PRE-PRINT: RISK FACTORS FOR GAMBLING PROBLEMS: AN ANALYSIS BY GENDER

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Risk factors for gambling problems: An analysis by gender

Abstract

Differences in problem gambling rates between males and females suggest that associated risk factors vary by gender. Previous combined analyses of male and female gambling may have obscured these distinctions. This study aimed to develop separate risk factor models for gambling problems for males and for females, and identify gender-based similarities and differences. It analysed data from the largest prevalence study in Victoria Australia (N = 15,000). Analyses determined factors differentiating non-problem from at-risk gamblers separately for women and men, then compared genders using interaction terms. Separate multivariate analyses determined significant results when controlling for all others. Variables included demographics, gambling behaviour, gambling motivations, money management, and mental and physical health. Significant predictors of at-risk status amongst female gamblers included: 18-24 years old, not speaking English at home, living in a group household, unemployed or not in the workforce, gambling on private betting, electronic gaming machines (EGMs), scratch tickets or bingo, and gambling for reasons other than social reasons, to win money or for general entertainment. For males, risk factors included: 18-24 years old, not speaking English at home, low education, living in a group household, unemployed or not in the workforce, gambling on EGMs, table games, races, sports or lotteries, and gambling for reasons other than social reasons, to win money or for general entertainment. High risk groups requiring appropriate interventions comprise young adults, especially males; middle-aged female EGM gamblers; non-English speaking populations; frequent EGM, table games, race and sports gamblers; and gamblers motivated by escape.

Keywords: problem gambling, pathological gambling, risk factors, gender, male, female, prevalence study

Introduction

Prevalence studies in numerous jurisdictions consistently report at least double the rate of problem gambling amongst males compared to females (Williams, Volberg & Stevens, 2012). This suggests that risk factors for problem gambling may differ between men and women, although related research is inconclusive (Delfabbro, 2012; Johansson, Grant, Kim, Odlaug & Götestam, 2009). While risk factors do not presume causation, their identification allows recognition and targeting of high-risk groups for prevention, early intervention and treatment strategies (Perese, Bellringer & Abbott, 2005; Thomas & Jackson, 2008). A gendered understanding of these risk factors can inform design of public health campaigns and promotion of treatment services appropriately targeted to each gender.

This study aimed to develop separate risk factor models for gambling problems for males and for females, and identify any gender-based similarities and differences. By using multivariate techniques to analyse an existing dataset, it overcame limitations of previous studies identifying correlates with problem gambling, but which have been criticised for ignoring statistical overlap amongst risk factors (Delfabbro, 2009; Productivity Commission, 2010). The following brief literature review focuses on variables of interest in the current study – demographics, gambling behaviour, gambling motivations, and health.

Demographics

Reviews have consistently concluded that young males (18-30 years) are overrepresented amongst problem gamblers, while unemployment, divorced and single marital status, reliance on social welfare, low income, low education, and ethnic minority status have also been correlated (Delfabbro, 2012; Johansson et al., 2009; Williams, Volberg et al., 2012; Williams, West & Simpson, 2012). However, these generic risk factors have typically been derived from combined analyses which have not considered distinctive risk factors by gender.

Prevalence and gender-specific studies have illuminated some demographic differences in risk factors. Compared to males, females are typically older at gambling commencement and problem development and more quickly progress to problem gambling, reflecting a telescoping phenomenon (Blanco Petry, Stinson & Grant,, 2006; Castren et al., 2013a; Crisp et al., 2004; Tavares, Zilberman, Beites & Gentil, 2001; Wenzel & Dahl, 2009). Studies of treatment-seeking gamblers have identified further demographic gender differences. Amongst males (n = 826) and females (n = 694) attending problem gambling counselling in Victoria Australia, female clients were more likely to be Australian born, married, living with family and dependent children, and have substantially lower gambling debts (Crisp et al., 2004). A review of gender differences in treatment-seeking gamblers (Wenzel & Dahl, 2009) found inconclusive evidence for marital status, but moderate evidence that female clients have lower incomes compared to males.

The emergence of Internet gambling may be changing the demographic profile of female problem gamblers. McCormack, Shorter and Griffiths (2014) suggest that gambling online may be a potential risk factor in females due to enhanced feelings of safety over land-based venues. Females in their study had earlier age of online gambling uptake than males. Women's uptake of Internet gambling may explain why recent research from many jurisdictions indicates rapid rises in female problem gambling, especially amongst younger women (Dowling, 2013). A recent Tasmanian prevalence study found no differences in problem gambling rates between males and females (Christensen, Dowling, Jackson & Thomas, 2014). Conversely, a study in the US where Internet gambling is less available

found that younger female gamblers had lower problem gambling rates than younger male gamblers (Wong, Zane, Saw, & Chan, 2013).

Gambling behaviour

Gambling on multiple forms is consistently associated with problem gambling, with males typically gambling on more forms than women (Gainsbury, Russell, Hing, Wood, Lubman & Blaszczynski, 2014; Welte, Barnes, Wieczorek, Tidwell & Hoffman, 2004; Wenzel & Dahl, 2009). Males are also more likely than females to participate regularly in most gambling forms (Svensson, Romild, Nordenmark & Mansdotter, 2011), and to gamble more frequently and with higher expenditure (Hing & Breen, 2001a, 2001b). Continuous gambling forms are associated with increased risk (Delfabbro, 2012; Williams, West et al., 2012), with EGMs the main source of difficulties amongst most problem gamblers, and associated with 75%-80% of gambling-related problems in Australasia (Delfabbro, 2012). Women show higher risks for problem gambling on non-strategic forms such as EGMs and bingo (Binde, 2011; Grant, Chamberlain, Schreiber & Odlaug, 2012), and experience gambling problems almost exclusively with EGMs (Delfabbro, 2012; Holdsworth, Hing & Breen, 2012; Productivity Commission, 2010). Problematic Internet gambling forms are sports and race wagering, with related problems mainly experienced by men (Hing, Russell, Gainsbury & Blaszczynski, 2014). Skill based online gambling is associated with higher risk in males, and non-skill based online gambling with higher risk in females (McCormack, Shorter, & Griffiths, 2013; Wood & Williams, 2011).

