

Adolescent Gambling in the ACT

March 2005

Report to the

ACT Gambling and Racing Commission

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1.0 EXECUTIVE SUMMARY

This report presents key findings of a 2003-2004 study into adolescent gambling in the Australian Capital Territory (ACT). The study is based on a survey of years 7 to 12 students from Government, Catholic, and Independent schools. The aim of this research project was to increase existing knowledge concerning the nature and extent of gambling amongst a population subgroup that was generally omitted by the Federal Productivity Commission in their 1999 report. Although previous studies of young people have been conducted in Victoria and South Australia that reveal higher prevalence of problem gambling than adults, no such work has ever been undertaken in the ACT. Our research therefore contributes to this scant Australian literature on adolescent gambling by providing further data concerning its measurement, causes and prevalence. In addition, this study provides regulatory and educational authorities in the ACT with a much-needed overview and the material basis for the development of evidence-based prevention and counselling programs, and education strategies. The research also assists in the development and validation of a consistent methodology to allow future replications, as well as providing baseline statistics against which future developments in adolescent gambling can be compared.

The survey on which this report is based, was specifically designed to: (a) assess the prevalence of adolescent gambling and problem gambling in the ACT, (b) identify the risk factors for adolescent problem gambling, (c) the psychological and social correlates of gambling and other high risk-behaviours, (d) gambling beliefs and cognitions, (e) the role of advertising in adolescent gambling, and (f) young people's help-seeking behaviour in relation to problem gambling. The key findings of the survey are set out below:

Prevalence and Social Context of Gambling

- Students were asked to indicate the frequency of their gambling for the year prior to completing the survey. The results showed that 29.6% of students reported that they had never gambled, 60.4% reported infrequent gambling,

and 10% said they gambled frequently (i.e. weekly or more often).

Participation rates varied according to the age or year level of students. The highest rates were amongst Year 11 and 12 and the lowest rates amongst Year 7s, with the strongest increase occurring after year 10. These prevalence rates are similar to previous South Australian estimates of gambling participation based upon a similar sampling methodology.

- The most popular type of gambling based upon overall participation was private card games (40%) and bingo/ scratch cards (41%), racing (32%) and gambling on sporting events (26%). Only 6.1% of students had gambled on the internet in the past year, making it one of the least popular forms of gambling.
- Overall participation rates differed very little in term of gender. However, males were more likely than females to be frequent gamblers. Boys were also more likely to gamble on card games, racing, sports events and scratch tickets, but there were no differences between males and females for lottery or poker machine gambling.
- Young people indicated that 72% of their parents gamble, a rate very similar to the overall national average. There was a significant association between the frequency of adolescent and parental gambling involvement.
- The social context of adolescent gambling varied according to type of gambling activity. Card games were predominantly played with friends. Poker machine and internet gambling were most commonly undertaken alone, whereas racing, lottery and scratch card gambling were more likely to be undertaken with parents.

Problem Gambling

- We used two measures to determine the prevalence of problem gambling in the survey: the DSM-IV-J, an adolescent version of a problem gambling screen, and a new Australian screen, the Victorian Gambling Screen (VGS). Using these two measures, we estimated that between 3% and 4% of adolescents experienced problems associated with their gambling (4.4% using

DSM-IV-J and 3.3% using VGS). Previous Australian studies also indicate a prevalence rate between 3 and 4%. Adolescent problem gambling prevalence estimates are higher than recent adult estimates of 1.9% for ACT adults (Australian Institute of Gambling Research 2001) and 2.1% for Australian adults (Productivity Commission 1999).

- Boys were significantly more likely to be problem gamblers than girls (7.8% vs 2.7%).
- Problem gamblers were significantly more likely than the rest of the sample to be involved with card games, poker machines, racing, sports-betting and internet gambling but not with lotteries or bingo and scratch cards. Problem gamblers also engaged in a wider range of gambling activities.
- Problem gamblers started gambling at a significantly younger age (mean age of 9.62 years vs. mean age of 11.77 years).
- Problem gamblers were also more likely to report having a large win when they first started to gamble.
- Adolescent problem gamblers were also significantly more likely to have someone close to them who they felt had a gambling problem.
- More problem gamblers (90%) reported that their parents gambled than the rest of the sample (71%).
- Problem gamblers indicated a stronger intention to gamble when they turned 18 than the rest of the sample.
- Problem gamblers endorsed survey items suggesting that their friends and family were much more likely to gamble and approve of gambling than others in the sample.

Correlates of problem gambling

- More problem gamblers report high levels of illegal and legal drug use; three

quarters of problem gamblers reported drinking alcohol on a weekly basis compared with only half of the non-problem sample. The prevalence of smoking by problem gamblers was 4 times the rate recorded for non-problem gamblers; for marijuana over 6 times the rate and for harder drugs, 10 to 20 times the rate recorded for the non-problem sample.

- Problem gamblers experienced significantly poorer mood states, had lower self-esteem, poorer general health, felt more alienated from society, and were more likely to feel that they did not have sufficient money to satisfy their needs.
- Problem gamblers reported having many friends and engaging in many activities with others. However, they were more likely to report having poorer relationships between themselves and their peers.

Understanding odds and perceiving risks of gambling

- All students rated card games, racing and sports betting as more skilful than other forms of gambling. Problem gamblers rated games of pure chance (such as poker machines and scratch tickets) as involving more skill than others in the sample.
- Survey results show that many young people do not have an accurate understanding of the true odds of gambling activities, and are likely to overestimate the probability of winning on activities such as lotteries.
- Problem gamblers were particularly susceptible to the idea that they are more skilful on activities where no such skill is possible (e.g. poker machines, lotteries and roulette). They also felt that certain dice numbers were more difficult or easier to obtain, and were more optimistic about their chances of winning and making money from gambling.
- At the same time, problem gamblers were no less accurate in their understanding of questions of basic probability. Thus, an important finding of the survey is that the possession of objective knowledge of mathematics and

statistics does not shield people from either an interest in gambling, or irrational perceptions of gambling.

Exposure to gambling advertising

- Students were asked if they could recall seeing an advertisement for gambling during the week prior to completing the survey. Overall, 71.1% of problem gamblers and 61% of non-problem gamblers could recall seeing an advertisement and many were able to nominate the brand or venue that was being advertised.

Help-seeking

- Students were asked to identify who they would seek help from if they had a gambling problem. Students reported that they would consult, in the following order, their friends, counsellors (including school counsellors), family members and school staff.

Recommendations

Based on the results of our survey research, we recommend that regulators and educators consider the following:

1. Although regulatory provisions appear to be working reasonably well, there may be a need to strengthen existing regulatory controls to prevent young people from gambling on specific activities, most notably, lotteries, scratch tickets and poker machines. For example, more frequent ID checking may be required to ensure that young people are not gaining access to lottery products before the age of 18. Although adolescent gambling, and problem gambling, occurs on private activities or parentally sanctioned legal gambling rather than as a result of underage access to commercial gambling venues (e.g. casinos or poker machine venues), there is evidence that a few young people are gambling on commercial gambling activities.

2. Patents play an important role in exposing young people to gambling and should be targeted in any educational programs or public awareness campaigns that seek to reduce adolescent gambling.
3. It is important to teach young people about objective odds because many young people do not know how difficult it is to win in some forms of gambling, like lotteries.
4. Given that statistical knowledge does not always preclude the development of erroneous beliefs about gambling, other educative strategies need to be employed in school-based learning where adolescents can observe firsthand the development of idiosyncratic belief systems and superstitious beliefs (e.g., via role playing exercises).
5. As friends are the primary source of assistance in the event of a gambling problem, future school programs could provide advice for young people on appropriate ways of responding to and supporting a friend who is experiencing problems with gambling.

2.0 PROJECT BACKGROUND

This report presents the findings of research conducted in the Australian Capital Territory (ACT) during 2003 and 2004. The research project, entitled, *Adolescent Gambling: prevalence, risk factors, and opportunities for controls and interventions*, was supported by an Australian Research Council Linkage Grant (LPO348759) with industry partner, the ACT Gambling and Racing Commission. The Chief Investigators for the project were Professor Peter Grabosky (Australian National University) and Dr Paul Delfabbro (University of Adelaide). Dr Julie Lahn (Australian National University) was initially appointed to the project as a Research Officer and later, as a Postdoctoral Fellow. Jodie Houston (Australian National University) provided assistance with data preparation.

3.0 INTRODUCTION

Gambling has been a part of Australian culture since the first European settlement. Only in the past generation, however, have gambling industries developed to the point that the number and variety of gambling opportunities are without precedent. This raises the significant question of how the new culture of gambling is impacting on Australia's youth. While prevalence studies conducted by the Productivity Commission (1999) reported that about 80% of Australians have engaged in some form of gambling, and approximately 2% experience serious gambling problems, the survey sample was limited to respondents aged 18 or older. Given the paucity of previous, or indeed subsequent, research on younger subjects, our knowledge about the gambling behaviour of Australian youth is severely limited.

This is particularly unfortunate, given the fact that overseas research reveals young people to be at significantly higher risk than adults for gambling related problems (National Research Council 1999; National Gambling Impact Study Commission 1999). Across a number of studies conducted in Canada (Derevensky & Gupta 2000; Gupta & Derevensky 1998, Ladouceur, Dube & Bujold 1994), the United States (Shaffer & Hall 2001; Volberg & Moore 1999), the United Kingdom (Fisher 1993, 1999; Wood & Griffiths 1998) and Australia (Delfabbro & Thrupp 2003; Moore & Ohtsuka 1997), it has been found that between 60-80% of young people aged 13-17 years gamble at least once per year, and that between 3-5% display many of the behaviours indicative of adult problem gambling (Derevensky, Gupta & Winters 2003). Such behaviours include an excessive preoccupation with gambling, chasing losses, lying to friends and family about the extent of gambling, as well as giving up important commitments (e.g. school or friendships) to continue gambling.

Although disagreements exist concerning the interpretation and validity of problem gambling prevalence rates (see Derevensky et al. 2003; Ladouceur et al. 2000), there is other evidence that suggests that adolescence may be a critical period in the development of problem gambling. For example, in many studies of adult gambling (e.g. Abbott, McKenna & Giles 2000; Shaffer & Hall 2001) it has been found that most adult pathological gamblers report that their introduction to gambling occurred at a

very young age (usually 8-12 years). Moreover, in community prevalence studies (Ipsos-Reid 2003; Productivity Commission 1999; Queensland Treasury 2001; Wiebe, Single & Falkowski-Ham 2001; Welte et al. 2004) significantly higher rates of problem gambling occur in the 18-25 year age group, suggesting that problems very likely commenced prior to adulthood. Further attesting to the validity of prevalence findings are studies that have shown that individual differences in problem gambling scores amongst adolescents are positively related to various independent measures of psychosocial dysfunction. Young people who gamble regularly and/or who are classified as problem gamblers have been found more likely to be engaged in various forms of substance misuse (Griffith & Sutherland 1998; Shaffer & Korn 2002), have poorer educational outcomes (Gupta & Derevensky 1998, Fisher 1995, 1999; Ladouceur & Mireault 1988) and a variety of other social and behavioural difficulties (Dickson, Derevensky & Gupta 2002; Hardoon, Gupta & Derevensky 2004, Stinchfield 2000). Thus, adolescent gambling appears to be not only a problem in its own right, but symptomatic of broader disruptions to psychosocial adjustment.

4.0 PROJECT AIMS

This research aimed to provide fundamental baseline data on the prevalence of gambling by adolescents, an issue of growing public concern, but one for which there is a significant dearth of information. It measured the prevalence of gambling behaviour, and gambling problems, in the secondary school population of the Australian Capital Territory (ACT), which has one of the highest per capita expenditures on gambling in Australia. By building on work that has been done overseas, and to only a limited extent in Australia, the aim of the project was to enhance existing knowledge concerning this topic, and well as inform the policies of regulatory bodies and educational authorities in the ACT.

Based on a survey of secondary school students in the ACT, the proposed research project measured or identified:

- the prevalence of gambling and of problem gambling
- risk factors for adolescent problem gambling
- psychological and social correlates of gambling and problem gambling
- exposure to gambling advertising
- the nature of gambling-related cognitions
- awareness of help for problem gamblers

5.0 PREVIOUS RESEARCH

5.1 The prevalence of gambling and problem gambling

Those few Australian studies of adolescents that have been conducted have produced inconsistent results that diverge somewhat from overseas findings. A survey of gambling prevalence among Year 8 Victorian youth reported that only 41% had gambled in the past year compared with overseas prevalence rates of around 80% (Victoria DHS 1999). A more recent sample of students aged 15-17 from six metropolitan high schools in South Australia found that 47.8% had gambled in the past year (Delfabbro & Thrupp 2001). By contrast, research conducted in 1998 by Moore and Ohtsuka (2000) in a working class area of Melbourne using a life-time estimate of gambling involvement found that nearly 90% of youth had gambled at least once.

In relation to problem gambling rates, Delfabbro and Thrupp (2001) reported adolescent problem gambling prevalence rates of 3.9 and 4.3% in selected South Australian schools, whereas Moore and Ohtsuka (2000) surveyed schools in a lower-middle class area of Melbourne and reported that only 3% could be classified as problem gamblers or potential problem gamblers as based upon a modified version of a standardised American scale (the SOGS-RA). Other Australian studies have not included, or reported, problem gambling rates.

Of those respondents who report having engaged in some form of gambling, it is important to identify the type of gambling in which they have engaged. If respondents have engaged in widespread commercial activity, such as gambling in casinos or over the internet (given age restrictions on commercial gambling, and the existing prohibition of the delivery of internet gambling services to persons residents in Australia), this would have obvious implications for regulatory authorities. If on the other hand, those adolescents who gamble do so mostly with peers, such as betting in private card games or wagering with friends on sporting events, this creates new challenges for regulators, as well as for significant adults in the young people's lives (e.g. parents, educators and community leaders). In their survey of

adolescents in the western suburbs of Melbourne, Moore and Ohtsuka (1997) reported relatively high rates of participation in private forms of gambling, such as sports betting or private card games.

5.2 Measuring problem gambling in adolescent populations

Overall, research on adolescent gambling has suffered from inconsistencies in conceptualisation and measurement. Comparability has been made more difficult because researchers have used different survey instruments and different age cut-offs. This issue is of more than scientific interest, given the degree of concern over problem gambling in contemporary Australia. Wiebe, Cox and Mehmel (2000) report trends of over-endorsement for some items leading to overestimates of problem gambling and identify a need for further psychometric evaluation and refinement of instruments.

The most common instruments used to screen for pathological gambling in younger populations in North America are modifications to the South Oaks Gambling Screen and the DSM-IV. The SOGS-RA, as the revised version is called, has been found to overestimate the presence of gambling problems. The DSM-IV-J, which is often used for diagnosis in clinical settings, has been found to be more conservative.

