positive gambling expectancies by addressing beliefs that gambling can reduce negative emotions, increase positive emotions, increase social affiliation, and be a source of financial gain
- enhance negative gambling expectancies by emphasising the negative consequences of gambling such as losing control and preoccupation
- reduce non-productive coping, such as worrying, wishful thinking, avoiding the problem, blaming themselves, and "letting off steam"
- develop adaptive coping, such as attempting to solve the problem and referring to others
- reduce the social normalisation of gambling
- address the comorbid depression of young people
- address the comorbid marijuana and other drug use of children and adolescents

Appropriate targets for school-based prevention programs include gambling expectancies, coping, social normalisation of gambling, comorbid depression, and comorbid drug use

In the alcohol use literature, social learning [66, 71, 92, 96, 99, 102], alcohol expectancies [66, 92], emotional distress [66, 71, 92], and impaired coping [66, 92] are emphasised in the intergenerational transmission of alcohol use problems. The COA literature suggests that providing education sessions on alcohol that include general information on families with an alcohol dependent family member to all students is an effective school-based primary intervention [224]. Although this type of program should be transferable to children raised in problem gambling families, there is a need to develop and evaluate analogous primary prevention programs.

School-based primary and secondary prevention could benefit from resources designed to assist teachers and school welfare staff in addressing the specific issue of the familial transmission of gambling problems. However, the development of gambling problems is only one of a range of potentially adverse psychological, behavioural, and physical outcomes for children living in problem gambling families [24-39]. Moreover, issues related to the development of gambling problems in children and adolescents (with and without family member gambling problems) would also be of interest to teachers and school welfare staff. These resources could therefore be produced using current knowledge about the familial transmission of problem gambling, the effects of family member problem gambling on the psychological and behavioural functioning of children and adolescents, and the development of youth problem gambling. Examples of such resources include:

- The distribution of state-specific resource guides based on the 2006 *Problem Gambling: A Guide for Victorian Schools* [255] through the Australian education systems.
- The distribution of a shorter teachers resource guide through the Australian education system because teachers are often best placed for problem recognition
- Professional development for teachers and school welfare staff
- The construction of an online interaction resource that could be accessed and utilised by whole school communities of students (children and adolescents), parents (with gambling problems or parents of young people who gamble), school welfare and leadership staff (counsellors, psychologists, principals, welfare co-ordinators), and teachers[1]. This type of resource could be maintained at a national level with links to relevant state and territory-specific content, or maintained at a state and territory level utilising a high level of shared content.

School-based prevention efforts could benefit from the development of resources to assist teachers and school welfare staff

10.2 Secondary Prevention Programs

Secondary prevention specifically targets high-risk groups for identification and intervention. The goals of secondary prevention for individuals raised in problem gambling families are to identify and address early symptoms of problem gambling in order to prevent the development of more serious gambling problems and to identify and change predisposing risk factors for problem gambling or other adverse outcomes [281]. Secondary prevention programs involve screening for a family history of gambling problems and the provision of interventions to individuals of all ages (young children, adolescents, and adults) across a range of settings, such as mental health services, family service agencies, relationship counselling agencies, health care settings, criminal justice settings, and youth agencies [281].

Secondary prevention targets individuals raised in problem gambling families for identification and intervention

To date, there have been no documented secondary prevention initiatives targeting individuals raised in problem gambling families. However, the consistent major finding in the *Children at Risk Project* of familial transmission of gambling problems suggests that individuals raised in problem gambling families are appropriate target populations for secondary prevention initiatives. The findings of stronger transmission for fathers and mothers suggests that the children of problem gamblers are appropriate target populations for secondary prevention initiatives while

[1] A model of a whole of school website has been developed by the PGRTC and is available on request.

the seemingly relatively weaker transmission for siblings suggests that the siblings of problem gamblers are less in need of targeted prevention programs. Moreover, it is likely that the children of problem gamblers will present at a range of different services given the secondary finding in the *Children at Risk Project* that growing up in a problem gambling family was associated with a range of adverse outcomes, including depression, higher life dissatisfaction, marijuana and other drug use, non-productive coping, parental and sibling psychopathology (mental health issues, problem drinking, drug problems), parental separation/divorce, family financial debts, and family and living situation dissatisfaction.