Gambling motivations

Gambling to serve a psychological need increases likelihood of problem gambling (Williams, West et al., 2012), especially if to escape from negative mood states (Blaszczynski & Nower, 2002; Nower & Blaszczynski, 2010). Women's greater use of EGMs as a maladaptive coping mechanism to escape stresses, loneliness and boredom is consistently associated with increased problem gambling risk (Lloyd et al., 2010; Sacco, Torres, Cunningham-Williams, Woods & Unick, 2011; Walker, Hinch & Weighill, 2005). Gambling to earn income has also been implicated as heightening risk of gambling problems (Lee, Chae, Lee & Kim, 2007; Nower & Blaszczynski, 2010). Positive expectancies from gambling, such as excitement and money, predict problems in both men and women (Spurrier & Blaszczynski, 2014). Lister (2014) found that chasing in EGM play was a significant predictor of problem gambling in males over females; however desire to win in females was a higher predictor of chasing than in males. Overall, there is strong evidence of gender differences in gambling motivations, with escape from negative emotions and problems a central motivator for female problem gamblers; being preoccupied with the game, cognitions about winning, and egotism are associated with male problem gambling (Wenzel & Dahl, 2009).

Health

Problem gambling is highly co-morbid with mental and physical health problems (Petry, Stinson & Grant, 2005; Welte et al., 2004), although causal directions are unclear. In terms of substance abuse, male treatment-seeking gamblers are more likely to report alcohol and other substance abuse, compared to female counterparts (Dannon et al., 2006; Martins, Tavares, da Silva Lobo, Galetti & Gentil, 2004; Wenzel & Dahl, 2009). In the general population, nicotine use has been associated with

female at-risk gamblers, and alcohol use disorder with male at-risk gamblers (Pilver, Libby, Hoff & Potenza, 2013). In relation to mental health, female treatment-seeking gamblers are more likely to report anxiety or mood disorders, with a review finding strong evidence for this association (Wenzel & Dahl, 2009). In the general population, a large representative US study (Petry et al., 2005) identified significant associations between pathological gambling and alcohol use and drug use disorders, and mood, anxiety and personality disorders amongst both men and women. However, relationships between pathological gambling and alcohol dependence, any drug use disorder, drug abuse, nicotine dependence, major depression, and generalised anxiety disorders were significantly greater for women. Problem gambling is also associated with poorer general health (Erickson, Molina, Ladd, Pietrzak & Petry, 2005; Petry, 2006; Pietrzak, Molina, Ladd, Kerins & Petry, 2005) and a range of specific conditions, including tachycardia, angina, cirrhosis and other liver disease, along with higher medical utilisation (Morasco et al., 2006). However, gender comparisons are scant. A representative Canadian study (Afifi, Cox, Martens, Sareen & Enns, 2010) found numerous health conditions were more prevalent amongst problem gambling females, compared to non-problem gambling females. These included chronic bronchitis, fibromyalgia and migraines, along with lower general health.

In summary, the literature suggests that male and female problem gamblers may differ in terms of demographics, problematic gambling form, gambling behaviours and motivations, substance misuse, and a range of health conditions. This study investigated which of these factors are salient in separate risk factor models for men and for women.

Methods

Recruitment and sampling

New analysis was conducted of data from A Study of Gambling in Victoria Australia (Hare, 2009), the largest gambling study in that jurisdiction. Conducted between August–October 2008, 15,000 adults (18 years+) were surveyed. Data were weighted to ensure close alignment with the Victorian adult population.

Measures

Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). The 9-item PGSI was administered to all gamblers. Unlike the validated version, responses were asked and scored as never = 0, rarely = 1, sometimes = 1, most of the time = 2, and always = 3. Cut-off scores were 0 = non-problem gambler, 1-2 = low risk gambler, 3-7 = moderate risk gambler, and 8-27 = problem gambler. Cronbach's alpha = 0.87.

Gambling behaviours during the past 12 months. Participation in 11 gambling forms (listed in Table 2) was assessed with yes/no responses, and frequency as number of times per week/month/year (converted to yearly).

EGM gambling. EGM gamblers were asked how many venues (including Internet sites) they had gambled on EGMs at, frequency of betting more than one credit per line and denomination mostly played.

Race wagering. Race wagerers were asked their three main bet types.

Money management for gambling on highest spend activity in past 12 months. Variables measured were how much cash and whether respondents typically brought debit and credit cards to the venue, and the number of times they used these cards per session.

Main three reasons for gambling on highest spend activity. Response options were social reasons, win money, general entertainment, takes your mind off things, relieves stress, boredom, and other (free response).

Smoking. Whether the respondent had smoked in the past 12 months and whether they currently smoked were measured.

Alcohol consumption. The 4-item CAGE alcohol screen (Ewing, 1984) measured the risk of clinically significant alcohol abuse.

Mental health. The Kessler 10 was used as a global measure of psychological distress. Responses were measured from 1 = none of the time to 5 = all of the time. Cut-off scores were 10-19 = likely to be well, 20-24 = likely to have a mild mental disorder, 25-29 = likely to have a moderate mental disorder, and 30-50 = likely to have a severe mental disorder.

Physical health. Respondents were asked to rate their overall health (from 1 = excellent to 5 = poor), whether they had experienced major problems, hardship or trauma in their life, and whether they currently had eight specific health conditions.