Derevensky and Gupta (2000) analysed prevalence rates for older adolescents using SOGS-RA, DSM-IV-J and Gamblers Anonymous 20 Questions and found DSM-IV-J to be the most conservative measure. Derevensky and Gupta found correlations of $r=.68$ between DSM-IV-J and SOGS-RA. Correlations were higher for males ($r=.84$) than for females ($r=.31$). Delfabbro (2001) compared the DSM-IV-J and the SOGS-RA and found the two instruments to be highly correlated ($r=.70$) with SOGS-RA yielding a problem gambling prevalence rate of 4.3% as opposed to a rate as measured by the DSM-IV-J of 3.9%.

The only instrument created in Australia is the Victorian Gambling Screen (or VGS) (Ben-Tovim et al. 2001). The screen seems adaptable for use with Australian adolescents primarily as it requires few alterations (e.g. changing 'spouse' or 'partner' to 'other important people in your life'). Recently assessed, the VGS was found to underestimate gambling problems by having a scoring threshold that was too high

(Wenzel et al. 2004). As yet, this measure has not been tested with adolescents.

5.3 Identifying the risk factors for adolescent problem gambling

Gupta and Derevensky (2000) identify a number of risk factors for problem gambling, including male gender, risk seeking, low self-esteem, depression, suicide ideation, and poor general coping skills. Adolescent pathological gamblers were more likely to have a parent who gambles excessively (Gupta & Derevensky 1998). Lesieur and Klein (1987) identified impulsivity as an important risk factor. A longitudinal study by Winters et al. (2002) found parental problem gambling, substance abuse, and poor school performance to predict later problem gambling among youth. Vitaro et al. (1997, 2001) found impulsivity, low parental supervision, and deviant friends predicted subsequent problem gambling among adolescent males. Fisher (1993, 1999) has reported similar results in Britain.

One Australian study reports that unstructured leisure time is the strongest predictor of potential problem gambling (Moore & Ohtsuka 2000). These findings are consistent with the work of Blaszczynski, McConaghy and Frankova (1990), who identified boredom and the desire to escape a dysphoric state as one of the main explanations for problem gambling generally. Burnett, Ong and Fuller (1999) showed that gambling by Victorian Year 12s, particularly in boys, was symptomatic of a broader interest in risk-taking activities including drug-use, alcohol consumption and risky driving.

5.4 Identifying Correlates

Many international studies into adolescent gambling have shown that gambling is a significant indicator of broader difficulties in social and psychological adjustment. For example, adolescents with gambling problems are more likely to engage in other high-risk behaviours (Griffiths & Sutherland 1998; Maden, Swinton & Gunn 1992; Winters & Anderson 2000; Vitaro et al. 2001; Yeoman & Griffiths 1996). Barnes, Welte, Hoffman, and Dintcheff (1999) in the US showed that 62% of young people who drank heavily gambled on a weekly basis compared with only 43% of moderate drinkers. Similar findings were obtained by Gupta and Derevensky (1998a) in

Canada, who found that adolescents classified as problem or pathological gamblers were three to four times more likely to drink alcohol on a weekly basis, take drugs or smoke compared with those who gambled very little, or not at all. Another American study by Volberg and Moore (1999) showed that over 50% of at-risk or adolescent problem gamblers in Washington State smoked or used alcohol compared with only a quarter of non-problem gamblers.

A favourable interpretation of these findings is that adolescent gambling is merely another form of risk-taking and therefore should be considered in the context of young people's natural interest in experimentation and desire for independence during adolescence. Gambling and minor substance use enables young people to sample some of the experiences of adult life, and can form the basis for peer interactions (Delfabbro & Thrupp 2003; Dickson et al. 2002). However, as Fisher (1993,1999) and Winters and Anderson (2000) point out, a negative side to these findings is that gambling also often coincides with less desirable or antisocial forms of risk-taking. Ladouceur, Boudrealt, Jacques and Vitaro (1999) found that problem gamblers in Canada were significantly more likely to have been suspended or excluded from school than non-problem gamblers, whereas Fisher (1999), in a national UK study, found that 23% of problem gamblers had truanted to gamble. In addition, in both Fisher's sample and also several North American studies, a link has been found between adolescent problem gambling and petty crime or delinquency (Ladouceur, Dube, & Bujold 1994; Lesieur & Klein 1987). As Hardoon, Gupta and Derevensky (2004) have suggested, these variations in the literature's perception of adolescent gambling probably occur because of the changing social context of gambling as young people become more heavily involved. Initially, gambling may start off as an enjoyable social activity undertaken with psychologically well-adjusted peers, but become problematic when young people gravitate towards more antisocial peers whose gambling forms one part of a broader range of problematic risk-taking behaviours.

Another important finding in this literature is that adolescent problem gamblers tend to be less psychologically well adjusted than their peers (Petry & Tawfik 2001; Westphal et al 1998). Adolescent problem gamblers tend, for example, to be more

depressed and apprehensive and to have poorer coping skills than non-problem gamblers. As Gupta and Derevensky (1998a) point out, one reason why this might be so is that gambling may serve as a form of emotional escape from painful experiences arising from unhappy home lives, difficulties at school, or previous abuse. Such interpretations are consistent with Jacob's well-known general theory of addictions (Gupta & Derevensky 1998b; Jacobs 1988) that suggests that young people with a history of trauma or ongoing unhappiness are vulnerable to addiction because of a desire to block out the ongoing psychological effects of these experiences. In Jacob's view, the painful reality of everyday life is avoided by seeking novelty, risks, altered identities and enhanced mood states. Gambling in many cases is thought to fulfil this function because gambling venues provide a milieu that isolates people from the outside world, and which provides excitement and social interactions not available elsewhere. In support of this view, Gupta and Derevensky (1998b) developed a structural equation model that confirmed the importance of emotional vulnerabilities and escape motivations in problem gambling. However, as they also point out, this relationship is also likely to run the other way. Just as emotional vulnerability may contribute to problem gambling, excessive gambling may also serve to intensify the emotional states underlying the behaviour.

Despite these developments in international research, so far only one study in Australia has examined the links between adolescent gambling and psychological adjustment (Jackson 1999). In Jackson's study, 2700 first year high-school students (Year 8) in the State of Victoria were surveyed about their gambling habits and administered a variety of questions relating to their social, educational and psychological adjustment. The study found that those who were more involved in gambling (as measured by the number of activities preferred) were more likely to engage in risky-behaviours (alcohol, smoking, drug-use), to be less satisfied with school, and more likely to engage in self-harming behaviours. Unfortunately, the age of the students, the low rate of gambling, as well as the absence of a validated problem gambling screen did not provide an opportunity to determine the relationship between problem gambling and adolescent functioning.

5.5 Cognitive perceptions of gambling

Since the mid 1980s, increasing attention has been directed towards the role of cognitive processes in etiology and maintenance of problematic gambling behaviour. A central assumption underlying this research is that gambling decision-making is not entirely objective or rational (Ferland et al. 2002; Griffiths 1995; Sharpe & Tarrier 1993; Walker 1992a). Instead, gambling appears to be governed by many false or irrational perceptions and biases that contribute to misguided expectations about the probability of winning and losing. Evidence for this view arose initially from so-called speaking aloud studies (e.g., Griffiths 1995; Ladouceur & Gaboury 1988; Ladouceur, Gaboury, Dumont & Rochette 1988; Ladouceur, Gaboury, Bujold, Lachance & Tremblay 1991; Walker 1992b) in which gamblers were asked to verbalise aloud their thoughts while gambling. These studies showed that over 70% of gambling-related cognitions were irrational. Even on entirely chance determined games such as slot-machines or roulette, gamblers reported being able to enhance their performance via practice and use of strategies, or developed false or superstitious associations between unrelated events (Toneatto, Blitz-Miller, Calderwood, Dragonetti & Tsanos 1997).

Many of these beliefs were attributed to a variety of information processing biases commonly recognized in the broader information processing literature (Wagenaar 1988). Some examples included: the illusion of control (Langer 1975; Langer & Roth 1975), in which gamblers falsely over-estimate their ability to influence outcomes; the representation heuristic or gambler's fallacy (Kahneman & Tversky 1972), where short-term sequences of events are thought to self-correct so as to resemble long-term sequences; confirmation bias (where information is selectively processed so as to maintain faith in erroneous strategies); hindsight bias, where outcomes are always assumed to have turned out as predicted, and attributional biases which lead to positive outcomes being attributed to skill and negative outcomes to uncontrollable factors (Griffiths 1995).

Other more recent work has confirmed the findings of speaking aloud studies using survey instruments designed to measure specific biases. Raylu and Oei (2004) and Toneatto et al. (1997), for example, showed that various forms of irrational beliefs

and biases were very prevalent amongst problem gamblers. Similar results have been reported by Joukhador, Blaszczynski, and Maccallum (2004) who administered an 8-item gambling superstition scale to problem and non-problem gamblers. Problem gamblers endorsed these items significantly more strongly than non-problem gamblers. Jefferson and Nicki (2003) obtained much the same result using a belief scale relating specifically to video lottery terminal users (VLTs) in Canada. Problem gambling scores (as measured by the SOGS, Lesieur & Blume 1987) were positively related to the strength of people's endorsement of cognitive distortion items.

Although Delfabbro (2004) has questioned whether these effects may only be due to greater experience rather than a greater susceptibility to irrationality, Ladouceur (2004) has provided further data that more clearly delineate the cognitive differences between problem and non-problem gamblers. According to Ladouceur (2004) the critical factor appears to be, not the range or nature of beliefs that is important, but rather the conviction with which the beliefs are held. Problem gamblers appear more likely to adhere to the beliefs in the face of contradictory evidence because these ideas have become more strongly reinforced and entrenched over time.

5.6 Exposure to gambling advertising

While advertising by Australia's gambling industries has become more responsible, there are concerns that some advertising messages may be targeting youth. In any event, even if messages are not intentionally aimed at youth, gambling may be perceived as sophisticated adult activity by those whose ardent aspirations to transcend to adulthood are irrepressible. The Second International Think Tank on Youth Gambling Issues (2001) identified a need for research into the effects of exposure to advertising on the adolescent consumption of gambling compared with alcohol and cigarettes. Findings from Canada (Wiebe & Falkowski-Ham 2003), New Zealand (Amey 2001) and the USA (Grant & Won Kim 2001) report that adults and adolescents can recall instances of exposure to gambling advertisements. In the Grant and Won Kum (2001) study, almost half of the 'pathological gamblers' interviewed reported gambling advertising on radio, billboards and television as a 'trigger' for their gambling. In the Canadian adolescent study, these messages were viewed on television and the internet, and comparatively few reported seeing responsible

gambling advertising. Further research on the nature of the impact of gambling advertising on the consumption of gambling products by adolescents is underway (e.g. International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University; and by Korn, University of Toronto).

5.7 Help-seeking

International research by Gupta and Derevensky (2000) and Griffiths (1998) reports that adolescents with gambling problems tend not to present themselves for treatment. This has been attributed to a variety of factors, including the lack of suitable services and friends and family continually 'bailing the teenager out' before the problem escalates.

Australian literature on this question appears scant. An analysis of calls to G-Line (Jackson 1999) reported very few callers were under the age of 20. Kids Help Line received calls from 15,000 kids in the ACT during 2003 but they receive too few calls relating to gambling to keep statistics. In a pilot study conducted in Queensland, Kids Help Line received between 1% and 2% of calls that mentioned gambling. Further analysis revealed that these young callers were primarily concerned with other issues like financial or relationship worries and mentioned gambling problems later in the conversation.

6.0 PROCEDURE

6.1 Consent

Approval to proceed with the survey was received from Australian National University's Human Research Ethics Committee and from the ACT Department of Education, Youth and Family Services. In addition, the ACT branches of the Catholic Education Office and the Association of Independent Schools gave approval to approach and invite their member schools to participate. After approval to conduct the study had been obtained from all relevant school authorities, written approval was sought from individual school principals. Teachers who were willing to assist in the administration of the surveys were identified and contacted by the researchers and provided with copies of the surveys, as well as information sheets and consent forms for parents and students. In some schools, access was provided to all school grades, whereas in others, it was only possible to obtain co-operation of teachers at specific year levels or particular classes. Some teachers specifically set aside class time for administration of the surveys themselves, whereas others arranged times where the researcher could be present during survey administration.

Since parental approval was required, the eligible population for the study was further limited to those students who took the information sheets home to their parents and obtained their consent to participate (45% of all surveys handed out). Of the 938 surveys returned, 12 (1.3%) had to be discarded because of incomplete or aberrant responding, leaving a valid sample of 926 young people. Correlation analysis conducted across all schools confirmed that there was no relationship between consent form presentation rates and key indicators such as problem gambling prevalence and overall gambling involvement. These results suggest that variations in the rate of consent form returns were unlikely to have had a significant effect upon the results obtained. Conversations with both students and teachers indicated that the failure to return forms was likely due to a number of issues including, students forgetting to take them home or show them to their parents, parents refusing to sign or forgetting to sign, or students forgetting to bring them in

on the required day.

6.2 Participants

The total sample comprised 926 students¹ including 51.1% ($n=473$) males, 48.4% ($n=448$) females and 5 students whose gender was not clearly indicated on the survey.² Participating students were drawn from grades 7-12 in 18 schools in the Australian Capital Territory (ACT) in 2003-4. The ACT is one of the principal territories of Australia surrounding Australia's capital city, Canberra (Population: approximately 330,000). Eleven of the participating schools were Government high schools, and the remaining seven were Catholic or Independent. This ratio was similar to that for the ACT area as a whole (approximately 60% Government and 40% Catholic/Independent). Survey respondents comprised 346 students (37.4%) in years 7-8³, 406 (43.9%) in years 9-10⁴ and 174 (18.8%) in years 11-12⁵. The mean age of the sample was 14.46 years ($SD = 1.64$) with an age range of 11 to 19 years (only 39 or 4.2% were 18 years or older). Thirty-two (3.5%) identified themselves as Aboriginal or Torres Strait Islander⁶ and 24.3% indicated that a language other than English was spoken at home.⁷ Most students lived with their parents (73.2%), 8.9% lived independently, and the rest lived in other arrangements. When asked whether their

¹ A small sub-sample ($N=21$) was administered an on-line version of the survey as part of a pilot test. These responses did not diverge significantly from those of the larger sample, and are included in the overall N of 926.

² The comparative gender proportions of the total ACT secondary school population in 2003 comprised 50.8% males ($n=14,454$) and 49.2% females ($n=13,998$) (DEYFS 2004).

³ Year 7-8 students comprised 34.5% of the total ACT secondary school population in 2003 ($n=9,825$).

⁴ Year 9-10 students comprised 33.5% of the total ACT secondary school population in 2003 ($n=9,532$).

⁵ Year 11-12 students comprised 31.9% of the total ACT secondary school population in 2003 ($n=9,082$).

⁶ Recent figures suggest that 1.3% of Canberra-Queanbeyan residents and 2.4% of all Australians are Indigenous (ABS 2003). About 40% of the national Indigenous population is under the age of 15. The comparatively numerous Indigenous youth population may help account for the large proportion of Indigenous respondents in the survey sample.