Secondary prevention programs require identification of a family history of gambling problems using valid screening instruments. However, as previously indicated in Chapter 3, there are currently no screening instruments for identifying the children or family members of problem gamblers. There is also currently no national approach to screening for problem gambling in individuals or their family members. Although we employed several single items in the *Children at Risk Project* to specifically identify the children and siblings of problem gamblers, we have adapted a more general screening item from the item recommended for primary care screening in our Medical Journal of Australia editorial [285]. This item has been found to have excellent sensitivity and specificity in identifying people with problem gambling or who have elevated risk of developing problem gambling. The item is:

Have you or anyone else in your family ever had an issue with gambling?

Service users who positively endorse this question are then asked:

Who is it that has had this issue?

Secondary prevention programs require identification of a family history of gambling problems using valid screening instruments

Once individuals with a family history of gambling problems have been identified, a service response is required. Secondary prevention initiatives could involve a spectrum of interventions, from prevention education through to complex case management and treatment. Secondary prevention programs for COAs often share common components [284], including:

- *Social support*. Most secondary prevention programs are group interventions offering mutual support and exchange of experiences.
- *Information*. Most programs provide information about alcohol use, problem drinking, and the sequences of parental problem drinking for their children. Some programs discuss the increased risk of alcohol use problems for the children of problem drinkers.
- *Skills training*. Most prevention programs teach participants how to manage alcohol-related problems and general skills, such as social skills or problem solving.
- *Coping with emotional problems*. Many preventative programs identify and teach participants how to manage emotional problems.

As discussed in the section outlining school-based primary prevention (Section 10.1.2), the findings from the *Children at Risk Project* suggest that secondary prevention initiatives employ strategies that attempt to reduce positive gambling expectancies, enhance negative gambling expectancies, reduce non-productive coping, develop adaptive coping, reduce the social normalisation of gambling, and address the comorbid depression, marijuana use, and other drug use (refer to Section 10.1.2 for a more detailed discussion).

Most secondary prevention programs incorporate social support, information, skills training, and coping with emotional problems

10.2.1 Community service settings

Taken together, the findings of the *Children at Risk Project* suggest that individuals raised in problem gambling families and their family members may present with any number of difficulties to a range of community services. Therefore, routine screening for the presence of a family history of gambling problems followed by a service response is seemingly justified. An illustration of such a service response is provided by the *Mental Health Community Based Program* of the Council of Australian Governments' (COAG) National Action Plan on Mental Health. The Program funds a range of projects to support families, carers, children, and young people whose lives are affected by mental illness. The Program is one of three mental health initiatives currently being delivered by the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) under the COAG National Action Plan. The others are the Personal Helpers and Mentors Program and the Mental Health Respite Care Program. Together, these measures provide a range of support services for individuals with mental illness, their families, their carers, and the communities that support them.

Routine screening and a service response for a family history of problem gambling seems to be justified in community service settings

The *Mental Health Community Based Program* aims to achieve a range of objectives. Adapted for children living in problem gambling families, those with particular relevance include:

- supporting families, carers, children and young people (aged 16 to 24 years) affected by problem gambling
- developing a sound evidence base and practical framework for broader problem gambling intervention in a community context
- providing enhanced support for children of parents who have their own gambling problems
- improving family functioning and social support for families, carers, children and young people (aged between 16 and 24 years) affected by problem gambling

The *Mental Health Community Based Program* projects have a range of planned outcomes. Adapted for children living in problem gambling families, those with particular relevance include:

- reducing the prevalence of risk factors that contribute to the onset of problem gambling and prevent longer term recovery
- increasing the proportion of people with an emerging or established gambling problem who are able to access the right health care and other relevant community services at the right time, with a particular focus on early intervention.