Socio-demographics. Questions established respondents' age, gender, language other than English spoken at home, education, household composition and employment status.

Analysis

Due to minimal risk of problematic gambling, respondents participating in private betting, keno, lottery-type games, instant scratch tickets, bingo, phone/SMS competitions, and raffles/sweeps/other competitions less than once a month (and not participating in any other forms) were excluded. Of the 11,235 gamblers, 2,304 met these criteria.

As only 0.7% of the sample met criteria for problem gambler, they were combined with moderate risk gamblers in an "at-risk" (AR) group (PGSI 3+) which was compared to a "non-problem gambler" (NP) group (PGSI 0-2). After weighting, the number of included respondents was 8,917, with 463 (5.2%) at-risk (284 males, 179 females).

Analyses determined which factors differentiated non-problem from at-risk gamblers separately for women and men (i.e. simple effects). Results for females and males were then compared using interaction terms. Due to possible overlap, separate multivariate analyses determined which results were significant when controlling for all others. All analyses were conducted using a p-value (alpha) of 0.05 or lower.

Problem gambling

Significantly higher proportions of males scored as low risk, moderate risk and problem gamblers compared to females (Table 1). A significantly higher proportion of females were non-problem gamblers.

Insert Table 1 About Here

Demographic characteristics

Age

For both genders, significantly higher proportions of at-risk gamblers were in younger age brackets compared to non-problem gamblers. Amongst males, those aged 18-34 years were more likely to be at-risk (χ^2 (5, N = 4,510) = 54.77, p < 0.001, Φ = 0.11), as were females aged 18-24 years (χ^2 (5, N = 4,407) = 19.12, p = 0.002, Φ = 0.07). Conversely, both males and females aged 65 years+ were significantly more likely to be non-problem gamblers compared to younger counterparts. A significant interaction indicated the pattern of results differed significantly across genders (χ^2 (5, N = 8,919) = 13.31, p = 0.021). Younger males were more likely to be at-risk compared to younger females, while older females were more likely to be non-problem gamblers compared to older males.

Language spoken at home

For both genders, at-risk gamblers were significantly more likely to speak a language other than English at home compared to non-problem gamblers (χ^2 (1, N = 4,407) =5.65, p = 0.017, Φ = 0.04 for females and χ^2 (1, N = 4,512) = 22.19, p < 0.001, Φ = 0.07 for males). This difference did not differ by gender, χ^2 (1, N = 8,919) = 0.51, ns.

Education

For both genders, at-risk gamblers were significantly more likely to cease education at Year 10 (females 48.9%, males 36.4%) compared to non-problem gamblers (females 35.2%, males 28.2%), while non-problem gamblers were significantly more likely to have attended university (females 25.3%, males 27.2%) compared to at-risk gamblers (females 15.5%, males 17.7%), χ^2 (3, N = 4,356) = 16.84, p = 0.001, Φ = 0.06 and χ^2 (3, N = 4,468) = 16.80, p = 0.001, Φ = 0.06 respectively. There was no significant interaction between genders, χ^2 (3, N = 8,813) = 1.01, *ns*.

Household composition

Significant differences in household composition were observed for both genders (female χ^2 (6, N = 4,392) = 44.22, p < 0.001, Φ = 0.10 and male χ^2 (6, N = 4,492) = 48.41, p < 0.001, Φ = 0.10). For both genders, at-risk gamblers were significantly more likely to live in group households compared to non-problem gamblers (female AR 9.6%, female NP 2.4%, male AR 10.6%, male NP 4.1%). For females, a significantly higher proportion of at-risk gamblers lived in one-parent family households (14.1% AR, 8.7% NP), whereas a significantly higher proportion of non-problem gamblers lived as couples with children (48.8% NP, 40.7% AR). For males, a significantly higher proportion of non-problem gamblers lived as a couple without children (28.2% NP, 16.9% AR). No significant differences were observed between risk groups for either gender for other living arrangements. The overall omnibus interaction test between genders was not significant, χ^2 (6, N = 8,893) = 5.90, *ns*.

Employment

Significant differences between risk groups were observed for both genders for employment (female χ^2 (3, N = 4,404) = 17.54, p = 0.001, Φ = 0.06, male χ^2 (3, N = 4,506) = 20.22, p < 0.001, Φ = 0.07). Males in full-time employment were significantly less likely to be at-risk gamblers (NP 64.4%, AR 55.4%), while the opposite was true for males employed part-time (AR 19.3%, NP 11.0%). A significantly higher proportion of unemployed females were at-risk compared to non-problem gamblers (AR 7.8%, NP 2.8%). No significant differences were observed between male risk groups or female risk groups for other employment categories. The relationship between employment status and at-risk gambling differed by gender, χ^2 (3, N = 8,919) = 12.67, p = 0.005. Female non-problem and at-risk

gamblers were significantly more likely to not be in the workforce compared to male counterparts, while male non-problem and at-risk gamblers were significantly more likely to be employed full-time.

Gambling behaviour

Participation

Risk groups of both genders were compared for participation in different gambling forms. Neither gender showed significant differences between risk groups for lottery-type games or phone/SMS competitions (Table 2).

Insert Table 2 About Here

For both genders, a significantly higher proportion of at-risk gamblers (compared to non-problem gamblers) participated in EGMs, table games, keno and bingo. Private betting, race and sports betting were related to at-risk gambling for men. Instant scratch tickets were related to at-risk gambling for women.

Males of both risk levels were significantly more likely to participate in private betting, table games, race and sports betting. Females of both risk levels were significantly more likely to buy scratch tickets and play bingo.

Interaction tests indicated that EGM participation was significantly more problematic for females than for males, while the opposite was found for table games and race betting. The same may be true for sports betting and bingo, but there were insufficient at-risk female sports betters and male bingo gamblers for results to reach statistical significance.