⁷ In comparison, 14.5% of Canberra-Queanbeyan residents and 15% of all Australians speak a language other than English at home. In the current study, students were not asked if they themselves spoke a language other than English but only if one was spoken in the home in which they resided. This may account for the comparatively high rate of students in the survey sample who live in homes where a language other than English is spoken.

parents were in employment, 7.1% indicated that their father was unemployed, and 10.4% reported that their mother was unemployed.⁸

Cross tabulation analyses revealed no significant association between school type (Catholic/Independent vs. Government) and gender, $\chi^2 (1) = 1.82, p > .05$. T-test comparisons of age across school type and gender revealed no differences between the ages of males and females, $t (911) < 1$, but showed that students from Government schools were significantly older than non-Government school students ($M = 14.90, SD = 1.76$ vs. $M = 14.10, SD = 1.44$), $t (916) = 7.62, p < .001$.

⁸ The rate of maternal unemployment is unusually high for the ACT. Anecdotal evidence collected during the supervision of surveys suggests that students did not read the question clearly and were inclined to indicate that their mothers were unemployed even when they were not looking for employment.

7.0 FINDINGS

7.1 The Prevalence and Social Context of Adolescent Gambling

In this section we outline our findings on two interrelated issues. First, we present the prevalence data on gambling and problem gambling amongst ACT adolescents and describe how they differed according to young people's gender, age and preferred gambling activity. Second, we discuss the social context of adolescent gambling in the ACT, focusing on peer and familial gambling. Previous research on this topic suggests that involvement in gambling is strongly influenced by social factors, including the attitudes and behaviours of immediate family members and peers. These social influences also expose young people to gambling and provide them their first opportunities to gamble. Our research was focused on discovering to what extent family and peer gambling predicted the involvement of individual adolescents and how young people were gaining access to gambling activities, e.g. were they doing it alone, with parents, or with other peers?

7.1.1 Measures

The following measures were included in our survey of ACT adolescents to discover the prevalence and social context of gambling and problem gambling:

Gambling habits

Respondents were asked how often during the previous 12 months they had gambled on all the major forms of gambling available in the ACT, including: cards (private vs. Casino), poker-machines, racing, sports betting (not including racing), lotteries (Keno, Lotto, Powerball or Pools), bingo or scratch cards, and Internet gambling. All responses were recorded on 5 point scales, where 1 = Never; 2 = 1-2 times per year; 3 = 3 times a year up to monthly; 4 = 2-3 times per month; and 5 = Weekly or more often.

Gambling context

For each type of gambling, respondents were asked to indicate the social context in which they gambled. Categories included: alone, with parents, with brother or sister, with other relatives or with friends. In addition, to assess the validity of the gambling involvement questions, a small sub-sample (n = 21) who completed the online version of the survey were also asked to indicate whether they gambled with their own money. Almost all indicated that this was the case.

Parental gambling and gambling amongst significant others

Respondents were asked to indicate (by marking the appropriate box) whether their parents gambled on each of the types of gambling described above. Two further questions asked respondents to indicate whether there was anyone close to them who had a gambling problem (Yes/ No) and that person(s) relationship to them.

Peer and family approval of gambling

On 5-point Likert scales (1=strongly disagree to 5=strongly agree) adolescents were asked to describe the gambling attitudes and behaviours of their friends and family. Four questions were asked based upon varying the words friends and family 'Most of my friends/ family approve of gambling', and 'Most of my friends/ family gamble a lot'. These items were adapted from scales developed by Moore and Ohtsuka (1997) and previously used by Delfabbro and Thrupp (2003).

Early big wins

Adolescents were asked (Yes or No) whether they had obtained a large win in their first few attempts at gambling.

DSM-IV-J

The adolescent version of the DSM-IV, the DSM-IV-J (Fisher 1992) was used. This scale comprises 12 items. It includes such behaviours as: being preoccupied with gambling, being restless and irritable if unable to gamble, "chasing" behaviour,

spending lunch money, stealing money, and social conflict. Each of the items was scored Yes / No, with scores being based upon the total number of Yes responses. As with the adult scale, scores of 4 or more on the DSM-IV-J are indicative of problem gambling. In the present sample, the internal reliability was found to be very high, $\alpha=0.91$. It is important to note that there have been concerns raised in the literature regarding the scoring of the DSM-IV-J, particularly due to researchers' use of two possible scoring methods (Derevensky, Gupta & Winters 2003). In Fisher's (1992) original formulation, scoring was based on 9 items, but most studies (including those by Derevensky and Gupta e.g. 1998a) have used all 12 items. Derevensky et al. (2003) argue that scoring using the 4 from 12 method yields few significant discrepancies from the 4 from 9 method because the 3 additional items refer to rarer behaviours (e.g., stealing) that are only indicative of the most severe forms of gambling disorder. Thus, to maintain consistency with the vast majority of recent studies, the present study uses the 4 from 12 scoring method, but reports the results of the 9 item scoring method as well.

Victorian Gambling Screen (VGS)

Respondents were also administered the Victorian Gambling Screen (VGS) recently developed and validated in Australia by Ben-Tovim, Esterman, Tolchard, Battersby & Flinders Technologies (2001). The VGS Harm to Self Scale comprises 15 statements. Respondents were scored according to their responses on a 5-point scale where 'Never' = 0, 'Rarely' = 1, 'Sometimes' = 2, 'Often' = 3, and 'Always' = 4. The scoring range for this scale is from 0 to 60. Validation of this scale against gold-standard clinical interviews with problem gamblers and ROC analysis (see Ben-Tovim et al., 2001) indicates that a cut-off score of 21 or higher identifies a person as a problem gambler. Concurrent validity indicates that this scale correlates very highly with the South Oaks Gambling Screen ($r = 0.97$), but provides a wider range of scores. The advantages of this scale for the present study are that it is: (a) the only measure of problem gambling developed in Australia, (b) it has been specifically designed as a scale, and (c) that very few changes were required to make it suitable for adolescents (for the item referring to hiding signs of gambling, references to 'spouse, partner, children' was removed and the only reference was to 'other important people in your

life'). In the present study, the alpha reliability of the scale was very high, $\alpha=0.91$, and correlated with the DSM-IV-J ($r = 0.65$), but not so highly as to make it redundant.

7.1.2 Results

Gambling Prevalence

The survey results indicate that 70.4% of all respondents had gambled in the 12 months prior to completing the survey. Most of these adolescents had gambled infrequently. Only 10% of all respondents had gambled frequently. Table 1 below sets out these findings on gambling frequency and the gender of those persons who never gambled, and those who had gambled infrequently and frequently.

Table 1. Number (%) of male and female adolescents gambling at each frequency
($n = 898$)

	Gambling frequency		
	Never <i>n</i> (%)	Infrequent <i>n</i> (%)	Frequent <i>n</i> (%)
Male	127 (27.5)	270 (58.4)	65 (14.1)
Female	139 (31.9)	272 (62.4)	25 (5.7)
Overall	266 (29.6)	542 (60.4)	90 (10.0)

Table 1 indicates that there was no difference between the proportions of males and females who gambled infrequently or who had not gambled in the past 12 months. However, there was a significant association between gender and level of involvement, with the proportion of male gamblers in the frequent group almost twice that of females, $\chi^2(2) = 17.59$, $p < .001$. Further analyses showed that students who identified themselves as being Indigenous (Aboriginal or Torres Strait Islander) gambled more than all other students: 35.5% had gambled frequently and only 12.9% had never gambled in the past 12 months compared with figures of 9.3%

and 30.1% for non-indigenous students, $\chi^2(2) = 23.65, p < .001$.

The rate of total gambling participation increased across school year levels from 64.1% in year 7 to 80.5% in year 12. After year 10, the proportion of students who had not gambled decreased by 12%, and the number of infrequent gamblers had increased by 12.6% (see Table 2). Thus, while the proportion of frequent adolescent gambling remained relatively constant across the age groups, the proportion reporting gambling involvement steadily increased with the most dramatic increase from Year 10 to Year 12 (approximately 15-17 years of age). These variations were not in any way influenced by the type of school (Catholic or Public) attended by adolescents, $\chi^2(2) < 1$.

Table 2. Number (%) of adolescents gambling at each frequency by year level

	Gambling Frequency		
	Never <i>n</i> (%)	Infrequent <i>n</i> (%)	Frequent <i>n</i> (%)
Year 7	47 (35.9)	76 (58.0)	6 (6.1)
Year 8	61 (29.0)	124 (59.0)	25 (11.9)
Year 9	72 (30.4)	136 (57.4)	29 (12.2)
Year 10	49 (31.4)	93 (59.6)	14 (9.0)
Year 11	25 (25.8)	63 (64.9)	9 (9.3)
Year 12	14 (19.4)	52 (72.2)	6 (8.3)

Specific Gambling Activities

The most popular forms of gambling among all adolescents were private card games (39.8%) and bingo/scratchies (40.5%). Betting on racing, and sporting events were also popular (32% and 26% respectively) (Table 4). Commercial gambling activities such as casino card games, poker-machines and Internet gambling attracted the least participants (12% and 5% respectively). Across the entire sample (including non-participants who gambled on 0 activities), the mean number of activities participated in by each person was 1.78 ($SD = 1.83$), with 21.6% ($n = 200$) of adolescents gambling on one activity, 37.5% on 2-4 ($n = 347$), and 9.5% ($n = 88$) gambling on 5 or more

activities. Boys gambled on significantly more activities than girls ($M = 1.93$, $SD = 1.93$ vs. $M = 1.62$, $SD = 1.69$ for girls), $t(919) = 2.55$, $p < .05$.

Table 3. Number (%) of adolescents gambling on each activity at each frequency

	Gambling Frequency		
	Never <i>n</i> (%)	Infrequent <i>n</i> (%)	Frequent <i>n</i> (%)
Private card games	538 (60.1)	328 (36.6)	29 (3.2)
Casino card games	845 (95.5)	34 (3.8)	6 (0.7)
Poker machines	771 (87.3)	100 (11.3)	12 (1.4)
Racing	603 (68.1)	270 (30.5)	13 (1.5)
Sports betting	652 (73.9)	190 (21.5)	40 (4.5)
Lotteries	677 (76.7)	194 (22.2)	12 (1.4)
Bingo/ scratchies	527 (59.5)	343 (38.8)	15 (1.7)
Internet	820 (93.9)	40 (4.6)	13 (1.5)

In order to compare participation rates on specific activities by grade-level and gender, the original frequency categories were recoded into metric variables (number of times per year) as based upon category midpoints or assigned estimates (i.e., Never = 0, 2-3 times per month = $2.5 \times 12 = 30$, Weekly = 52). Frequencies were then compared using t-tests. These analyses revealed that boys gambled significantly more frequently on card games, racing, sports events, and on scratch tickets, but there were no significant differences for lotteries, poker machines or the Internet (all comparisons, $p < .05$). Similar analyses were conducted using one-way ANOVA to compare participation rates across grade-levels (7-8, 9-10, 11-12) and revealed only one significant difference. The level of poker machine gambling increased from less than once per year amongst grade 7-8 to almost 5 times per year for years 11-12, $F(2, 885) = 16.62$, $p < .001$. The other important age-related change was in the range of activities preferred, which increased from 1.61 ($SD = 1.71$) amongst years 7-8 to 1.79 ($SD = 1.89$) at Year 9 and 10 to $M = 2.11$ ($SD = 1.90$) by Year 11 and 12, $F(2, 925) = 4.49$, $p < .05$. A fisher LSD post-hoc comparison showed that the Year 11 and 12 figure differed significantly from the Year 7 and 8 figure ($p < .05$).

Parental gambling

All students were asked to indicate whether their parents gambled. Seventy two percent of parents were reported to gamble, with half of all respondents reporting that their parents gambled on lotteries (51%), 33% on bingo/scratchies (36%), 30% on racing, and 25% on poker machines (note: this appears likely to be an underestimate given that figures of between 35-40% are obtained in most surveys of Australian adults (Productivity Commission 1999). Importantly, it was found that there was a significant association between the frequency of adolescent gambling and parental gambling involvement, $\chi^2(2) = 121.79, p < .001$. Amongst those students who gambled frequently, 85.7% of parents gambled compared with only 47.8% amongst those students who never gambled.

Table 4. The social context of gambling

	<i>n</i>	Alone <i>n</i> (%)	With parents <i>n</i> (%)	With Siblings <i>n</i> (%)	Other relatives <i>n</i> (%)	With friends <i>n</i> (%)	Combination <i>n</i> (%)
Card games	418	55 (13.2)	28 (6.7)	46 (11.0)	33 (7.9)	150 (35.9)	106 (25.3)
Poker machines	172	67 (39.0)	32 (18.6)	6 (3.5)	10 (5.8)	45 (26.2)	12 (7.0)
Racing	318	59 (18.6)	150 (47.2)	12 (3.8)	20 (6.3)	33 (10.4)	44 (13.8)
Sports-betting	272	59 (21.7)	70 (25.7)	20 (7.4)	22 (8.1)	66 (24.3)	35 (12.8)
Lotteries	250	63 (25.2)	138 (55.2)	10 (4.0)	14 (5.6)	12 (4.8)	13 (5.2)
Scratchies	382	92 (24.1)	184 (48.2)	19 (5.0)	31 (8.1)	18 (4.7)	38 (9.9)
Internet	114	79 (69.3)	11 (9.6)	4 (3.5)	1 (0.9)	13 (11.4)	6 (5.2)

Nb. Combination indicates two or more the other categories

Social context of gambling

For each of the specific activities, students were asked to indicate the circumstances in which they gambled (e.g., alone, with parents, with friends). A summary of the results is provided in Table 4. As can be observed, the nature of involvement varies considerably across the different forms of gambling. Card games are predominantly played with friends, poker machine and Internet gambling is most commonly undertaken alone, whereas racing, lottery gambling and scratch cards are more likely

to be played with parents. In other words, for these latter activities, young people appear to be provided access to them by their parents.

Problem gambling: prevalence

While most young people experienced no problems associated from their gambling, 41 (4.4%) could be classified as problem gamblers based upon the 4 point cut off score on the DSM-IV-J, with a figure of 3.3% ($n = 31$) for the VGS, as based upon a cut-off score of 21. Thus, using the 21 cut-off point on the VGS yields a somewhat more conservative estimate of problem gambling. The correlation between the two scales was, $r(566) = 0.65$, $p < .001$. Taken together, it was possible to classify 5.4% ($n = 50$) respondents as problem gamblers on least one of the two scales.

Problem gambling: individual differences

Demographic analysis showed that boys were significantly more likely to be problem gamblers than girls (7.8% vs. 2.7%), $\chi^2(2) = 12.09$, $p < .001$. A highly significant association was also found between indigenous status with 28% of the 32 indigenous students classified as problem gamblers compared with only 4.1% of non-indigenous students (a sevenfold difference), $\chi^2(2) = 32.86$, $p < .001$. No age or grade-level differences were observed but an upward trend was observed (4.0% for Year 7-8s, 6.2% of years 9-10, and 6.3% for Years 11-12).

Further analyses examined the relationship between problem gambling and involvement in specific activities. Problem gamblers were significantly more likely than the rest of the sample to be involved with card games (80%), poker machines (54%), racing (68%), sports-betting (68%), and Internet gambling (20%) but not with lotteries or bingo and scratch-cards (all associations, $p < .001$). Problem gamblers also engaged in a wider range of activities ($M = 4.70$, $SD = 2.31$ vs. $M = 1.62$, $SD = 1.65$ for the rest of the sample), $t(924) = 9.29$, $p < .001$.