The *Family Mental Health Support Services Project* is funded under the *Mental Health Community Based Program* to support families, children and young people affected by mental illness. The service provider responsibilities and accountabilities identified in program documentation place a clear onus on these programs to be evidence-led in their development and to adopt high standards of program monitoring and evaluation. These requirements include, among others:

- contributing to the overall development and improvement of the program such as sharing best practice methods based on evidence and data and participating in skills development and continuous improvement
- providing quality services which are effective, efficient, and appropriately targeted
- working collaboratively to deliver the program, particularly with other agencies and services to ensure the best possible outcome for program participants.

10.2.2 School settings

As previously indicated, school-based programs generally comprise a primary prevention component and a secondary prevention component [281, 284] (refer to Section 10.1.2 for a detailed discussion of school-based primary prevention). In COA research, the secondary prevention component often provides targeted information or support to vulnerable children who identify that they live with an alcohol dependent family member [281]. Outcomes of child-focused problem detection can be school-based counselling or referral for more serious difficulties. To date, there have been no documented school-based primary prevention programs targeting the familial transmission of gambling behaviour.

As discussed in the section outlining school-based primary prevention (Section 10.1.2), school-based primary and secondary prevention could benefit from resources designed to assist teachers and school welfare staff in addressing the development of gambling problems and other adverse outcomes. These resources may include the development of school resource guides, the development of a shorter teachers resource guide, professional development for teachers and school welfare staff, and the construction of an online interaction resource (refer to Section 10.1.2 for a more detailed discussion of these resources).

In the COA literature, secondary prevention initiatives generally involve referring children of problem drinkers to support groups with leaders and/or personal coaches [284]. Some findings of controlled studies evaluating these school-based programs indicate that there are a number of positive effects on indirect outcome measures, such as social support, self-esteem and self-control [286] coping strategies

and help-seeking behaviour [287], and knowledge [283, 288, 289]. However, apart from some reduction in depressive symptomatology, these programs do not seem to exert a clear effect on measures of mental health and problem drinking. Further research is required to determine whether these types of programs are generalisable to children raised in problem gambling families.

School-based secondary prevention initiatives could involve referring children living in a problem gambling family to support groups with leaders and/or personal coaches

10.3 Tertiary Prevention Programs

The main aim of tertiary prevention is to prevent further dysfunction in problem gamblers and to support their recovery, which in turn should mitigate the impact on family members. The most obvious way to prevent the development of gambling problems in children and adolescents raised in problem gambling families is to successfully treat the problem gambling of the family member [284]. There is some evidence in the COA literature that treatment of parents results in better physical and psychological outcomes for the children [290, 291]. However, there do not seem to be any studies that have examined whether treatment of parents and other family members with a gambling problem has an effect on the gambling, psychological, and behavioural functioning of children growing up in problem gambling families.

The most obvious way to prevent the development of gambling problems in children and adolescents raised in problem gambling families is to successfully treat the problem gambling family member

Tertiary prevention programs also include interventions for individuals raised in problem gambling families and family-focused interventions for problem gambling. The findings of the *Children at Risk Project* have implications for the delivery of both types of interventions. In the *Children at Risk Project*, children raised in problem gambling families were clearly at an increased risk of developing gambling problems themselves. Parental psychopathology (mental health issues, problem drinking, and drug problems) and family financial debts were among the risk factors for the familial transmission of gambling problems. A range of adverse outcomes other than problem gambling were also associated with growing up in a problem gambling family including depression, life dissatisfaction, marijuana and other drug use, non-productive coping, parental and sibling psychopathology (mental health issues, problem drinking, drug problems), parental separation/divorce, family financial debts, and family and living situation dissatisfaction. These findings are consistent with a growing literature that suggests that problem gambling significantly disrupts dyadic or marital relationships and family environments and has a substantial impact on the mental and physical health of partners, children, and other family members [eg., 23, 33, 148, 156].