Frequency

Both genders were compared for gambling at least weekly/less than weekly on each form, with non-participants in each form excluded from analysis. No significant differences were observed between risk groups for either gender for frequency of private betting, lottery-type games or bingo (Table 3).

Insert Table 3 About Here

For both genders, those engaging at least weekly in EGMs, table games, race betting and instant scratch tickets were significantly more likely to be at-risk gamblers. The same was true for males on keno and sports betting, and for females on bingo, although based on small numbers.

For both genders, those engaging less than weekly in EGMs, table games and race betting were significantly more likely to be non-problem gamblers. The same was true for males on keno, sports betting and raffles/sweeps/competitions, and for females on scratch tickets and phone/SMS competitions.

Significant interactions were observed for sports betting, scratch tickets, bingo and phone/SMS competitions, although the sports betting and bingo results were based on small numbers.

Results for scratch tickets and phone/SMS competitions were more strongly related to at-risk gambling for females than for males.

EGM playing behaviours

Amongst both genders, those playing EGMs at three or more venues were significantly more likely to be at-risk gamblers (female AR 62.1%, female NP 34.8%, χ^2 (3, N = 789) = 41.81, $p < 0.001$, $\Phi = 0.23$; male AR 53.4%, male NP 33.9%, χ^2 (3, N = 881) = 27.87, $p < 0.001$, $\Phi = 0.18$). Those playing at only one venue were significantly more likely to be non-problem gamblers (female NP 39.9%, female AR 17.6%, male NP 39.1%, male AR 24.9%). This pattern did not differ significantly across genders, χ^2 (3, N = 1,671) = 3.07, *ns*.

Often/always playing more than one credit per EGM line was associated with at-risk gamblers, with this effect more pronounced for males (male AR 64.0%, male NP 39.1%). Rarely/never playing more than one credit per line was more prominent among male non-problem gamblers (42.4%) compared to male at-risk gamblers (19.2%), χ^2 (4, N = 874) = 51.75, $p < 0.001$, $\Phi = 0.24$. A similar pattern was observed for female gamblers (χ^2 (4, N = 754) = 10.06, $p = 0.039$, $\Phi = 0.12$), although a significant interaction term (χ^2 (4, N = 1,626) = 9.99, $p = 0.041$) revealed a significantly more pronounced result for males than females.

One cent EGMs were significantly more popular amongst non-problem gamblers of both genders (female NP 55.5%, female AR 37.9%, χ^2 (5, N = 776) = 25.50, $p < 0.001$, $\Phi = 0.18$; male NP 43.8%, male AR 29.5%, χ^2 (5, N = 858) = 22.39, $p < 0.001$, $\Phi = 0.16$). This result did not differ significantly between genders, χ^2 (5, N = 1,634) = 8.00, *ns*.

Race wagering behaviours

Race bets other than win/place, each way or trifectas were associated with at-risk gambling for both genders (female AR 26.8%, female NP 8.7%, χ^2 (3, N = 409) = 12.96, $p = 0.005$, $\Phi = 0.18$; male AR 20.6%, male NP 8.0%, χ^2 (3, N = 781) = 42.02, $p < 0.001$, $\Phi = 0.23$). Trifecta betting was associated with at-risk bettors (24.1% compared to 11.3% NP) amongst males. Male at-risk gamblers were significantly less likely to bet on win/place (NP 60.0%, AR 42.6%) or each way outcomes (NP 20.8%, AR 12.8%), compared to non-problem gamblers. The overall pattern of results did not differ significantly between genders, χ^2 (3, N = 1,191) = 2.53, *ns*.

Money management

For both genders, at-risk gamblers were significantly more likely to bring EFTPOS/ATM cards with them when gambling (female AR 35.6%, female NP 17.2%, χ^2 (3, N = 1,818) = 46.14, $p < 0.001$, $\Phi = 0.16$; male AR 39.6%, male NP 17.1%, χ^2 (3, N = 1,988) = 87.20, $p < 0.001$, $\Phi = 0.21$), and significantly less likely to not bring any cards at all (female AR 28.3%, female NP 49.4%; male AR 21.2%, male NP 41.7%). There were no significant differences between risk groups in each gender for bringing a credit card or bringing both an EFTPOS/ATM and credit card. There was no significant interaction, χ^2 (3, N = 3,807) = 3.37, *ns*.

At-risk gamblers of both genders were significantly more likely to bring larger amounts of cash to gambling venues, particularly $100 or more, compared to non-problem gamblers (female AR 19.7%, female NP 6.1%, χ^2 (5, N = 1,852) = 87.87, $p < 0.001$, $\Phi = 0.22$; male AR 39.6%, male NP 17.7%, χ^2 (5, N = 2,035) = 87.96, $p < 0.001$, $\Phi = 0.21$). Both at-risk and non-problem male gamblers

were significantly more likely to bring more than $100 cash compared to female at-risk and non-problem gamblers (χ^2 (5, N = 3,425) = 130.77, $p < 0.001$, $\Phi = 0.20$ and χ^2 (5, N = 462) = 23.48, $p < 0.001$, $\Phi = 0.23$ respectively). Non-problem gamblers of both genders were significantly more likely to bring up to $20 (female NP 40.4%, female AR 13.0%; male NP 31.3%, male AR 14.4%).

At-risk gamblers of both genders were significantly more likely than others to withdraw extra money at least once while at a gambling venue (female AR 57.6%, female NP 14.3%, χ^2 (5, N = 958) = 194.50, $p < 0.001$, $\Phi = 0.45$; male AR 63.3%, male NP 15.2%, χ^2 (5, N = 1,215) = 295.74, $p < 0.001$, $\Phi = 0.49$), although the result did not differ significantly by gender, χ^2 (5, N = 2,176) = 5.51, *ns*.