There were also interesting differences in gambling history. When asked at what age they had first gambled with their own money, problem gamblers indicated that they had started significantly younger ($M = 9.62$, $SD = 3.16$ years vs. $M = 11.77$, $SD = 3.09$

for the non-problem gamblers), $t(433) = 4.10, p < .001$. Problem gamblers were also significantly more likely to indicate having had a large win when they first started gambling (54% vs. 21% for the rest of the sample who gambled), $\chi^2(2) = 24.98, p < .001$, and to have someone close to them with a gambling problem (50% vs. 14% for the rest of the sample), $\chi^2(2) = 46.02, p < .001$. Twenty-two percent of these people close to them were identified as immediate family, 25% were family friends, and 20% were other relatives. These findings were also reflected in the general prevalence of familial gambling. Ninety percent of the problem gamblers indicated that their parents gambled compared with only 71% amongst the rest of the sample, $\chi^2(2) = 8.23, p < .01$, and this difference was sustained across all specific forms of gambling except lotteries (all $\chi^2(2)$ analyses significant, $p < .001$).

Table 5. Mean (*SD*) ratings of future gambling intentions

	Problem gamblers (<i>n</i> = 49) <i>M</i> (<i>SD</i>)	Non-problem gamblers (<i>n</i> = 848) <i>M</i> (<i>SD</i>)	<i>t</i> -value
Can't wait to turn 18 to gamble at venues	2.04 (1.31)	3.96 (1.17)	11.09***
Will gamble a lot more when 18	2.21 (1.43)	4.13 (1.49)	8.69**
In future, will definitely gamble regularly	2.40 (1.38)	4.33 (0.89)	9.61**

** $p < .01$ *** $p < .001$

Future intentions to gamble

Respondents were also asked 3 questions relating to their future intention to gamble when they were 18 (where lower scores equated to greater agreement). As indicated, problem gamblers (PG) expressed a significantly stronger intention to gamble when 18 than the rest of the sample (all effect sizes very large, Cohen's $d > 1.0$). Further inspection of the distribution of 'strongly agree' and 'agree' responses, showed that

64% of PGs could not wait to turn 18 to gamble, 62% intended to gamble a lot more, and 50% wanted to gamble regularly. Only 12.2%, 10.7% and 3.8% of non-problem gamblers strongly agreed or agreed with the same 3 questions.

Social influences and gambling norms

Respondents were asked to indicate whether their friends and family gambled and whether they approved of gambling. As indicated in Table 6, problem gamblers endorsed these items significantly more strongly, suggesting that their friends and family were much more likely to gamble and to endorse gambling. Further inspection of response distributions revealed that 44-56% of problem gamblers strongly agreed or agreed with the statements compared with 7-17% (mean = 15% across of the 4 questions) of the non-problem gamblers.

Table 6. Mean (SD) ratings of future gambling intentions

	Problem gamblers (<i>n</i> = 49) <i>M</i> (<i>SD</i>)	Non-problem gamblers (<i>n</i> = 848) <i>M</i> (<i>SD</i>)	<i>t</i> -value
Most of my friends gamble	2.73 (1.35)	4.18 (0.99)	7.45***
Most of my friends approve of gambling	2.38 (1.03)	3.47 (1.07)	6.82***
Most people in my family gamble	2.67 (1.14)	3.91 (1.11)	7.36***
My family approves of gambling	2.64 (1.19)	3.70 (1.08)	6.55***

*** $p < .001$

7.1.3 Discussion

Overview: Involvement and problem gambling

The results show that the overall pattern of gambling in Canberra shares many similarities with results obtained in other Australian States. The overall involvement

rate (70.4% for the past 12 months) was very similar to the figure of 62.5% for years 10, 11, 12 obtained by Delfabbro and Thrupp (2003) in South Australia, but higher than the figure of 41% obtained by Jackson et al. and lower than the 90% life-time estimate obtained by Moore and Ohtsuka (2000) in Victoria. Such results are, however, generally reconcilable in that the Victorian studies differed somewhat in their methodology and sampling. Jackson (1999) used a younger sample (only year 8s) than was used in current study, whereas Moore and Ohtsuka's (2000) involvement questions used a life-time frame of reference rather than the previous 12-month involvement. The latter wording would have almost certainly increased the reported level of involvement, whereas the former sampling would have reduced it. Indeed, as the results from our study show that, at least for Canberra, age/year level may play a role in prevalence rates as we found gradual increases from years 7 to year 12 (64 - 80%) with more dramatic increases (12%) in infrequent gambling occurring after year 10.

In terms of the types of gambling preferred by ACT teenagers, it was found that private card games were most popular, followed by bingo / scratchies, racing and sporting events. Students were least interested in commercial gambling such as casino card games, poker-machines and the internet, with only 6% of students reporting having used this medium for gambling. Thus, it appears that existing regulatory controls restricting access to gambling venues are working reasonably well, and this is a finding which is consistent with previous Australian studies. However, the results also revealed a number of important differences between the ACT and the comparable study undertaken by Delfabbro and Thrupp (2003) in South Australia. Canberra adolescents were more likely to gamble on racing (32% vs. 14%), and on private card games (40% vs. 20%), whereas South Australian adolescents were more likely to gamble on lotteries (36% vs. 23%). The difference for lotteries is very likely a reflection of the varying regulatory environment in the two locations; namely, the fact that lottery products are legally available to South Australian adolescents, but not to those from the ACT. On the other hand, the differences observed for racing and cards are more difficult to explain and may require further investigation, perhaps through focus group discussions undertaken with young people in the sample to examine the specific nature of the activities (e.g., whether

young people are accompanying their parents to popular racing carnivals, whether off-course betting agencies are readily available to minors).

Table 7. Summary of current knowledge concerning adolescent problem gambling in Australia

Author (year)	<i>n</i>	Participant Age-range	Australian State	Measure	Prevalence rate
Moore & Ohtsuka (1997)	1017	18-25 years	Vic	Modified SOGS	3.0
Moore & Ohtsuka (2001)	710	13-19 years	Vic.	Modified SOGS	Not reported
Delfabbro & Thrupp (2003)	505	15-17 years	S.A.	DSM-IV-J	3.5
Delfabbro, Lahn, & Grabosky (2004)	926	12-17 years	ACT	VGS DSM-IV-J	3.3 4.4

1. Moore & Ohtsuka (1997): 757 adolescents, 250 University students

Although the vast majority of adolescents appeared to be experiencing few difficulties associated with their gambling, the results nonetheless showed that between 3-4% of the sample could be classified as problem gamblers. As indicated in Table 7, this figure is only the fourth adolescent prevalence rate to be formally reported in the public domain in Australia, but it reveals some element of convergence across the different studies. Despite slightly varying samples and differences in the measures used, all studies appear to indicate a national prevalence rate of approximately 3 to 4%, which is twice the adult rate reported by the Productivity Commission (1999). In this current study, it was found that the newly developed VGS produced a considerably lower prevalence figure than the more well-established DSM-IV-J. Similar results using the VGS in adult populations have been reported by Wenzel et al. (2004) who found that the scale was not inherently more conservative, but imposed a cut-off score (21) that appeared to be too high, and

which therefore may need to be revised downwards in future validation studies. Nevertheless, irrespective of which estimate is taken, the results of this study appear to be somewhat lower than figures reported in recent international reviews of similar studies conducted in Canada (see Derevensky, Gupta, & Winters 2003), where rates have varied from 3.4% to 6.7%, with an average of around 5.0%. These differences appear surprising given the pervasiveness of gambling in Australia as well as similarity in the laws restricting access to gambling amongst minor in the two countries, but it may be that many forms of gambling (e.g., poker machines) are more difficult for adolescents to access in Australia because they are confined to venues (casinos, hotel gaming floors) where strict licensing laws usually prevent minors from entering gaming areas.

Demographic differences

Consistent with many other studies (e.g., Delfabbro & Thrupp 2003; Gupta & Derevensky 1998), the results also provided useful insights into demographic differences in gambling involvement, most importantly the role of gender and ethnicity. Although there was little difference between the proportions of males and females who had gambled and those males and females who hadn't gambled, twice the number of males were frequent gamblers. Males also gambled significantly more frequently on many activities, including on sports, card games, racing, and scratch tickets, and also gambled on a wider range of activities in general. These findings were entirely consistent with previous studies in Canada (Derevensky & Gupta 1998), Australia (Moore & Ohtsuka 2000) and the United Kingdom (Fisher 1999).

Gender differences such as these are pervasive throughout the risk-taking literature and likely reflect a combination of cultural, developments and socialization factors during childhood an early adolescence (Delfabbro 2000; Hardoon & Derevensky 2001; Martinez 1995). For example, during childhood, boys are more likely than girls to play (or be encouraged to play) competitive games involving tests of physical skill or mettle, and this is reflected in their choice of gambling activity. In general, with the exception of scratch tickets, boys appear to have a stronger preference than girls for activities that resemble sporting activities. In such activities, the aim is not solely

to win money, but to exert dominance over others through placing larger, riskier bets, choosing the winning team or horse, and being willing to take risks where others might not be willing to do so. In this sense, gambling (as with other high risk activities) may serve as “rite of passage” that serves a specific developmental purpose; namely, to give adolescents an opportunity to experience some of the elements of adulthood, and to confer on themselves a sense of independence by doing things that might not be condoned by society. Almost certainly, this general motivation is likely to be important for both girls and boys, but the evidence here still indicates that young males may have broader motivations for gambling and, as a result, they tend to gain exposure to, and knowledge of, a wider range of activities from an early age. Importantly, almost every prevalence study undertaken in Australia has shown that these trends persist into adulthood, but that the gender difference observed for overall participation rates disappears because of the very significant uptake of lottery and poker machine gambling by young women (Productivity Commission 1999).

A further important finding is that students who identified as Indigenous or who said that a language other than English was spoken at home (NES), comprised a large proportion of problem gamblers. Our sample included a greater proportion of Indigenous and NES students than exists in the general Canberra population but their representation in the problem gambling group seems unrelated to their general overrepresentation in the total sample. This finding requires further research especially in light of existing conflicting evidence from Victoria where Asian students were found to gamble less than non-Asian students overall, but were more likely to experience gambling problems (Moore & Ohtsuka 2001). Moreover, the particularly high rate of problem gambling amongst indigenous students is also concerning, although not unexpected given previous Australian research indicating a higher rate of problem gambling in the adult indigenous community (AIGR/ LIRU 1999; Productivity Commission 1999). Some previous sociological research (e.g., Foote 1996) has suggested that gambling features predominantly in indigenous communities as a form of social exchange, but the findings may also reflect broader differences in social and economic hardship; for example the greater allocation of leisure time to gambling because of unemployment and poverty. These hypotheses

cannot be answered by the current research, but provide a useful starting point for further more qualitative investigations of specific subgroups within the Canberra region.

Useful insights were also obtained into some contextual aspects of adolescent gambling, in particular, the early experiences of gamblers and the way in which they gamble. Consistent with the findings of Delfabbro and Thrupp (2003) in South Australia and Moore and Ohtsuka (1997) in Victoria, problem gamblers were found to have started gambling at a younger age than the rest of the sample, were significantly more likely to have parents and friends who gambled and who approved of gambling⁹, and were more likely to know individuals who they felt had a gambling problem than other adolescents. This group was also significantly more likely to have obtained a large win when they first started gambling, a factor that has been consistently recognized as a significant correlate of gambling problems during adulthood (Lesieur 1984). The results from Table 4 further showed that it was possible to differentiate activities according to the social context in which gambling occurs. Internet gambling is usually undertaken alone; racing, lotteries and scratchies usually involve parents; whereas card games are usually undertaken with friends. Other activities such as poker machines and sports betting involve a combination of contexts (alone, parents and friends). In general, other relatives and siblings play a relatively minor role in ongoing gambling, although this does rule out their involvement in introducing young people to gambling.

These results confirm previous findings (e.g., Wood & Griffiths 1998) suggesting that parents play a very important role in exposing young people to gambling, although further research is needed to determine the exact context in which this is occurring; for example, whether parents are buying tickets or placing bets on their children's behalf, giving tickets as gifts, or whether children are giving their parents money to gamble. Most other studies (e.g., Fisher 1999; Gupta & Derevensky 1998) generally suggest that young people spend their own money, so that the involvement is not purely vicarious. Indeed, our results here clearly show that a very substantial

⁹ It is important to note that, in Australia, over 70-80% of the population gambles, so that it is more likely than not that young people will have parents who also gamble. Our analyses clearly show, however, that the rates of parental gambling amongst problem gamblers are higher than others in the sample.

proportion of adolescent gambling is not being undertaken with parental involvement. Taken as a whole, the findings again underscore the importance of engaging parents in any educational program to address adolescent gambling, but also suggests that further regulatory controls may need to be introduced to prevent young people from gambling on specific activities; most notably, lotteries, scratch tickets and poker machines. Even though our sample included a small number of teenagers aged 18 and 19 who can legally participate in these activities, our analyses showed that removal of this group made no difference to the findings, and that the under-aged group in fact gambled more than this older sample.

7.2 Psychological Correlates

The research findings presented in this section focuses on the links between adolescent psychological and social adjustment. Our starting hypothesis was that adolescent problem gamblers would score significantly more poorly on measures of psychological adjustment or general mental health, be more disillusioned and alienated, and also be more likely to be engaged in other high risk activities. Further, given the recent research relating to the importance of peer relationships, the paper also included several exploratory analyses to obtain preliminary information concerning the relationship between adolescent gambling and peer relations; in particular, the relationship between adolescent gamblers and others in their peer group.

7.2.1 Measures

Our measures for estimating problem gambling prevalence and psychosocial adjustment included the following.

Gambling habits

Respondents were asked how often during the previous 12 months they had gambled on all the major forms of gambling available in the ACT, including: cards (private vs. Casino), poker-machines, racing, sports betting (not including racing), lotteries (Keno, Lotto, Powerball or Pools), bingo or scratch cards, and Internet gambling. All responses were recorded on 5 point scales, where 1 = Never; 2 = 1-2 times per year; 3 = 3 times a year up to monthly; 4 = 2-3 times per month; and 5 = Weekly or more often.

DSM-IV-J

See 7.1.1 for details of this problem gambling screen.

Victorian Gambling Screen (VGS)

See 7.1.1 for details of this problem gambling screen.

Negative mood scale

Negative mood was measured using a 5-item negative mood checklist previously used in 10-year longitudinal adolescent school-leaver study by Tiggemann and Winefield (1989). For each of the 5 words (bored, lonely, angry with self, happy (reversed scored), helpless and depressed), participants indicated how often they felt that way, 1 = Almost never, 2 = Sometimes, 3 = Quite often, and 4 = Almost always. The minimum score of 6 indicated almost no negative symptoms, whereas the maximum score of 24 indicated a very negative mood state. The alpha reliability of this scale was acceptable, $\alpha = 0.80$.