Tertiary prevention programs also include interventions for individuals raised in problem gambling families and family-focused interventions for problem gambling

10.3.1 Interventions for individuals raised in problem gambling families

In Australia, there are no specialist services for individuals (adolescents or adults) who present with the behavioural or psychological consequences of being raised in a problem gambling family. There are also no evaluations of interventions specifically designed for individuals raised in problem gambling families. This is in contrast with the COA literature, which comprises a limited literature evaluating individual counselling [292], group interventions [293], and 12-step self-help programs [294] for COAs and adult children of alcoholics (ACOAs). Kingree and Thompson reported significant improvements in depression and substance use in a randomized trial of 114 ACOAs with substance use problems participating in self-help groups or substance-misuse education classes. A two-year randomized controlled trial of three interventions (alcohol intervention program, coping intervention program, combination program) conducted by Hansson et al. for 82 university students revealed that drinking outcomes were best for the group receiving the combination program. Positive effects on drinking between 1 and 2 years were found for the combined intervention group only, suggesting that intervention for alcohol alone is not enough to achieve long-term changes in problem drinking behaviour. Finally, another possible intervention method could be a supporting website for individuals raised in problem gambling families with focused content for children, adolescents, and adults [284]. These websites could offer information and chat functions for individuals who are aware of their situation and are actively seeking support.

The development of interventions specifically designed for individuals raised in problem gambling families is needed

Possible interventions for individuals raised in problem gambling families include individual treatment, group treatment, 12-step programs, and website support

As for school-based secondary prevention efforts (Section 10.1.2), the findings of the *Children at Risk Project* imply that treatment programs for individuals raised in problem gambling families comprise strategies that attempt to reduce positive gambling expectancies, enhance negative gambling expectancies, reduce non-productive coping, develop adaptive coping, reduce the social normalisation of gambling, and address the comorbid depression, marijuana use, and other drug use of adolescents.

Gambling expectancies, coping, social normalisation of gambling, comorbid depression, and comorbid drug use are appropriate targets of tertiary interventions for individuals raised in problem gambling families

Despite the lack of programs specifically designed for individuals raised in problem gambling families, the specialist problem gambling services in most Australian states and territories provide services to the family members of problem gamblers. Moreover, 12-step programs such as Gam-Anon, which are designed to support families and friends of problem gamblers, are available to support the family members and friends of problem gamblers in several Australian states and territories. Several studies have also evaluated coping skill interventions specifically designed to assist partners or "concerned significant others" (CSOs) [149, 157]. In the largest study, Hodgins and colleagues [149] evaluated the efficacy of a self-help workbook based on the Community Reinforcement and Family Therapy (CRAFT) model. CRAFT, which has been successfully employed with the CSOs of problem drinkers, is a cognitive-behavioural intervention that aims to improve CSO personal and relationship functioning, engage the problem gambler into treatment, and decrease gambling behaviour. In this study, 186 CSOs (56% spouses) were randomly allocated to a workbook only condition, a workbook plus telephone support condition, and a control condition (treatment resource information package). The findings revealed that although the conditions did not differ in terms of CSO functioning and gambling-related negative consequences, the workbook conditions produced better outcomes in terms of gambling behaviour, program satisfaction, and having needs met than the control condition.

Although the specialist problem gambling services in most Australian states and territories provide services to the family members of problem gamblers, young people are underrepresented as significant other clients in these services [156]. The range of issues associated with problem gambling families also suggests that children and adolescents living in problem gambling families are likely to present to services other than the specialist problem gambling services for a range of issues. Taken together, these findings imply that services such as specialist child and adolescent services should engage in routine screening for a family history of problem gambling and have an intervention capacity to manage the complex presentations of children living in problem gambling families.