Main reasons for gambling on highest spending form

Significant differences were observed between risk groups for gambling motivations for both males (χ^2 (4, N = 2,034) = 30.53, $p < 0.001$, $\Phi = 0.12$) and females (χ^2 (4, N = 1,854) = 61.87, $p < 0.001$, $\Phi = 0.18$). Post hoc tests revealed that, for both genders, at-risk gamblers were significantly less likely to report gambling to win money (27.9% females, 31.6% males vs. 44.4% NP females, 44.5% NP males) or to raise money for charity (0.6% females, 0.7% males vs 6.4% NP females, 2.7% NP males), but were significantly more likely to select options recoded into "other" due to small cell sizes (31.8% females, 17.9% males vs 12.9% NP females, 10.9% NP males). "Other" responses included: escaping boredom, relieving stress, taking the respondent's mind off things and various self-reported reasons. Male at-risk gamblers were significantly more likely to report gambling for general entertainment (26.7% vs 19.2% NP males), while the same result was not statistically significant for females. There was no significant interaction effect (χ^2 (4, N = 3,888) = 4.61, *ns*).

Health

Substance use

At-risk gamblers of both genders were significantly more likely to have smoked in the last 12 months (female AR 49.2%, female NP 24.4%, χ^2 (1, N = 1,854) = 50.46, $p < 0.001$, $\Phi = 0.17$; male AR 51.9%, male NP 28.1%, χ^2 (1, N = 2,034) = 64.37, $p < 0.001$, $\Phi = 0.18$) and to be current smokers (female AR 42.5%, female NP 18.7%, χ^2 (1, N = 1,854) = 54.74, $p < 0.001$, $\Phi = 0.17$; male AR 45.3%, male NP 21.0%, χ^2 (1, N = 2,034) = 77.88, $p < 0.001$, $\Phi = 0.20$). There were no significant interactions for either smoking variable (χ^2 (1, N = 3,888) = 0.20, *ns* and χ^2 (1, N = 3,888) = 0.03, *ns* respectively).

At-risk gamblers of both genders were significantly more likely to show signs of clinical alcohol abuse (female AR 15.3%, female NP 6.5%; male AR 17.0%, male NP 9.6%) or to have moderate (female AR 6.5%, female NP 2.5%; male AR 12.6%, male NP 5.6%) or high (female AR 2.4%, female NP 0.2%; male AR 3.6%, male NP 0.8%) clinical alcohol abuse compared to non-problem gamblers (female χ^2 (4, N = 1,487) = 36.35, $p < 0.001$, $\Phi = 0.16$; male χ^2 (4, N = 1,819) = 55.17, $p < 0.001$, $\Phi = 0.17$). The interaction term comparing genders was not statistically significant (χ^2 (4, N = 3,299) = 1.86, *ns*). Non-problem gamblers were significantly more likely to show no signs of clinical alcohol abuse compared to at-risk gamblers (female NP 80.9%, female AR 64.5%; male NP 68.3%, male AR 48.6%).

Mental health

For both genders, at-risk gamblers were significantly more likely to have mild (female AR 13.9%,

female NP 5.6%; male AR 13.4%, male NP 3.9%), moderate (female AR 11.1%, female NP 2.3%; male AR 8.8%, male NP 1.3%), or severe (female AR 15.0%, female NP 1.9%; male AR 6.0%, male NP 1.4%) mental disorders compared to non-problem gamblers (female χ^2 (3, N = 1,856) = 161.40, p < 0.001, Φ = 0.30; male χ^2 (3, N = 2,033) = 140.84, p < 0.001, Φ = 0.26). This result did not differ significantly between genders. Conversely, non-problem gamblers of both genders were significantly more likely to be in the 'likely to be well' category on the K10 (female AR 60.0%, female NP 90.2%; male AR 71.8%, male NP 93.5%). Both at-risk (χ^2 (3, N = 464) = 12.36, p = 0.006, Φ = 0.16) and non-problem (χ^2 (3, N = 3,425) = 13.39, p = 0.004, Φ = 0.06) male gamblers were significantly more likely than female counterparts to be well.

At-risk gamblers of both genders (47.5% females, 28.9% males) were significantly more likely to have experienced trauma or hardship compared to non-problem gamblers (25.0% females, 14.2% males), χ^2 (1, N = 1,854) = 41.53, p < 0.001, Φ = 0.15 and χ^2 (1, N = 2,033) = 38.40, p < 0.001, Φ = 0.14 respectively Both at-risk and non-problem female gamblers were significantly more likely to have experienced trauma or hardship compared to males. However there was no significant interaction, χ^2 (1, N = 3,887) = 0.21, *ns.*

Physical health

Amongst both genders, at-risk gamblers were significantly more likely to report lung conditions including asthma (21.0% AR females, 10.7% NP females, χ^2 (1, N = 1,855) = 13.81, p < 0.001, Φ = 0.09; 15.4% AR males, 9.0% NP males, χ^2 (1, N = 2,034) = 11.49, p < 0.001, Φ = 0.08), depression (31.8% AR females, 11.1% NP females, χ^2 (1, N = 1,854) = 61.07, p < 0.001, Φ = 0.18; 25.6% AR males, 6.6% NP males, χ^2 (1, N = 2,034) = 104.76, p < 0.001, Φ = 0.23), anxiety disorders (26.8% AR females, 9.5% NP females, χ^2 (1, N = 1,855) = 48.99, p < 0.001, Φ = 0.16; 22.5% AR males, 5.6% NP males, χ^2 (1, N = 2,033) = 95.52, p < 0.001, Φ = 0.22) and obesity (20.1% female AR gamblers, 11.4% female NP gamblers, χ^2 (1, N = 1,854) = 11.42, p = 0.001, Φ = 0.08; 14.4% AR males, 7.0% NP males, χ^2 (1, N = 2,034) = 17.88, p < 0.001, Φ = 0.09). Male at-risk gamblers were significantly more likely to report other health conditions (16.5% AR males, 11.8% NP males, χ^2 (1, N = 2,034) = 5.00, p = 0.025, Φ = 0.05), while female at-risk gamblers (8.4%) were significantly more likely to report diabetes compared to non-problem gamblers (4.7%, χ^2 (1, N = 1,854) = 4.51, p = 0.034, Φ = 0.05). Female non-problem gamblers were significantly more likely than male counterparts to have experienced depression (11.1% vs 6.6% for NP males, χ^2 (1, N = 3,425) = 21.28, p < 0.001, Φ = 0.08), anxiety (9.5% vs 5.6% for NP males, χ^2 (1, N = 3,425) = 18.60, p < 0.001, Φ = 0.07), or obesity (9.5% vs 5.6% for NP males, χ^2 (1, N = 3,424) = 19.62, p < 0.001, Φ = 0.08), with no significant gender differences between at-risk gamblers. No significant differences were observed for either gender for heart conditions, diabetes or cancer. There were no significant interactions for any health condition.