Rosenberg self-esteem scale

Self-esteem was measured using Rosenberg's (1965) self-esteem scale. This scale consists of 10 items and respondents indicate their level of agreement (1 = Strongly agree, 2 = Agree, 3 = disagree, 4 = Strongly disagree). The scoring range was from 10 (low self-esteem) to 40 (high self-esteem). Tiggemann and Winefield (1989) have used this measure extensively in South Australian adolescent research. This scale had very good internal reliability in the present sample, $\alpha = 0.87$.

General health Questionnaire (GHQ-12)

General psychological and medical health was measured using Goldberg and Williams (1988) GHQ-12. Participants indicated the frequency of various symptoms over the 'last few weeks' (e.g., losing sleep due to worry, feeling constantly under strain) on 4-point scales that vary slightly depending upon wording of the question and the direction of scoring. An example includes: 1 = More so than usual, 2 = Same as usual, 3 = Less so than usual, 4 = Much less than usual). Scoring involved assigning 1-point for every response of 3 or 4, so that the maximum score of the scale was 12 with a minimum of 0. The alpha reliability of this scale was very good, $\alpha =$

0.84.

Social alienation

The social alienation scale (Dodder & Astle 1980) comprised 9 statements and respondents were required to indicate whether they agreed or disagreed with each statement. This scale was designed to measure a person's perception of disengagement, or disillusionment, with society. Previous research by Winefield, Tiggemann, Winefield and Goldney (1993) has found that this measure was highly predictive of long-term psychological adjustment in young adults. This measure had reasonable internal consistency with, $\alpha = 0.70$. Lower scores on this scale indicate greater endorsement of the items.

Popularity and peer relations

As a measure of peer relations, adolescents were asked to indicate what percentage of their class liked them, and what percentage they did not like.

Financial Scale

The Financial Scale was used to measure perception of financial security. This measure was first used in Tiggemann and Winefield (1989). Participants were required to rate their agreement with twelve statements according to a 4-point scale (1=strongly agree, 4=strongly disagree). Reliability analysis of this measure was good, $\alpha = 0.79$.

Leisure activities

Respondents were asked to indicate how they spend their spare time both in terms of 4 broad categories and also specific activities. The broader questions were based on Tiggemann, Winefield, Winfield and Goldney (1993): "Doing nothing in particular", "Watching TV programs", "Activities by yourself" and "Activities with other people". For each of these items, participants were given 4 response categories: 1. A further list of specific social and solitary activities was provided and participants

were asked to tick which ones they engaged in.

Alcohol consumption

Young people were asked to indicate how often they usually drink alcohol, where 0 = Never, 1 = Less than once per week, 2 = 1-2 Days per week, 3 = 3-4 Days per week, 4 = 5-6 Days per week, and 6 = Every day. They were also provided with a description of a standard drink and asked to indicate how many standard drinks they usually consumed on each occasion.

Cigarette smoking

Young people were asked to indicate whether they smoked cigarettes and how many they would typically smoke per day.

Drug use

Respondents were asked whether they used any drugs and, if so, what sort. Options included: marijuana, heroin, speed, ecstasy, cocaine, or other.

7.2.2 Results

Problem gambling and other high-risk behaviours

Respondents were asked to indicate how often they drank alcohol and we divided their responses into principal groups: those who drank less than once per week, and those who drank at least weekly. For other substances, the question asked whether they were currently using any other drugs. As indicated in Table 8, over three quarters of problem gamblers drank alcohol on a weekly basis compared with only half of the non-problem sample. The prevalence of smoking amongst problem gamblers was 4 times the rate, for marijuana over 6 times the rate, and for harder drugs, 10 to 20 times the rate recorded for the non-problem sample.

Table 8. Prevalence of substance use amongst problem and non-problem gamblers

	Problem gamblers <i>n</i> (%)	Non-problem gamblers <i>n</i> (%)	$\chi^2(1)$
Alcohol+	29 (78)	372 (52)	9.49**
Cigarettes	20 (52)	89 (13)	45.88***
Marijuana	27 (69)	81 (11)	107.80***
Heroin	16 (41)	17 (2)	107.66***
Speed	16 (41)	32 (4)	88.22***
Ecstasy	18 (46)	30 (4)	115.82***
Cocaine	18 (46)	23 (3)	140.32***

1. + = Weekly or more often

2. *n* varies across substance types due to missing data

The psychological wellbeing of problem gamblers

Problem gamblers and non-problem gamblers were compared in terms of their scores on 5 measures of psychological wellbeing. As indicated by Table 9, problem gamblers experienced significantly poorer mood states, had lower self-esteem, poorer general health, felt more alienated from society, and were more likely to feel that they did not have sufficient money to satisfy their needs. The effect sizes for all of these effects ranged were moderate, with the strongest effect being observed for anomie.

All of these variables were entered into a logistic regression analysis with problem gambler status as the dependent measure. The model correctly classified 95% of cases and showed that social alienation was the strongest predictor of problem gambling status (Wald = 6.37, $p < .01$, Odds-ratio = 0.84). In other words, each unit decrease in endorsement (higher score) was associated with a $1/0.84 = 20\%$ reduced likelihood of being in the problem gambling group.

Table 9. Mean (*SD*) scores on measures of psychological functioning amongst problem and non-problem gamblers

	Problem gamblers <i>M (SD)</i>	Non-problem gamblers <i>M (SD)</i>	<i>t</i> -value	Cohen's <i>d</i>
Negative mood	15.24 (5.73)	12.86 (3.93)	2.89**	0.49
Self-esteem	26.33 (7.77)	29.27 (6.07)	3.21***	0.42
GHQ-12	4.45 (3.11)	2.92 (2.72)	3.52***	0.52
Social alienation ²	12.27 (2.56)	13.90 (2.81)	3.77***	0.61
Relative deprivation	26.47 (6.22)	24.44 (6.01)	2.14*	0.33

1. * $p < .05$ ** $p < .01$ *** $p < .001$

2. Higher scores indicate lower endorsement of items

Peer relationships

Respondents were also asked to indicate how many close friends they had, how many peers in their class they disliked, and how many disliked them. The results showed that problem gamblers had no fewer friends than the rest of the sample, but appeared to be significantly more disaffected amongst their peers. In response to the question about others, problem gamblers indicated that they disliked twice as many peers as other respondents ($M = 12.24$, $SD = 10.39$ vs. $M = 6.04$, $SD = 7.55$), $t(768) = 3.44$, $p < .01$ (Cohen's $d = 0.69$). They also indicated that significantly more peers disliked them ($M = 9.83$, $SD = 10.52$ vs. $M = 5.51$, $SD = 7.48$), $t(601) = 2.22$, $p < .05$ (Cohen's $d = 0.48$).

A further series of questions asked respondents to indicate how they usually spent their leisure time (doing nothing, activities along, activities with others, going out) on a 5-point scale. No significant differences were observed for all items except that problem gamblers indicated undertaking more activities with others than the did the rest of the sample ($M = 3.16$, $SD = 0.95$ vs. $M = 2.80$, $SD = 0.81$), $t(775) = 2.59$, $p < .01$ (Cohen's $d = 0.40$).

Substance Use: Multiple Regression analyses

A potential problem with the above analyses is that gender is significantly associated with problem gambling, and scores on some of these measures of adjustment also differ significantly between boys and girls and in the same direction as the gambling-related effects. For example, boys are more likely to smoke marijuana, and to use all of the hard drugs. In order to determine the relative importance of gambling status, a series of hierarchical logistic regression analyses were undertaken. Involvement in the high-risk activity was the dependent measure (0 = Not involved, 1 = Involved), gender was entered on the 1st step and gambling status on Step 2. In the interest of parsimony, this analysis was confined to a generic question that asked whether participants used any other substance apart from alcohol, nicotine / cigarettes, and marijuana. The analysis convincingly showed that problem gambling was the critical variable. In the final model, which correctly classified 87% of cases, gender was a non-significant predictor, whereas problem gambler status was highly significant with an odds-ratio of 0.062. In other words, if a person responded “yes” to the ‘any other substance’ question, he or she was $1/0.062 = 16$ times more likely to be a problem gambler.

Psychological well-being in relation to each form of risk-taking

Although it is clear that there is an overlap between problem gambling (PG) and drug use and that the latter is associated with poorer psychological adjustment, three questions remained. First, is PG related to adjustment when the influence of substance abuse has been taken into account? Second, does the combination of PG and substance have effects that differ from those observed for gambling alone? Third, which of the two risk behaviours appears to have the strongest association with adjustment? This analysis was undertaken using a 2 Problem Gambler Status x 2 Drug Use (Yes/No) factorial ANOVA with each of the psychological adjustment measures in Table 2 included as dependents.

The results showed that problem gambling status was most reliably associated with poorer adjustment. There was a significant main effect of PG status for negative mood, $F(1, 776) = 10.08, p < .001$ ($\eta^2 = 0.01$), for self-esteem, $F(1, 778) = 4.03, p < .01$

($\eta^2 = 0.01$), for social alienation, $F(1, 767) = 7.60, p < .001$ ($\eta^2 = 0.01$), and for GHQ-12, $F(1, 776) = 7.11, p < .01$ ($\eta^2 = 0.01$). There were no significant PG status x Drug use interactions for any of the 4 measures and only one significant main effect of Substance Use (for negative mood), $F(1, 776) = 10.03, p < .001$ ($\eta^2 = 0.01$). However, as indicated by the beta-squared values, it is important to recognize that the independent contribution of problem gambling is quite small when substance use is included in the model.

7.2.3 Discussion

The results of this study were generally very consistent with previous international research. Adolescent problem gamblers were significantly more likely than non-problem gamblers to engage in other high-risk behaviours and to be less psychologically well-adjusted. In particular, problem gamblers were also significantly more socially alienated and disillusioned with society, and more likely (as based on relative deprivation scores) to feel that they were deprived of the resources necessary to engage in a variety of everyday activities. As indicated by the results of the logistic regression analysis, social alienation was found to be strongest psychological predictor of adolescent problem gambling, with the resultant model found capable of correctly classifying 95% of cases into the two groups. However, despite these differences in overall psychological functioning, and problem gamblers' greater disaffection with their general peer groups, most nevertheless reported having a number of close friends and that they often engaged in activities involving other people.

The fact that adolescent problem gamblers are generally less psychologically well-adjusted compared with their peers is consistent with broader findings in the gambling literature (e.g. Blaszczynski & Nower 2001; Jacobs 1988; McCormick 1987; Walker 1992) suggesting that gambling satisfies important psychological needs; namely, to relieve anxiety and depression caused by unhappy life experiences. According to this view, gambling is not seen as an intractable pathology maintained by fundamental flaws in the people's character or biological makeup. Instead, people are seen as becoming dependent or "addicted" to gambling because it may serve to

regulate or enhance their mood states. In the absence of the activity, people feel unfulfilled, under-stimulated and depressed, and so develop a strong urge to gamble because of the absence of other activities that could provide similar benefits. If this is also true amongst adolescents, findings such as these therefore suggest that psychological interventions involving the alleviation of negative affect and disillusionment amongst adolescents could be an effective step towards reducing adolescent problem gambling before it continues into adulthood.

The fact that adolescent problem gamblers were also more likely to engage in other high-risk behaviours is also consistent with the above explanation. Psychological maladjustment is also associated with involvement in a range of other high-risk behaviours (Dickson et al. 2002). However, there is also evidence from other studies (e.g., Burnett, Ong, & Fuller 1999) that this pattern of results may also arise from individual differences in risk-taking propensity. For example, Burnett et al. (1999), using a sample of a similar age, found that male regular gamblers scored significantly higher on measures of Zuckerman's (1979) sensation-seeking scale and had a strong interest in a variety of other high-risk activities. Risk-taking was therefore seen as being the result of a need to maintain optimum levels of arousal or excitement rather than as a means to alleviate dysphoric mood states. Although the desire to elevate arousal is also a key component of Jacobs' theory, Zuckerman's model perceives risk-taking as being positively reinforcing, so that the two explanations are not entirely consistent. Another difference is that Zuckerman (1979) conceives of a desire for stimulation as arising from genuine individual differences in physiology, whereas Jacobs' believes this need is not inborn, but arises from traumatic or unhappy experiences.

Once again, it must be pointed out that these results are only correlational, so one cannot assume that negative mood states preceded young people's interest in gambling, or whether it is merely symptomatic of the gambling itself. Furthermore, as we showed using more refined analyses that controlled for the influence of other forms of risk-taking, it is important to recognize that the relationship between psychological disposition and problem gambling is relatively small. In Section 7.1 where we examined the attitudinal and social context of the behaviour, we found

that social factors, including the extent to which young people's friends and family gamble, is also likely to play a very strong role. Indeed, as Dickson et al. (2002) point out in their extensive review, psychological vulnerability is likely to be only one of a number of risk factors contributing to an interest in high-risk activities.

A final component in this study was to explore possible links between adolescent problem gambling and peer relations. Previous research (e.g., Hardoon et al. 2004) has suggested that problem gambling may be an increasingly antisocial behaviour in that young people may become increasingly isolated from peers as their dependence increases. However, the results here provide little evidence for this. On the contrary, young problem gamblers were found to live active social lives and reported having a number of close friends. Although this may indicate that gambling problems had not developed sufficiently to lead to isolation, one cannot necessarily take heart from these findings in that the friends identified may also have been gamblers and perhaps actively encouraged the behaviour (Griffiths 1995). Thus, as Hardoon et al. (2004) point out, in considering the role of peer relations in risk-taking behaviours such as gambling, it may be important to draw a distinction between peer support and peer influence. Having a supportive network of peers has often been identified as a factor that may protect young people from the undesirable consequences of risk-taking behaviours. However, such networks may also provide the primary source of peer pressure to engage in high-risk behaviours (Gupta & Derevensky 1997). Accordingly, in assessing the social adjustment of adolescent gamblers, it is important to consider not merely the existence of social networks, but also the nature of the interactions between peers, as well as the attitudes and characteristics of the group.

7.3 Statistical Knowledge and Perception of Risks

This section presents our findings on the nature of irrational gambling-related cognitions. We have analysed students according to their gambling status (problem gambler, non-problem gambler) and assessed their understanding of objective odds, the nature of randomness, the role of skill in gambling, and the perceived profitability of gambling. The results confirmed previous findings that problem gamblers tend to possess stronger beliefs in the role of skilful play in chance activities and that gambling is a potentially profitable activity. Interestingly, problem gamblers possessed similar understandings of objective probabilities. These results are explored below.

7.3.1 Measures

Gambling habits

See 7.1.1 for details of this measure.

DSM-IV-J

See 7.1.1 for details of this problem gambling screen.

Victorian Gambling Screen (VGS)

See 7.1.1 for details of this problem gambling screen.

Attitudes towards gambling

Participants were also administered a 9-item measure of people's economic perception of gambling developed by Delfabbro and Thrupp (2003). For each statement, respondents had to rate their agreement on a 5-point Likert scale (1 = Strongly agree to 5 = Strongly disagree. These items included: 'Gambling is a risky activity', 'You can lose all your money gambling', 'Gambling is a waste of money', 'Gamblers usually lose', 'To gamble is to throw away money', 'You can make a living

from gambling', 'Gambling is a good way to get rich quickly', 'Gambling is a better way to make money than working', 'Gambling is designed to give high returns' The scale had very good internal consistency, $\alpha = 0.83$. Selected items were reversed scored so that higher scores represented more a cautious attitude towards gambling (range 9 – 45).