10.3.2 Family-oriented interventions for problem gambling

The range of issues associated with problem gambling families implies that family-oriented treatment programs and services are appropriate. Depending on where problem gamblers or their family members present, these services may be conducted within gambling-specific services or any other community service, such as family service agencies and couples counseling agencies. Family-oriented treatment programs conducted in community agencies require routine screening for the presence of gambling problems or a family history of gambling problems. Unfortunately, however, there is a lack of family-focused interventions specifically designed for the treatment of problem gambling.

The range of issues associated with problem gambling families implies that family-oriented interventions for problem gambling are appropriate

In the COA literature, a serious attempt to combine the traditional treatment of the problem drinking parent with preventative services for the children is the *Strengthening Families* program [295, 296]. This training program is aimed at parents with alcohol or substance use problems and their children. It comprises three components: parent program, child program, and family program. The parent and child programs are conducted concurrently and each comprise 12 weekly sessions of 2 to 3 hours. The parent program involves educational training and the child program involves training in communication skills, coping skills, and resistance skills. The family program involves the groups merging in the final hour of each session to practice the skills taught in that session. Specific interventions have been developed for children aged 6 to 10 years and 10 to 14 years. A trial randomly allocating 118 families to the *Strengthening Families* program or a care-as-usual control condition revealed significant reductions in parental substance use and the substance use of older substance-using children. There were also significant improvements in parental educational skills and self-efficacy, child social skills, and family relations. It is reasonable to assume that this type of program, which could be integrated relatively easily into traditional problem gambling treatment settings, could be applied to problem gambling families.

The Strengthening Families program for problem drinking and drug using families provides an empirically-supported model combining traditional treatment of parents with preventative services for children

As well as a lack of family-focused interventions for problem gambling, couple-oriented interventions are also under-developed. Ciarrocchi [297] describes an *integrative behavioural couple therapy* (IBCT) model. The primary aim of this therapeutic model for couples is to support problem gamblers in abstaining from gambling. This model employs a range of diverse strategies, including developing environmental controls, restoring the couples' financial situation, managing legal problems, permitting non-gambling partners to ask questions and give gamblers feedback about their behaviour, and providing gamblers' partners with emotional support. Lee [298-300], drawing on the work of Satir [301], has developed the *Congruence Couple Therapy* (CCT) model. This integrative, multi-dimensional model, based on a systemic approach, is centred on the concept of congruence, which is assessed according to four dimensions: interpersonal, inter-psychic, universal-spiritual, and intergenerational. For example, the therapist fosters the development of spouses' understanding of their communication behaviours in connection with their family learning. In addition, the therapist attempts to promote acceptance and validation of the partner's needs and experience. CCT, which involves 12 weekly couple sessions, seeks to initiate structural changes in the couple system in order to obtain durable changes to gambling habits and communication. Finally, Bertrand, Dufour, Wright and Lasnier [302] have proposed *Adapted Couples Therapy* (ACT), a couples-focused

intervention of usually eight to 12 sessions. ACT is designed to be offered in conjunction with individual treatment (usually cognitive-behaviour therapy) of the family member with the gambling problem. Despite these descriptions, the effectiveness of these approaches has not been adequately tested. It is evident that the development of a rigorous evidence base for the efficacy of family and couples interventions for problem gambling is required.

The development of an evidence base for the efficacy of family and couples interventions for problem gambling is required

10.3.3 Treatment programs and services for adolescent problem gambling

Another approach to preventing problems in the children of problem gambler is to prevent future parents from becoming problem gamblers and reduce the incidence of adolescent problem gambling. However, age-specific approaches for the treatment of adolescent problem gamblers remain to be adequately evaluated. Gupta and Derevensky [303]described a treatment model predicated upon their findings that youth problem gamblers generally show evidence of depressive symptomatology, somatic disorders, anxiety, attention deficits, academic, personal and family problems, high risk-taking, poor coping skills, and as such, use gambling as a way of escaping daily and long-term problems, in addition to experiencing erroneous cognitive beliefs and distortions. Although they contend that the underlying psychological problems must be effectively managed in order for the adolescent to cease gambling and prevent relapse, there is no evaluation of this program in the literature. Ladouceur, Boisvert, and Dumont [304] employed a cognitive-behavioural program with four adolescent male pathological gamblers. They found clinically significant improvements in beliefs about the perception of control when gambling, significant reduction in severity of gambling problems, and that three adolescents were abstinent at the six months follow-up evaluation. Taken together, these findings imply that adolescent problem gambling is amenable to intervention but that age-specific approaches for the treatment of problem gambling require further development and evaluation.