Multivariate analyses

Preceding analyses comparing non-problem and at-risk gamblers identified important factors then included in multivariate analyses:

- Age (dummy-coded, 18-24 as reference group)
- Speaking a language other than English at home
- Education (dummy-coded, university as reference group)

- Household type (recoded as couple with child(ren), couple without children, group household and other, then dummy-coded with couple with child(ren) as reference group)
- Employment (dummy-coded, "not in workforce or away from work" and "unemployed" as reference group)
- Engagement in each main gambling form
- Main reasons for gambling on highest spend activity (dummy-coded, "other" as the reference group, "to raise money for charity" also collapsed into reference group)

Other variables were not included because of high correlation with included variables, because relevant bivariate analyses were either non-significant or had very low effect sizes, or because relatively few respondents were asked or answered the question.

The model was run separately for males and for females, predicting at-risk gambling status (i.e. PGSI 0-2 vs PGSI 3+, coded as 0 and 1 respectively).

Risk factors amongst females

All questions in the analysis were completed by 1,820 females: 1,648 non-problem gamblers and 172 at-risk gamblers. The overall model was statistically significant (χ^2 (28, N = 1,820) = 252.04, $p <$ 0.001), correctly predicting 99.3% of non-problem gamblers, but only 11.5% of at-risk gamblers.

Significant predictors of at-risk status amongst female gamblers were: 18-24 years old (compared to being 65+), speaking a language other than English at home, living in a group household (compared to couple with children), unemployed or not in the workforce (compared to both full-time and part-time employment), betting on private betting, EGMs, scratch tickets or bingo (compared to not betting on those forms), not betting on raffles/sweeps/other competitions (compared to betting on them), and gambling for reasons other than social reasons, to win money or for general entertainment (Table 4).

Insert Table4 About Here

Risk factors amongst males

Valid data from 2,005 males were included: 1,722 non-problem gamblers and 283 at-risk gamblers. The overall model was statistically significant (χ^2 (28, N = 2,005) = 369.39, $p < 0.001$), correctly predicting 98.3% of non-problem gamblers and 26.4% of at-risk gamblers.

Significant predictors of male at-risk gambling status were: 18-24 years old (compared to being 65 or older), speaking a language other than English at home, Year 10 or lower education (compared to Year 12 or university education), living in a group household (compared to couple with children), unemployed or not in the workforce (compared to full-time employment), betting on EGMs, table games, races, sports, or lottery-type games (compared to not betting on those forms), not betting on raffles/sweeps/other competitions (compared to betting on them), and gambling for reasons other than social reasons, to win money or for general entertainment (Table 5).

Insert Table 5 About Here

Comparison of risk factor models for females and males

Tables 4 and 5 allow identification of significantly different predictors for females and males by comparing the odds ratios from one model to the confidence interval for the other.

Aged 45-54 (compared to 18-24), and betting on private betting, EGMs and scratch tickets were stronger predictors of at-risk gambling for females. Stronger predictors for males were university education (compared to Year 10 or lower), unemployed (compared to working full-time), and betting on table games, races and lottery-type games.

Discussion

Consistent with previous studies (Williams, Volberg & Stevens, 2012), this study found that significantly higher proportions of males scored as low risk, moderate risk and problem gamblers compared to females, suggesting gender-based differences in risk factors. This study supported several risk factors for gambling problems identified in previous studies, but also revealed important differences by gender. Gender-based differences were most pronounced for participation in various gambling forms. The only form posing a risk factor for both genders was EGMs, as previously implicated (Dowling, Smith & Thomas, 2005; Williams, Volberg, et al., 2012). This risk was heightened for female compared to male at-risk gamblers, and amongst 45-54 year old women, in accordance with prior research (Crisp et al., 2004; Welte et al., 2007). This was despite a more pronounced association with higher problem gambling severity amongst men of frequently playing more than one credit per EGM line, a behaviour associated with EGM problem gamblers in general (Hing & Breen, 2002). This finding supports suggestions to reduce maximum bet size to reduce EGM-related harms because problem gamblers are most likely to bet large amounts (Livingstone, Woolley, Zazryn, Bakacs & Shami, 2008; Williams, West et al., 2012), and because reducing maximum bet size significantly decreases time and money spent (Blaszczynski , Sharpe & Walker, 2001).

Both male and female at-risk gamblers were more likely than their non-problem counterparts to play EGMs at least weekly and at three or more venues, but were less likely to play one cent EGMs. Thus, although risks with EGMs appear heightened amongst middle-aged women, frequent EGM gambling at multiple venues using higher denomination EGMs appear generic risk factors across genders. These results suggest that regular EGM gamblers in general, and middle-aged female EGM gamblers in particular, are appropriate targets for public health campaigns aimed at lowering risk of problem gambling.