Perceptions of skill

Participants were asked to rate out of 10 how much skill was involved in each of the types of gambling listed above. A score of 0 indicated "No skill at all", 5 = "Equal skill and chance" and 10 = "All skill". They were also asked to indicate their favourite activity (gambling activity or otherwise) involving skill and to rate their own skill out 10, as well as indicate how skilful they were compared with the average person, where 0 = Much worse than average, 5 = About the same, 10 = Much better than average.

Understanding of odds and probabilistic concepts

Five questions were included to measure participants' understanding of the true odds of common gambling activities, their understanding of randomness, and their level of mathematical reasoning. The first question asked participants to indicate from a series of choices which set of odds was closest to those associated with winning based upon having all 6 of one's numbers (out of a choice of 45) come up in Cross-lotto. Five choices were provided: 1 in 900, 9000, 90,000, 1 million, 5 million, 8 million, and 20 million. The closest answer was 8 million. The second and third questions asked participants to indicate whether any numbers on a 6-sided die were easier or harder to get and, if so, which ones. Question 4 informed the participants that a coin had been tossed 12 times in a row and that a series of possible outcomes had occurred. Participants were asked which of the outcomes was most likely. The first 3 options were 3 sequences comprising either 10 alternations, 2 alternations, or 5. Option 4 was that "none of them are likely if the coin is fair" and 5 = "All of them are equally likely if the coin is fair". Question 5 informed participants that the odds of getting 3 girls in a row in a family was $1/2 \times 1/2 \times 1/2 = 1/8$ or 12.5%. The question

then asked: "If a family had 3 girls, what was the probability of the next one being a girl?"

7.3.2 Results

Perceived skill in gambling activities

Participants were asked to rate on a scale of 1 to 10 how much skill was involved in common forms of gambling, where 1 = No skill and 10 = All skill. A summary of the results broken down by gambler status is provided in Table 10. Overall, card games, racing and sports-betting were rated as more skilful than the other activities.

However, as indicated, problem gamblers rated all forms of gambling as involving significantly more skill than non-problem gamblers, with very large effects being observed for games of pure chance, e.g., poker machines, bingo, lotteries and roulette. Indeed, for these activities, problem gamblers' scores tended to fall at the midpoint of the scale indicating a belief that outcomes were due to an equal measure of skill and chance.

Table 10. Mean (SD) skill ratings for common gambling activities

	Problem gamblers (<i>n</i> = 49) <i>M</i> (<i>SD</i>)	Non-problem Gamblers (<i>n</i> = 819) <i>M</i> (<i>SD</i>)	<i>t</i> -value	<i>d</i>
Poker	5.95 (3.51)	4.70 (3.03)	2.45*	0.38
Blackjack	5.57 (3.62)	4.51 (2.92)	2.02*	0.32
Poker machines	3.58 (3.85)	1.18 (2.39)	4.23***	0.77
Racing	5.55 (3.64)	4.15 (3.09)	3.04*	0.42
Sports betting	5.90 (3.48)	4.32 (3.06)	3.46***	0.48
Lotteries	4.12 (4.19)	1.36 (2.46)	4.57***	0.83
Bingo	4.16 (4.25)	1.16 (2.25)	4.91***	0.92
Roulette	4.82 (3.97)	2.30 (2.91)	4.38***	0.73

1. *df* for *t*-test ranged from 850-873 depending upon the incidence of missing data.

2. * *p* < .05 ** *p* < .01 *** *p* < .001

Perception of lottery odds

Students were also asked to indicate the probability of winning a lottery draw involving the selection of 6 numbers from 45 (true odds 1: 8.145 million). The distribution of responses is provided in Table 11. A Kolmogorov-Smirnov test revealed no significant differences between the two distributions of scores, suggesting that both groups gave a similar pattern of responses ($p > .05$). However, it is noteworthy that over half the overall sample rated the odds of winning as being 8 times greater than really was the case, and that a quarter thought the odds were only 1 in 900.

Table 11. Perceived odds of winning a lottery draw (6 from 45 numbers)

	Problem gamblers ($n = 50$) n (%)	Non-Problem gamblers ($n = 797$) n (%)	Overall ($n = 847$) n (%)
1 in 900	19 (38)	185 (23)	204 (24)
1 in 9000	2 (4)	48 (6)	50 (6)
1 in 90,000	1 (2)	54 (7)	55 (6)
1 in a million	4 (8)	124 (16)	128 (15)
1 in 5 million	2 (4)	75 (9)	77 (9)
1 in 8 million*	5 (10)	105 (13)	110 (13)
1 in 20 million	17 (34)	17 (2)	34 (4)

1. * = Correct answer.

Perception of randomness

A third question asked participants to indicate whether there were any numbers of a single die that were harder or easier to get. Within the overall sample, 214 (26%) said that some numbers were harder to get, with a similar percentage (27%) indicating that some numbers were easier to get. Of these who said 'Yes' and responded to the

next question, over half ($111 / 203 = 55\%$) indicated that 6's were hardest to get, whereas approximately half (49%) indicated that 1s and 2s were easiest to get. Problem gamblers were significantly more likely to hold the belief about hard numbers than non-problem gamblers (43% vs. 25% for the non-problem gamblers), $\chi^2(1) = 6.65, p < .01$. Almost identical results were obtained for the easy number question (44 vs. 26%), $\chi^2(1) = 7.21, p < .01$.

Knowledge of factual probabilities

Students were also asked to indicate the probability of getting two heads when two coins are tossed ($p = 0.25$). As indicated in Table 12, fewer than half the sample gave the correct answer (0.25). However, there was no evidence to suggest that problem gamblers were any more inaccurate than non-problem gamblers, $\chi^2(1) < 1$. A limitation of this question was that no p-value greater than 0.25 was given in the list of options, making it impossible to determine whether there was a tendency for problem gamblers to overestimate the probability of the specified event.

Table 12. Perceived chance of obtaining two heads when two coins are thrown

	Problem gamblers ($n = 48$) n (%)	Non-Problem gamblers ($n = 829$) n (%)	Overall ($n = 877$) n (%)
0.25	18 (38)	340 (41)	358 (41)
0.33	4 (8)	106 (13)	110 (13)
0.40	6 (13)	27 (3)	33 (4)
0.50	20 (42)	355 (43)	375 (43)

1. * = Correct answer

Susceptibility to representation bias in outcome sequences

A fifth question provided respondents with a number of sequences of outcomes resulting from repeated coin tosses. Respondents were asked to indicate whether one

sequence (varying in terms of the number of alternations) was more likely than another, or equally likely. In total, only $465 / 852 = 55\%$ of respondents gave the correct answer; namely, that all were equally likely. For the 3 patterns, 30% said that the sequence with 5 or 10 alternations was most likely, but only 3% said that the one with only two alternations of colour was likely. A further 12% said that none of the sequences was likely. Importantly, only 12 or 25% of problem gamblers gave the correct answer compared to 453 or 57% of the non-problem gamblers, $z = 2.28$, $p < .01$ (proportion difference test).

Susceptibility to recency effects

A final question asked participants to indicate the odds of obtaining a girl in a family, where the first three children had all been girls. A tendency to favour gambler's fallacy logic (or negative recency) would be revealed in lower probability estimates, whereas higher estimates would indicate positive recency (as is often favoured by gamblers who believe they are 'on a roll'). A t-test showed that problem gamblers showed little bias and were significantly more accurate. Their probability estimate was closer to 50% than the non-problem group ($M = 51.8$, $SD = 48.56$ vs. $M = 35.5$, $SD = 30.32$ for the non-problem group), $t(695) = 3.24$, $p < .001$ (Cohen's $d = 0.41$). In other words, the non-problem gamblers were more likely to believe that the odds of a girl were less likely after 3 girls had been born.

Perceived risks of gambling

Participants were administered the 9-item scale previously developed by Delfabbro and Thrupp (2003) to measure gambling-related optimism. High scores on this scale indicate lower risk aversiveness and a belief that gambling is a good way to make money. As expected, problem gamblers scored significantly higher on this scale ($M = 26.92$, $SD = 7.16$ vs. 17.54 , $SD = 5.59$ for the non-problem gamblers), $t(910) = 9.11$, $p < .001$.

Age related confounds

A potential confound in the analyses so far is that an understanding of probability

and gambling might vary as a function of age. If problem gambling also varied according to age (so that poorer understanding was associated with age levels with lower levels of problem gambling) then the effects described above might be due to age rather than problem gambling. There was little evidence to support this contention. In our analyses presented in section 7.1, we showed that problem gambling scores did not vary significantly across age-levels, suggesting that this confound did not occur.

7.3.3 Discussion

At the most general level, these findings clearly show that many young people do not have an accurate understanding of the true odds of gambling activities, and are more likely than not to overestimate the probability of winning. The results also supported the findings of Joukhador et al. (2004) and Jefferson and Nicki (2003) that adolescent problem gamblers were more likely to endorse questions indicating an irrational or misguided perception of gambling activities. For example, when asked about how skilful they were, problem gamblers rated themselves as being significantly more skilful when gambling on activities where no such skill was possible (e.g., poker machines, lotteries and roulette). They were also more likely to believe that certain numbers on a six-sided die were harder or easier to obtain, and also held more optimistic views about their chances of winning, and making money from gambling. However, this study found little evidence that young problem gamblers had a poorer understanding of the objective odds of gambling activities. When asked to indicate the probability of winning a major lottery, problem gamblers were no less accurate than others in the sample, and on one question concerning binary odds, problem gamblers were found to be more accurate than others in the sample. In other words, these findings provide further support the conclusions of Benhsain and Ladouceur (in press) who similarly found little evidence that the possession of objective knowledge of mathematics and statistics does not shield people from either an interest in gambling, or other erroneous perceptions.

This apparent divergence between understanding the objective odds and more specific irrational beliefs related to the gambler's personal perceptions of gambling

appears consistent with Ladouceur's (2001) view of a distinction between "cold" / objective knowledge and "hot" or personally relevant cognitions. The results suggest that problem gamblers appear to share much of the same cold knowledge as others, but may differ in how they utilise or evaluate this information. During the process of gambling, specific idiosyncratic beliefs (e.g., that one can control the outcomes, or that certain numbers are luckier than others) come to over-ride more objective considerations, and this appears to occur to a much greater extent amongst problem gamblers. Sévigny and Ladouceur (2004) have referred to this process as a form of cognitive switching and provide experimental evidence to show how gamblers, with ostensibly objective views about the nature of gambling, will revert to irrational strategies when they become personally involved in the process of gambling itself. To account for this effect, Sevigny and Ladouceur offer a neurophysiological explanation based upon variations in hemispheric functioning, suggesting that a switch to left hemispheric functioning during gambling increases the gambler's propensity for finding non-existent links between events, or between events and behaviour. However, another explanation is that greater irrationality during gambling sessions results from greater cortical arousal. Both Sharpe and Tarrier (1993) and Ladouceur, Gaboury, Bujold, Lachance and Tremblay (1991) have drawn attention to the possible links between irrational thinking and arousal, whereas Friedland and Kleinen (1991) have shown that people are more likely to perceive control or seek control in situations where they feel more anxious. Several studies (e.g. Coventry & Norman 1997; Griffiths 1993) have shown that arousal levels during gambling sessions tend to be higher than prior to, or after the session.

Irrespective of which explanation is true, these results nevertheless have important implications for current suggestions relating to the introduction of gambling-related information in schools and in the community. First, the results suggest that there remains some value in continuing to teach young people about the objective odds because many young people clearly do not know how difficult it is to win in some forms of gambling, most importantly lotteries. Our results therefore are consistent with the rationale of programs such as the Harvard Medical School's program "Facing the Odds" that contains an extensive section relating to the odds of lottery activities. Provision of this information would also appear to be consistent with the

States's obligation to provide young people with the necessary information to allow them to make informed choices as consumers (Eggert 2004). Moreover, their findings do not rule out the possibility that such information could be influential as a primary intervention, i.e., as a way to prevent problems before they develop.

However, in terms of assisting young problem gamblers, the results suggest that other strategies may need to be employed. Rather than providing only statistical information, these young people may need to be engaged in school activities that provide greater insights into idiosyncratic belief systems and superstitious beliefs. For example, as discussed in a recent South Australian school education program entitled *Dicey Dealings* (Glass 2004), this task could be undertaken using role-playing tasks in which young people engage in mock gambling scenarios so that they can observe firsthand, the development of superstitious beliefs and other erroneous beliefs. Another strategy adopted in Canadian educational strategies (Saskatchewan Health 1999) has been to show videos depicting teenagers engaged in conversations about how they personally perceive gambling, and the various misconceptions that contributed to their difficulties. In this way, it is hoped that young people will be more strongly motivated to challenge their own beliefs, or at least undertake gambling with greater self-awareness. As Langer (1975) and more recently Dixon, Hayes, and Aban (2000) have shown in experiments relating to illusion of control beliefs, a greater orientation towards rationality can substantially reduce people's susceptibility to illusory beliefs during ongoing task performance (Sevigny & Ladouceur 2003).

7.4 Exposure to Gambling Advertising

The impact of gambling advertising on the public has been under-researched. Consequently, the effects of advertising on youth or adult introduction to and maintenance of gambling is unknown. The second International Think Tank of Youth Gambling Issues (2001) highlighted the need for urgent research into existing knowledge of the effects of advertising on alcohol and cigarette consumption, analyze current gambling advertising and conduct research into the precise effects of advertising on particular sub-groups. Current research projects are underway and are attempting to examine the effects of gambling advertising on youth (International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University; and Korn, University of Toronto). Research conducted to date (e.g. Amey 2001; Grant & Won Kim 2001; Wiebe & Falkowski-Ham 2003) suggests that adults and adolescents do remember seeing gambling advertising and can recall specific advertisements but the precise relationship between exposure to advertising and gambling participation is unknown.

7.4.1 Methods

Gambling Advertising

Respondents were asked to indicate if they could recall seeing an advertisement for some form of gambling during the past week? Secondly, they were asked if they could recall a brand name associated with their recalled instances of gambling advertising.

7.4.2 Results

Table 13 shows that problem gamblers remember having seen gambling advertisements more than other gamblers. Our results indicate that the majority of ACT adolescents surveyed could recall seeing an advertisement promoting gambling in the week prior to completing the survey. Sixty-one per cent of non-problem

gamblers and 71.1% of problem gamblers remembered having seen gambling advertising. But more even rates of non-problem gamblers and problem gamblers had remembered seeing a lottery advertisement. Problem gamblers were also more likely to remember brand names associated with particular gambling activities. However, apart from Casino Canberra and lottery games, all students performed poorly when asked to recall a brand name associated with the gambling advertisement they saw.