Although an approach is to prevent future parents from becoming problem gamblers, age-specific approaches for the treatment of adolescent problem gamblers remain to be adequately evaluated

A secondary finding of the *Children at Risk Project* was that adolescent problem gambling was associated with a range of adverse outcomes, including non-productive coping, inconsistent discipline, parental separation/divorce, financial debts, family dissatisfaction, living situation dissatisfaction, money dissatisfaction, alcohol use, marijuana use, and other drug use (Study 2). These findings are consistent with a growing literature that suggests that adolescent problem gambling is associated with a range of factors, including as emotional distress, impaired coping, alcohol and substance use, and family problems (refer to Section 2.3.6.2). These

findings suggest that interventions for adolescent gambling problems should address these issues.

The range of issues comorbid with adolescent gambling problems also suggests that adolescents with gambling-related problems are likely to present to a range of services for a range issues other than their gambling. Moreover, the likelihood of children or young people to refer for treatment for gambling-related problems is low [305-307]. For example, a five year trend analysis of problem gambling clients presenting to the Victorian specialist gambling services revealed that individuals younger than 20 years of age comprised 1.0% of presenting clients compared with 9.0% of their proportion in the Victorian population [270]. Taken together, these findings suggest that services such as specialist child and adolescent services should engage in routine screening for gambling problems and have an intervention capacity to manage the complex presentations of children and young people with gambling problems.

10.3.4 Protocols requiring coordinated service response for children living in problem gambling families

Our discussion of policy implications for the children of problem gamblers revolves around the principle that, wherever they first appear in the service system, the same consistent high quality response ought to be provided to preserve their interests and to minimise the harm upon them of their parent's gambling difficulties. The goal of a coordinated service response is that two people with exactly the same profile of combined problem gambling and drug and alcohol or mental health problems both receive appropriate and comparable treatment regardless of whether the primary diagnosis is mental health/alcohol/drug problems or problem gambling. Further, the children of a person presenting with a primary diagnosis of problem gambling should also receive a similar treatment response as a person with the same problems but with a primary diagnosis of mental health issues or alcohol/drug problems.

In most Australian jurisdictions, the children of those who present to mental health services are likely to be referred for consideration by these authorities. There are many examples of well developed protocols requiring alcohol and drug and mental health service inter-agency and inter-service collaboration that ensure that the interests of the children affected by alcohol, drugs, or mental health issues are appropriately preserved. There are sophisticated protocols for managing the family and child welfare issues that arise from drug and alcohol and mental health problems for parents in most Australian jurisdictions. When parents present for treatment for serious drug, alcohol, and mental health issues, the appropriate family and child welfare agencies are mandated to act to preserve the interests of the family and the children.

The 2002 Protocol between Drug Treatment Services (DTS) and the Child Protection (CP) and Juvenile Justice Branch of the Victorian Department of Human Services (DHS) [308] is an example of a protocol that encourages greater collaboration and cooperation between service providers. The Protocol refers to Child Protection and organizations funded by DHS to provide alcohol and other drug treatment, education and prevention services. This includes a range of community-based services

including residential and non-residential withdrawal services, residential rehabilitation, supported accommodation, counselling, consultancy, peer support groups and specialist methadone services. Within this service sector is a range of programs targeted directly at families including: ante and postnatal support, family counselling and therapy, specialist rehabilitation for families, supported accommodation for women and children, domestic violence programs and parent support. The Protocol outlines 'common scenarios and practice issues' including confidentiality, sharing of information, case-management and disputes and complaints to further facilitate inter-sectoral collaboration and engagement with the client in the development, management and monitoring of treatment goals.