Although gambling problems amongst women are heavily skewed towards difficulties with EGMs (Delfabbro, 2012; Holdsworth et al., 2012), this study found a wider range of forms posing risk factors for men. These included table games, as also reported elsewhere (Delfabbro, 2012; Perese et al., 2005; Williams, West et al., 2012), and race and sports betting, which may be increasingly problematic due to their online availability. A large Australian study revealed that risk factors for higher problem gambling severity among Internet gamblers included betting on sports, races and poker (Gainsbury et al., 2014). Sports betting is a relatively new growth activity, with high problem gambling rates amongst regular and online sports bettors (Hing, Gainsbury et al., 2014; Hing, Vitartas & Lamont, 2014). Efforts to reduce risk factors need to accommodate migration of many gamblers to the online environment (Hing, Cherney, Blaszczynski, Gainsbury & Lubman, 2014).

Certain gambling motivations were also implicated as risk factors for both genders. These related to gambling for reasons other than social reasons, to win money or for general entertainment, with these other reasons including escaping boredom, relieving stress, and taking the respondent's mind off things. Gambling to escape and for mood regulation increases risks for gambling problems (Blaszczynski & Nower, 2002; Nower & Blaszczynski, 2010), with women more likely than men to gamble for mood regulation (Lloyd et al., 2010) and to escape everyday problems, boredom and loneliness (Grant & Kim, 2002; Sacco et al., 2011). Several studies of women's gambling have noted EGM use as a form of avoidant or emotion-based coping (Schull, 2002; Thomas, 1998; Thomas & Moore, 2003), which may explain their higher risk for EGM-associated problems. Risk reduction measures could discourage gambling to escape from negative mood states, particularly amongst women.

In contrast to some distinctive risk factors for men and for women, this study found nearly identical demographic risk factors between genders which generally aligned with findings from non-gendered research (Castrén et al., 2013b; Delfabbro, 2012; Johansson et al., 2009; Perese et al., 2005). These included young adult age, not speaking English at home, living in a group household, and being unemployed or not in the workforce. For male at-risk gamblers, low education was also a risk factor. These findings confirm that young adults are primary targets for risk reduction measures, and that messages should be sensitive to those from non-English-speaking backgrounds and with limited education.

The study has several limitations which could be avoided in future research. Relatively small numbers of problem gamblers necessitated their combining with moderate risk gamblers, obscuring any gender differences within each of these groups. Separate analyses for problem and moderate risk gamblers may also have yielded models with greater explanatory power. Future studies should consider a two-stage research design to improve the likelihood of obtaining adequate numbers of problem gamblers for separate analyses, given their low prevalence in the population. Several potential risk factors were asked only of at-risk gamblers in the original study which limited comparisons amongst PGSI groups. Use of a non-validated version of the PGSI may have affected assignment to PGSI groups. Most other measures were unvalidated, so it is difficult to assess whether related findings reflect true differences or measurement artefacts. Sample sizes were quite different across analyses, yielding different levels of statistical power. Where numbers were small, some results may be unlikely to generalise or replicate.

Conclusion

This study has presented a gender-based analysis of risk factors for gambling problems. Its value lies in identifying some distinctive differences between genders, corroboration and strengthening of previous findings through validation in a large representative population survey, use of multivariate analyses, and identification of high risk groups for targeting with appropriate interventions. These comprise young adults, especially males; middle-aged women who play EGMs; non-English speaking populations; frequent gamblers on EGMs, table games, race and sports betting; and gamblers motivated by escape-based reasons. Identifying distinctive risk factors by gender may also prompt more focus on the public health of women in relation to gambling, while still recognising that males are most at-risk of gambling problems.

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Table I PGSI categories by gender

	Females		Males	
	N	%	N	%
Non-problem gambler	3,903	88.6*	3.738	82.9
Low risk gambler	324	7.4	489	10.8*
Moderate risk gambler	142	3.2	214	4.7*
Problem gambler	37	0.8	70	1.6*
χ^2 (3, N = 8,917) = 60.56, $p < 0.001$, $\Phi = 0.08$				

* indicates the significantly higher proportion.

Table II Percentage of non-problem (NP) and at-risk (AR) gamblers who engage in each gambling form by gender