Table 13. Number (%) of adolescents who had seen gambling advertisements in the past week

Gambling Activity	Non-Problem Gambler %	Problem Gambler %	Examples of Gambling Brands Recalled
Casino	43.8	71.1	Casino Canberra
Pokies	21	60.5	local clubs ¹⁰
Racing	24.2	65.8	TAB
Sports	17.1	52.6	TAB, local clubs
Lottery	52.2	68.4	powerball, big red ball, Keno
Housie	21.5	51.4	scratchies, big red ball, powerball
Internet	29.3	52.8	Casino Online, Casino www, Fantasy League, Ladbrokes.com, www.slimegames, 888.com

¹⁰ Students tended to list the names of venues where pokies are found rather than indicate brands or individual machine names. The local and inter-state clubs mentioned include the Hellenic Club, Wests Rugby Club, Canberra labour Club, 'Dickson tradies', Belconnen Soccer Club, Southern Cross Club, Gungahlin Lakes, Canberra Club, Ainslie Football Club, and the East Lake Football Club.

7.4.3 Discussion

Our results confirm that adolescents do remember seeing gambling advertisements. Our results are consistent with previous research like Wiebe and Falkowski-Ham's (2003) finding that 78% of Ontario 11 to 16 year olds interviewed had seen a gambling advertisement with 50% having seen it on television and 27% via the internet. Further, our results indicate that adolescent problem gamblers are more likely to recall having seen a gambling advertisement, especial for venue gambling.

The degree to which adolescents are exposed to pro-gambling advertising is important, as it may bear some relation to gambling prevalence. We know that adolescents are introduced to gambling by their parents (see section 7.1) but it is unclear whether exposure to gambling advertising is a factor in the initial uptake of gambling products or in the maintenance of gambling behaviour. Further research on the receptivity of adolescents to gambling advertising is required to ascertain the relationship between adolescent receptivity to gambling advertising and its possible influence on their initial and ongoing desires to gamble.

7.5 Help-Seeking Tendencies

Given that adolescents do experience problems with gambling, it is important to determine from whom they are most likely to seek help. Overseas studies report that adolescents tend not to seek treatment (e.g. Gupta & Derevensky 2000; Griffiths 1998). Kids Help Line data from the ACT has no category for calls regarding gambling, as adolescents do not call to talk about their own or other people's gambling. This is also reflected in data relevant to other states. We also know that ACT adults sought assistance from friends and families for help (AIGR 2001). We wanted to find out where ACT adolescents would be most likely to seek help from. Knowing adolescent help seeking inclinations can assist in the design of school-based awareness programs and the suitable services for young people.

7.5.1 Methods

Help Seeking

In an open-ended question, respondents were asked their top three tendencies. We asked them: "If you had a gambling problem, where (apart from your family) would you go for help? List up to 3." The responses were coded into the following categories:

<u>Category</u>	<u>Examples of responses</u>
Friends -	'bestfriend', 'boyfriends', 'girlfriends'
Counsellors -	'psychologists', 'Gamblers Anonymous', 'professional', 'psychiatrist'
Family -	'Relatives', 'Family', 'Mum', 'Dad'
Telephone helpline -	'Lifeline', 'Youthline', 'Kids Helpline', 'gambling helpline', 'G-line' and 'hotline'
School -	'School', 'teachers', 'year co-ordinator'
Religion -	'Priest', 'Church', and 'God'
Don't Know -	'don't know'
Other Adults -	e.g. 'Police', 'Doctor', 'Adult Friend', 'Sports Coach', 'Scout Leader'

7.5.2 Results

The first preference for adolescent help seeking was friends. After friends, students indicated they would seek help from, in order of preference, counselors, family, telephone help-lines, school. Interestingly, non-problem gamblers were more likely to indicate that they would seek help from school staff indicating that they have a better relationship with school staff than problem gamblers.

Table 14. Adolescent Help-Seeking Preferences

Source of Help*	First Choice (n=556) % (n)	Second Choice (n=438) % (n)	Third Choice (n=293) % (n)
Friends	48.2 (268)	29.2 (128)	16.0 (47)
Counsellors	23.7 (132)	30.6 (134)	31.4 (92)
Family	8.3 (46)	8.0 (35)	6.5 (19)
Telephone Helpline	5.9 (33)	6.2 (27)	6.1 (18)
School	4.7 (26)	13.5 (59)	17.1 (50)
Religion	2.9 (16)	2.5 (11)	3.8 (11)
'Don't Know'	2.2 (12)	0.0 (0)	0.0 (0)
Other Adults	1.3 (7)	5.0 (22)	7.5 (22)
Other	2.9 (16)	5.0 (22)	11.6 (34)

7.5.3 Discussion

Our results indicate that adolescents prefer to access their peer networks to raise and manage problems. That adolescents would ideally seek out their peers for support confirms studies of other adolescent issues like self-harm (e.g. Schofield et al. 2004)

and for studies of adult gamblers in the ACT (AIGR 2001). People don't immediately go to counselling, they go to friends and family. These results are crucial in planning school-based awareness programs as young people will benefit from an improved understanding of the best way to support a friend with gambling problems.

8.0 FUTURE RESEARCH DIRECTIONS

The results of our research were broadly consistent with findings from overseas and from those few Australian studies that have been conducted to date. The majority of secondary school students gamble, and a small minority do so excessively. Most adolescent gambling (and adolescent problem gambling) tends to entail private activities or parentally sanctioned legal gambling rather than underage access to commercial gambling venues (e.g., casinos or poker machine venues). Those small percentage of adolescents with gambling problems are more likely to be male, involved in legal and illegal drug use, optimistic about their chances of winning, have parents and peers who gamble, and have poor relationships with peers and family, poor self-esteem, life satisfaction, general health, family and adjustment and social alienation.

To extend current knowledge of adolescent gambling, future adolescent gambling research could:

- **Evaluate gambling-focused school curricula**

To the extent that an adolescent's gambling activity may arise from a poor understanding of the logic and economics of gambling, school curricula may incorporate packages that challenge particular misunderstandings about gambling (e.g., the odds of winning and the nature of the industry) and which draw greater attention to the potential harms associated with gambling excessively. Many such programs are currently in place in Australia (for a review see Glass 2004), but information concerning their effectiveness is either non-existent, very sparse, or yet to be obtained.

- **Conduct complementary qualitative research**

Although we believe very strongly that prevalence research is an essential first stage in developing awareness and understanding of the extent of adolescent gambling in specific regions, a limitation of the current study is that we did not collect detailed contextual information about the setting in which gambling occurs. For example,

how do young people gamble with their parents, and what strategies do they use to gain access to venues? What differentiates gamblers from non-gamblers? In contemporary Australia, at least 80% of the adult population gambles, so that the vast majority of young people will have parents who gamble, or gamble regularly. What factors then determine whether some of these adolescents become problem gamblers and others do not? In our view, these sorts of question are more readily answered by qualitative research that asks both regular gamblers and problem gamblers to provide details concerning their gambling habits, e.g., to explain how gambling is incorporated into their weekly routines, into their social interactions with peers, and their family life.

- **Conduct longitudinal studies**

An important point concerning our results is that the problem gambling rate identified in this survey cannot necessarily be translated to the adult population. Although it would be tempting to conclude that many of these adolescents will continue on and become adult problem gamblers, there is no reason why this should be the case. In a recent longitudinal study involving 18-29 year olds undertaken in the U.S. by Slutske, Jackson, and Sher (2003), it was found that many people identified as problem gamblers at 18 were not necessarily problem gamblers a few years later. Problem gambling was instead found to be more "transitory and episodic than enduring and chronic" (p. 263). Accordingly, a very useful enhancement of this cross-sectional research would be to follow those with gambling problems from school into early adulthood. Such research would have considerable potential in being able to identify the protective and harm minimizing factors that allow young people to overcome a gambling problem before it becomes a life-time career.

- **Study risk-taking behaviour through peer interaction**

Another possible area of future inquiry is the varying role of peer relations in the development and maintenance in risk-taking behaviour. Adolescent problem gamblers are paradoxically both socially active, but also socially alienated, possibly suggesting gravitation towards peers who share their frustrations and disillusionment. Accordingly, further studies of groups of young gamblers and the

process of peer interaction and their relationship with wider peer groups (e.g., the school community) may provide further useful insights into the process by which gambling and other forms of risk-taking develop during adolescence.

- **Utilize both survey and experimental research measures**

A limitation of the current project is that the findings are based entirely on a self-report methodology using 'closed' type questions. Consequently, it would be useful to examine these findings more thoroughly using a combination of experimental and survey measures to determine whether self-reported irrationality is indeed borne out in practice. For example, the fact that young problem gamblers are more likely to perceive some numbers on a die as being more likely or others could be studied experimentally to determine whether these beliefs relate to direct measures of gambling involvement including bet sizes and overall expenditure in problem gamblers but not in other gamblers. Once this has been ascertained, studies could be conducted to determine whether instructed self-monitoring of thought patterns and behaviour could reduce, not only the prevalence of irrational cognitions, but also the intensity of the behaviour.

- **Uncover the language of young problem gamblers**

Furthermore, it would be beneficial to expand the present methodology to include interviews with individual problem gamblers perhaps engaged in gambling to determine the specific language that young people use to describe their views. Such work has previously been undertaken by Wood and Griffiths (2002) in relation to the UK National Lottery. Similar work could be undertaken in Australia to obtain greater insights in the specific experiences of adolescent gamblers and the type of message to be used in education strategies involving role-playing and video presentations.

9.0 RECOMMENDATIONS

Based on the results of our research we make the following recommendations to regulators and educators:

1. Although regulatory provisions appear to be working reasonably well, there may be a need to strengthen existing regulatory controls to prevent young people from gambling on specific activities, most notably, lotteries, scratch tickets and poker machines. For example, more frequent ID checking may be required to ensure that young people are not gaining access to lottery products before the age of 18. Although adolescent gambling, and problem gambling, occurs on private activities or parentally sanctioned legal gambling rather than as a result of underage access to commercial gambling venues (e.g. casinos or poker machine venues), there is evidence that a few young people are gambling on commercial gambling activities.
2. Engage parents in educational programs or public awareness campaigns that seek to reduce adolescent gambling. Parents need to be targeted in these kinds of measures as they play an important role in exposing young people to gambling.
3. It is important to teach young people about objective odds because many young people do not know how difficult it is to win in some forms of gambling, like lotteries.
4. Given that statistical knowledge does not always preclude the development of erroneous beliefs about gambling, other educative strategies need to be employed in school-based learning where adolescents can observe firsthand the development of idiosyncratic belief systems and superstitious beliefs (e.g., via role playing exercises).
5. As friends are the primary source of assistance in the event of a gambling problem, future school programs could provide advice for young people on appropriate ways of responding to and supporting a friend who is experiencing problems with gambling.

10.0 REFERENCES

Abbott, M., McKenna, B. & L. Giles. 2000. *Gambling and problem gambling among recently sentenced males in four New Zealand prisons*. Wellington: Department of Internal Affairs.

Amey, B. 2001. *People's participation in and attitudes to gaming, 1985-2000: final results of the 2000 survey*. Wellington, New Zealand: Department of Internal Affairs.

Australian Bureau of Statistics. 2003. *Canberra: a social atlas. 2001 Census of Population and Housing. ABS Catalogue No. 2030.8*. Canberra, Australia: Australian Bureau of Statistics, Commonwealth of Australia.

Australian Council of Social Service. 1997. *Young people, gambling and the internet*. Darlinghurst, Sydney, Australia: Australian Council of Social Service.

Australian Institute of Gambling Research. 2001. *Survey of the Nature and Extent of Gambling and Problem Gambling in the ACT*. Report to the ACT Gambling and Racing Commission. Sydney: Australian Institute of Gambling Research, University of Western Sydney.

Australian Institute of Gambling Research and the Labour and Industry Research Unit. 1999. *Long term study into the social impact of gaming machines in Queensland. An issues paper: the social and economic impact of gaming machines on Aboriginal and Torres Strait Islander communities in Queensland*. Brisbane: Department of Families, Youth and Community Care, The State of Queensland.

Barnes, G., Welte, J., Hoffman, J., & B. Dintcheff. 1999. Gambling and alcohol use among youth: influences of demographic, socialization, and individual factors. *Addictive Behaviors* 24(6):749-767.

Benhsain, K. & R. Ladouceur. in press. Knowledge in statistics and erroneous perceptions in gambling. *The Journal of Psychology*

Ben-Tovim, D., Esterman, A., Tolchard, B., Battersby, M., & Flinders Technologies.

2001. *The Victorian Gambling Screen: project report*. Melbourne: Gambling Research Panel.

Blaszczynski, A., McConaghy, N. & A. Frankova. 1990. Boredom Proneness in Pathological Gambling. *Psychological Reports* 67(1):35-42.

Blaszczynski, A., & L. Nower. 2002. A pathways model of problem and pathological gambling. *Addiction* 97(5):487-500.

Burnett, J., Ong, B., and A. Fuller. 1999. Correlates of gambling in adolescents. In, McMillen, J., and L. Laker (eds), *Developing Strategic Alliances: proceedings of the 9th National Association for Gambling Studies Conference*, pp.216-234.

Coventry, K. & A. Norman. 1997. Arousal, sensation seeking and frequency of gambling in off-course horse racing bettors. *British Journal of Psychology* 88:671-681.

Delfabbro, P.H. (2000). Gender differences in Australian gambling: a critical summary of sociological and psychological research. *Australian Journal of Social Issues* 35:145-157.

Delfabbro, P. 2004. The stubborn logic of regular gamblers: obstacles and dilemmas in cognitive gambling research. *Journal of Gambling Studies* 20:1-17.

Delfabbro, P. & L. Thrupp. 2001. *Gambling and Economic Socialisation: the nature and prevalence of under age gambling in South Australia*. Paper presented at the Annual Meeting of the National Association of Gambling Studies, Sydney.

Delfabbro, P., & L. Thrupp. 2003. The social determinants of youth gambling in South Australian adolescents. *Journal of Adolescence* 26(3):313-330.

Department of Education, Youth & Family Services. 2002. *Government School Bulletin: August 2003 Census*. Canberra, Australia: Department of Education, Youth & Family Services, Australian Capital Territory Government.

Derevensky, J. & R. Gupta. 1998. Child and adolescent gambling problems: a program of research. *Canadian Journal of School Psychology* 14(1):55-58.

- Derevensky, J. & R. Gupta. 2000. Prevalence estimates of adolescent gambling: a comparison of the SOGS-RA, DSM-IV-J, and the GA 20 questions. *Journal of Gambling Studies* 16(2/3):227-251.
- Derevensky, J. & R. Gupta. 2004. Adolescents with gambling problems: a synopsis of our current knowledge. *eGambling* 10: 22 pages.
- Derevensky, J., Gupta, R. & Winters, K. 2003. Prevalence rates of youth gambling problems: are the current rates inflated? *Journal of Gambling Studies* 19(4):405-425.
- Dickson, L., Derevensky, J. & R. Gupta. 2002. The prevention of gambling problems in youth: a conceptual framework. *Journal of Gambling Studies* 18(2):97-159.
- DiClemente, C., Story, M., & K. Murray. 2000. "On a roll": the process of initiation and cessation of problem gambling among adolescents. *Journal of Gambling Studies* 16(2/3):289-313.
- Diener, E., Emmons, R., Larsen, R. & S. Griffiths. 1985. The Satisfaction with Life Scale. *Journal of Personality Assessment* 49:71-75.
- Dixon, M., Hayes, L. & I. Aban. 2000. Examining the roles of rule following, reinforcement and pre-experimental histories in risk-taking behavior. *The Psychological Record* 50:687-704.
- Dodder, R. & D. Astle. 1980. A Methodological Analysis of Srole's Nine-Item Anomia Scale. *Multivariate Behavioral Research* 15:329-334.
- Eggert, K. 2004. Truth in gaming: toward consumer protection in the gambling industry. *Maryland Law Review* 63:217-286.
- Epstein, M., Baldwin, L. & D. Bishop. 1983. The McMaster Family Assessment Device. *Journal of Marital and Family Therapy* 9:171-180.
- Ferland, F., Ladouceur, R. & F. Vitaro. 2002. Prevention of problem gambling: modifying misconceptions and increasing knowledge. *Journal of Gambling Studies* 18(1):19-30.