The children of parents who present to gambling services should receive the same treatment response as those of parents presenting to mental health or drug and alcohol services

The effective treatment of children living in problem gambling families and problem gambling families require well developed protocols requiring inter-agency and inter-service collaboration. Problem gambling services require sophisticated protocols for referral of children to child-specific services or the capacity to provide such services themselves. A high level of integration of services encompassing assessment, referral, intervention, and post-intervention support can promote good outcomes for children living in problem gambling families.

A high level of service integration can promote good outcomes for children living in problem gambling families

10.4 Concluding Comments

This chapter addressed the task specified in the project brief: *To develop guidelines for the development of intervention strategies/programs for children at risk of developing problem gambling. These guidelines are intended for use at a targeted population level, not on an individual therapeutic level.* The findings of the *Children at Risk Project* have implications for policy and programmatic responses utilising a health promotion approach incorporating primary, secondary, and tertiary prevention efforts.

It is clear from the information presented from this chapter that interventions for individuals raised in problem gambling families are much more underdeveloped than interventions for individuals affected by alcohol and drug use problems and mental health issues in the family. There is a clear gap in relation to the development and evaluation of high quality, theory-driven primary, secondary, and tertiary prevention efforts for individuals raised in problem gambling families. There is a need for prevention efforts such as multi-media campaigns designed to influence generational change in attitudes to gambling consumption, school-based education

sessions and interventions with children raised in problem gambling families, treatment interventions for individuals raised in problem gambling families, and family-oriented treatment programs. Williams [281] outlines some research questions for the primary, secondary, and tertiary prevention of alcohol use problems for COAs that are applicable to individuals raised in problem gambling families (Table 10.1). The development of prevention programs for individuals raised in problem gambling families will require an operationalisation of the definition of a child living in a problem gambling family, the development of valid screening or severity assessment instruments to identify these children, a solution for the ethical dilemma of the need to involve parents who are potentially the source of the problem, the development of theory-driven prevention programs, and the development of an evidence base for the effectiveness of these programs [281, 284].

There is a clear gap in relation to the development and evaluation of high quality, theory-driven primary, secondary, and tertiary prevention efforts for individuals raised in problem gambling families

There are also many examples of well developed protocols requiring alcohol and drug and mental health service inter-agency and inter-service collaboration to ensure that the interests of the children affected by alcohol, drugs, or mental health issues are appropriately preserved. Coordination of problem gambling services with mainstream mental health and drug and alcohol services encompassing assessment, referral, intervention, and post-intervention support could promote effective service responses for individuals raised in problem gambling families. Although challenging, the development of prevention policies and services for individuals raised in problem gambling families will ensure better outcomes for the next generation of children and adolescents living in problem gambling families.

Table 10.1
Research questions for the prevention of alcohol use problems for COAs that are applicable to children living in problem gambling families

Primary prevention
• What are the most effective programs and settings for channelling information and at what level of risk is this approach sufficient to prevent problem gambling for children living in problem gambling families? • For which symptomless children living in problem gambling families are targeted prevention programs sufficient to prevent development of gambling problems and other dysfunctions? • What is the most effective combination of educational techniques and settings? • What are the most effective means of identifying and referring those in need of secondary and tertiary prevention programs?
Secondary prevention
• What are the best screening tools for which settings? • Does intervention into symptoms associated with increased risk of gambling problems decrease the incidence of gambling problems? • How do children living in problem gambling families who develop systems differ from those who do not develop symptoms? • What constitutes the best intervention program in which settings for what specific constellation of risk factors?
Tertiary prevention
• Which family-systems treatment techniques, in combination with which constellation of family characteristics, are most effective for preventing gambling problems and other dysfunctions in the child? • Do children living in problem gambling families with gambling problems need different treatment components to arrest their gambling problems and its intergenerational transmission than problem gamblers who do not live in problem gambling families?

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