- Fisher, S. 1992. Measuring pathological gambling in children: the case of fruit machines in the UK. *Journal of Gambling Studies* 8:263-285.
- Fisher, S. 1993. Gambling and pathological gambling in adolescents. *Journal of Gambling Studies* 9:277-287.
- Fisher, S. 1995. Adolescent Slot Machine Dependency and Delinquency: questions on a question of methodology. *Journal of Gambling Studies* 11(3): 303-10.
- Fisher, S. 1999. A prevalence study of gambling and problem gambling in British adolescents. *Addiction Research* 7:509-538.
- Foote, R. 1996. *Aboriginal Gambling: a pilot study of casino attendance and the introduction of poker machines into community venues in the Northern Territory*, Discussion Paper 1/96. Darwin: Centre for Social Research, Northern Territory University.
- Friedland, M. & G. Kleinen. 1991. The effects of stress, ambiguity tolerance, and trait anxiety on the formation of causal relationships. *Journal of Research in Personality* 25:88-107.
- Glass, L. 2004. *Dicey dealings: responsible gambling education strategy*. Adelaide: Department of Education and Children's Services.
- Goldberg, D. 1978. *Manual of the General Health Questionnaire*. Windsor, Berkshire, England: NFER-Nelson.
- Goldberg, D., & P. Williams. 1988. *A user's guide to the General Health Questionnaire*. Windsor, Berkshire, England: NFER-Nelson.
- Grant, J. & S. Won Kim. 2001. Demographic and clinical features of 131 adult pathological gamblers. *Journal of Clinical Psychiatry* 62:957-962.
- Griffiths, M. 1993. Tolerance in gambling: an objective measure using the psychophysiological analysis of male fruit machine gamblers. *Addictive Behavior* 18(3):365-372.

Griffiths, M. 1995. *Adolescent Gambling*. London: Routledge.

Griffiths, M. 1998. *Why adolescents don't turn up for treatment*. Paper presented at the 3rd Conference of the European Association for Gambling Studies, Munich, Germany.

Griffiths, M. & I. Sutherland. 1998. Adolescent gambling and drug use. *Journal of Community and Applied Social Psychology* 8(6):423-427.

Gupta, R. & J. Derevensky. 1997. Familial and social influences on juvenile gambling behavior. *Journal of Gambling Studies* 13(3):179-192.

Gupta, R. & J. Derevensky. 1998. Adolescent gambling behavior: a prevalence study and examination of the correlates associated with problem gambling. *Journal of Gambling Studies* 14(4):319-345.

Gupta, R. & J. Derevensky. 1998. An empirical examination of Jacobs' general theory of addictions: do adolescent gamblers fit the theory? *Journal of Gambling Studies* 14(1):17-50.

Gupta, R. & J. Derevensky. 2000. Adolescents with gambling problems: from research to treatment. *Journal of Gambling Studies* 16(2/3):315-342.

Gupta, R., Derevensky, J., & N. Marget. 2004. Coping strategies employed by adolescents with gambling problems. *Child and Adolescent Mental Health* 9:115-120.

Hardoon, K., & J. Derevensky. 2001. Social influences involved in children's gambling behavior. *Journal of Gambling Studies* 17:191-215.

Hardoon, K., Gupta, R., & J. Derevensky. 2004. Psychosocial variables associated with adolescent gambling. *Psychology of Addictive Behaviors* 18(2):170-179.

Harvard Medical School. 2002. *Facing the odds: the mathematics of gambling and other risks*. Boston: Harvard Medical School.

International Think Tank on Youth Gambling Issues. 2001. Summary Report. <http://www.hms.harvard.edu/doa/html/internationalthinktank2001.pdf> (visited

26 June 2002)

Ipsos-Reid & Gemini Research. 2003. *British Columbia problem gambling prevalence study*. Victoria, BC: Ministry of Public Safety and Solicitor General.

Jackson, A. 1999. *The impacts of gambling on adolescents and children*. Report prepared for the Department of Human Services, Victoria. Melbourne: School of Social Work, University of Melbourne.

Jacobs, D. 1988. Evidence for a common disassociative-like reaction among addicts. *Journal of Gambling Behavior* 4:27-37.

Jefferson, S. & R. Nicki. 2003. A new instrument to measure cognitive distortions in video lottery terminal users: the Informational Biases Scale (IBS). *Journal of Gambling Studies* 19:387-403.

Joukhador, J., Blaszczynski, A., & F. McCallum. 2004. Superstitious beliefs in gambling among problem and non-problem gamblers: preliminary data. *Journal of Gambling Studies* 20(2):171-180.

Kahneman, D. & A. Tversky. 1972. Subjective probability: a judgement of representativeness. *Cognitive Psychology* 3:430-454.

Ladouceur, R. 2004. Perceptions among pathological and non-pathological gamblers. *Addictive Behaviors* 29(3):555-565.

Ladouceur, R., Boudreault, N., Jacques, C., & F. Vitaro. 1999. Pathological gambling and related problems among adolescents. *Journal of child and adolescent substance abuse* 8:55-68.

Ladouceur, R., Dube, D. & A. Bujold. 1994. Gambling among primary school students. *Journal of Gambling Studies* 10(4):363-370.

Ladouceur, R., Dugas, M., Freeston, M., Leger, E., Gagnon, F., Thibodeau, N. & J. Boisvert. 2000. Effectiveness of a new cognitive-behavioral treatment for generalized anxiety disorder: evaluation in a controlled clinical trial. *Journal of Consulting and*

Clinical Psychology 68:957-964.

Ladouceur, R. & A. Gaboury. 1988. Effects of limited and unlimited stakes on gambling behavior. *Journal of Gambling Behavior* 4:119-126.

Ladouceur, R., Gaboury, A., Bujold, A., Lachance, N. & S. Tremblay. 1991. Ecological validity of laboratory studies of videopoker gaming. *Journal of Gambling Studies* 7:109-116.

Ladouceur, R., Gaboury, A., Dumont, D. & P. Rochette. 1988. Gambling: relationship between the frequency of wins and irrational thinking. *Journal of Psychology* 122:409-414.

Ladouceur, R. & C. Mireault. 1988. Gambling behavior among high school students in the Quebec area. *Journal of Gambling Behavior* 4(1):3-12.

Langer, E. 1975. The illusion of control. *Journal of Personality and Social Psychology* 32:311-328.

Langer, E. & J. Roth. 1975. Heads you win, tails it's chance: the illusion of control as a function of the sequence of outcomes in a purely chance task. *Journal of Personality and Social Psychology* 32:951-955.

Lesieur, H. 1984. *The chase: career of the compulsive gambler*. Cambridge: Schenkman Publishing.

Lesieur, H. & S. Blume. 1987. The South Oaks Gambling Screen (the SOGS): a new instrument for the identification of pathological gamblers. *American Journal of Psychiatry* 144:1184-1188.

Lesieur, H. & R. Klein. 1987. Pathological gambling among high school students. *Addictive Behaviors* 12:129-135.

Maden, T., Swinton, M., & J. Gunn. 1992. Gambling in young offenders. *Criminal Behaviour and Mental Health* 2:300-308.

Martinez, J.C. 1995. Risk taking on gender-typed tasks following an assignment

based upon sex. *Journal of Social Psychology* 135:573-579.

McCormick, R. 1987. Pathological gambling: a parsimonious need state model. *Journal of Gambling Behavior* 3:257-263.

Moore, S. & K. Ohtsuka. 1997. Gambling activities of young Australians: developing a model of behaviour. *Journal of Gambling Studies* 13(3):207-236.

Moore, S. & K. Ohtsuka. 2000. The structure of young people's leisure and their gambling behaviour. *Behaviour Change* 17(3):167-177.

Moore, S. & K. Ohtsuka. 2001. Youth gambling in Melbourne's west: changes between 1996 and 1998 for Anglo-European background and Asian background school-based youth. *International Gambling Studies* 1:87-102.

National Gambling Impact Study Commission. 1999. *National Gambling Impact Study Commission Report*. Washington, DC: National Gambling Impact Study Commission.

National Research Council. 1999. *Pathological gambling: a critical review*. Washington, D.C.: National Academy Press.

Petry, N. & Z. Tawfik. 2001. Comparison of problem-gambling and non-problem-gambling youths seeking treatment for marijuana abuse. *Journal of the American Academy of Child Adolescent Psychiatry* 40(11):1324-1331.

Productivity Commission. 1999. *Australia's Gambling Industries*. Canberra: Productivity Commission.

Raylu, N. & T. Oei. 2004. The Gambling Related Cognitions Scale (GRCS): development, confirmatory factor validation and psychometric properties. *Addiction* 99:1-12.

Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Princeton, New Jersey: Princeton University Press.

Saskatchewan Health. 1999. *Gambling: reducing the risks. A problem gambling prevention teaching resource to support middle level health education*. Regina, Saskatchewan,

Canada: Saskatchewan Health.

Schofield, G., Mummery, K., Wang, W. & G. Dickson. 2004. Epidemiological study of gambling in the non-metropolitan region of central Queensland. *Australian Journal of Rural Health* 12:6-10.

Sevigny, S. & R. Ladouceur. 2003. Gamblers' irrational thinking about chance events: the "double switching" concept. *International Gambling Studies* 3:163-170.

Shaffer, H. & M. Hall. 2001. Updating and refining prevalence estimates of disordered gambling behaviour in the United States and Canada. *Canadian Journal of Public Health* 92(3):168-172.

Shaffer, H. & D. Korn. 2002. Gambling and related mental disorders: A public health analysis. *Annual Review of Public Health* 23:171-212.

Sharpe, L. & N. Tarrier. 1993. Towards a cognitive-behavioural theory of problem gambling. *British Journal of Psychiatry* 162:407-412.

Slutske, W., Jackson, K., & K. Sher. 2003. The natural history of problem gambling from age 18 to 29. *Journal of Abnormal Psychology* 112(2):263-274.

South Australian Centre for Economic Studies. 2004. *Measurement of Prevalence of Youth Problem Gambling in Australia: report on review of literature*. Adelaide: South Australian Centre for Economic Studies.

Stinchfield, R. 2000. Gambling and correlates of gambling among Minnesota public school students. *Journal of Gambling Studies* 16:153-173.

Tiggemann, M., & A. Winefield. 1989. Predictors of future employment, unemployment, and further study in school-leavers. *Journal of Occupational Psychology* 62, 213-221.

Tiggemann, M., Winefield, H., Winefield, A., & R. Goldney. 1993. Gender differences in the psychological correlates of body-weight in young adults. *Psychology and Health* 9:345-351.

Toneatto, T., Blitz-Miller, T., Calderwood, K., Dragonetti, R., & A. Tsanos. 1997. Cognitive distortions in heavy gambling. *Journal of Gambling Studies* 13:253-266.

[http://hnb.dhs.vic.gov.au/commcare/yafsinte.nsf/obj/PG_Impacts_Adolescents/\\$FILE/PG_Impacts_Adolescents.pdf](http://hnb.dhs.vic.gov.au/commcare/yafsinte.nsf/obj/PG_Impacts_Adolescents/$FILE/PG_Impacts_Adolescents.pdf) (Visited 20 April 2004)

Vitaro, F., Arseneault, L. & R. Tremblay. 1997. Dispositional predictors of problem gambling in male adolescents. *American Journal of Psychiatry* 154(12):1769-1770.

Vitaro, F., Brendgen, M. Ladouceur, R. & R. Tremblay. 2001. Gambling, delinquency, and drug use during adolescence: mutual influences and common risk factors. *Journal of Gambling Studies* 17:171-190.

Volberg, R. & W. Moore. 1999. *Gambling and problem gambling among adolescents in Washington State: a six-year replication study 1993 to 1999*. Olympia: Washington State Lottery.

Wagenaar, W. 1988. *Paradoxes of gambling behaviour*. England: Erlbaum.

Walker, M. 1992a. *The psychology of gambling*. Sydney: Pergamon Press.

Walker, M. 1992b. Irrational thinking among slot machine players. *Journal of Gambling Studies* 8:245-288.

Welte, J., Barnes, G., Wieczorek, W., Tidwell, M., & J. Parker. 2004. Risk factors for pathological gambling. *Addictive Behaviors* 29(2):323-335.

Wenzel, M., McMillen, J., Marshall, D. & E. Ahmed. 2004. *Validation of the Victorian Gambling Screen. Report number 7*. Melbourne: Gambling Research Panel.

Westphal, J., Rush, J., Stevens, L., & L. Johnson. 1998. Gambling behavior of adolescents in residential placement in northwest Louisiana. *Southern Medical Journal* 91:1038-1041.

Wiebe, J., Cox, B. & B. Mehmehl. 2000. The South Oaks Gambling Screen revised for adolescents (SOGS-RA): further psychometric findings from a community sample.

Journal of Gambling Studies 16(2/3):275-288.

Wiebe, J. & A. Falkowski-Ham. 2003. *Understanding the audience: the key to preventing youth gambling problems*. Toronto, Ontario: Responsible Gambling Council.

Wiebe, J., Single, E. & A. Falkowski-Ham. 2001. *Measuring gambling and problem gambling in Ontario*. Toronto, Canada: Responsible Gambling Council.

Winefield, A., Tiggemann, M., Winefield, H. & Goldney, R. 1993. *Growing up with unemployment: a longitudinal study of its psychological impact*. London: Routledge.

Winters, K. & N. Anderson. 2000. Gambling involvement and drug use among adolescents. *Journal of Gambling Studies* 16(2-3):175-198.

Winters, K., Stinchfield, R., Botzet, A., & N. Anderson. 2002. A prospective study of youth gambling behaviours. *Psychology of Addictive Behaviors* 16(1):3-9.

Wood, R., & Griffiths, M. 1998. The Acquisition, Development and Maintenance of Lottery and Scratchcard Gambling in Adolescence. *Journal of Adolescence* 21:265-273.

Wood, R. & M. Griffiths. 2002. Adolescent perceptions of the National Lottery and scratchcards: a qualitative study using group interviews. *Journal of Adolescence* 25(6):655-668.

Yeoman, T. & M. Griffiths. 1996. Adolescent machine gaming and crime. *Journal of Adolescence* 19(2):183-188.

Zuckerman, M. 1979. *Sensation seeking: beyond the optimal level of arousal*. Hillsdale, New Jersey: LEA Incorporated Publications.