	F		M		NP		AR	
	NP	**AR**	**NP**	**AR**	**F**	**M**	**F**	**M**
N	**4,228**	**179**	**4,227**	**285**	**4,228**	**4,227**	**179**	**285**
Private betting	2.2	4.5	7.8	21.8*	2.2	7.8^	4.5	21.8^
Difference	χ^2 (1, N = 4,407) = 3.83, *ns*		χ^2 (1, N = 4,512) = 66.22, p < 0.001, Φ = 0.12		χ^2 (1, N = 8,455) = 136.63, p < 0.001, Φ = 0.13		χ^2 (1, N = 464) = 25.64, p < 0.001, Φ = 0.24	
Interaction	χ^2 (1, N = 8,919) = 1.31, *ns*							
EGMs	33.8	86.6*	35.3	78.6*	33.8	35.3	86.6^	78.6
Difference	χ^2 (1, N = 4,406) = 208.29, p < 0.001, Φ = 0.22		χ^2 (1, N = 4,512) = 211.84, p < 0.001, Φ = 0.22		χ^2 (1, N = 8,454) = 2.35, *ns*		χ^2 (1, N = 464) = 4.70, p = 0.030, Φ = 0.10	
Interaction	χ^2 (1, N = 8,919) = 5.92, p = 0.015							
Table games	3.2	6.7*	10.8	36.1*	3.2	10.8^	6.7	36.1^
Difference	χ^2 (1, N = 4,407) = 6.57, p = 0.010, Φ = 0.04		χ^2 (1, N = 4,512) = 158.11, p < 0.001, Φ = 0.19		χ^2 (1, N = 8,455) = 187.54, p < 0.001, Φ = 0.15		χ^2 (1, N = 464) = 51.11, p < 0.001, Φ = 0.33	
Interaction	χ^2 (1, N = 8,919) = 5.50, p = 0.019							
Horse/ harness/ greyhound racing	21.4	22.9	34.0	49.5*	21.4	34.0^	22.9	49.5^
Difference	χ^2 (1, N = 4,407) = 0.24, *ns*		χ^2 (1, N = 4,513) = 28.06, p < 0.001, Φ = 0.08		χ^2 (1, N = 8,456) = 169.07, p < 0.001, Φ = 0.14		χ^2 (1, N = 464) = 32.56, p < 0.001, Φ = 0.27	
Interaction	χ^2 (1, N = 8,919) = 6.75, p = 0.009							
Betting on sports or event results	2.6	3.9	9.9	25.4*	2.6	9.9^	3.9	25.4^
Difference	χ^2 (1, N = 4,406) = 1.14, *ns*		χ^2 (1, N = 4,511) = 65.40, p < 0.001, Φ = 0.12		χ^2 (1, N = 8,454) = 192.54, p < 0.001, Φ = 0.15		χ^2 (1, N = 463) = 35.67, p < 0.001, Φ = 0.28	
Interaction	χ^2 (1, N = 8,919) = 3.11, *ns*							
Keno	3.3	8.4*	4.0	8.8*	3.3	4.0	8.4	8.8
Difference	χ^2 (1, N = 4,407) = 12.80, p < 0.001, Φ = 0.05		χ^2 (1, N = 4,512) = 14.57, p < 0.001, Φ = 0.06		χ^2 (1, N = 8,455) = 2.82, *ns*		χ^2 (1, N = 464) = 0.02, *ns*	
Interaction	χ^2 (1, N = 8,919) = 0.15, *ns*							
Lotto/ Powerball/ Pools	75.3	70.9	73.1	75.8	75.3^	73.1	70.9	75.8
Difference	χ^2 (1, N = 4,406) = 1.78, *ns*		χ^2 (1, N = 4,512) = 0.99, *ns*		χ^2 (1, N = 8,454) = 5.58, p = 0.018, Φ = 0.03		χ^2 (1, N = 464) = 1.34, *ns*	
Interaction	χ^2 (1, N = 8,919) = 2.59, *ns*							
Scratch tickets	28.2	40.2*	20.8	24.9	28.2^	20.8	40.2^	24.9
Difference	χ^2 (1, N = 4,406) = 12.03, p = 0.001, Φ = 0.05		χ^2 (1, N = 4,513) = 2.73, *ns*		χ^2 (1, N = 8,455) = 63.51, p < 0.001, Φ = 0.09		χ^2 (1, N = 464) = 12.09, p = 0.001, Φ = 0.16	
Interaction	χ^2 (1, N = 8,919) = 2.05, *ns*							
Bingo	5.3	21.2*	1.1	3.2*	5.3^	1.1	21.2^	3.2
Difference	χ^2 (1, N = 4,407) = 77.95, p < 0.001, Φ = 0.13		χ^2 (1, N = 4,511) = 9.19, p = 0.002, Φ = 0.05		χ^2 (1, N = 8,455) = 119.39, p < 0.001, Φ = 0.12		χ^2 (1, N = 463) = 39.26, p < 0.001, Φ = 0.29	
Interaction	χ^2 (1, N = 8,919) = 1.28, *ns*							
Phone or SMS competitions	15.4	12.2	7.5	9.5	15.4^	7.5	12.2	9.5
Difference	χ^2 (1, N = 4,407) = 1.35, *ns*		χ^2 (1, N = 4,512) = 1.40, *ns*		χ^2 (1, N = 8,454) = 128.36, p <		χ^2 (1, N = 465) = 0.88, *ns*	

					0.001, Φ = 0.12			
Interaction	χ^2 (1, N = 8,919) = 2.91, *ns*							
Raffles, sweeps and other competitions	65.6*	50.3	55.7*	46.3	65.6^	55.7	50.3	46.3
Difference	χ^2 (1, N = 4,407) = 17.62, p < 0.001, Φ = 0.06		χ^2 (1, N = 4,512) = 9.53, p = 0.002, Φ = 0.05		χ^2 (1, N = 8,455) = 85.92, p < 0.001, Φ = 0.10		χ^2 (1, N = 464) = 0.69, *ns*	
Interaction	χ^2 (1, N = 8,919) = 1.63, *ns*							

Note: * indicates differences between non-problem and at-risk gamblers for each gender. ^ indicates differences between each gender separately for non-problem and at-risk gamblers.

Table III Percentage of non-problem (NP) and at-risk (AR) gamblers who engage in each gambling form by gender by frequency of gambling

		F		M		NP		AR	
		NP	**AR**	**NP**	**AR**	**F**	**M**	**F**	**M**
N		**94**	**8**	**328**	**62**	**94**	**328**	**8**	**62**
Private betting	Weekly	14.9	12.5	10.1	9.7	14.9	10.1	12.5	9.7
	Less often	85.1	87.5	89.9	90.3	85.1	89.9	87.5	90.3
Difference		χ^2 (1, N = 102) = 0.03, *n.s.*		χ^2 (1, N = 390) = 0.01, *n.s.*		χ^2 (1, N = 422) = 1.72, *n.s.*		Fisher exact test *n.s.*	
Interaction		χ^2 (1, N = 342) = <0.01, *n.s.*							
N		**1,427**	**155**	**1,494**	**223**	**1,427**	**1,494**	**155**	**223**
EGMs	Weekly	5.0	22.6*	6.0	23.8*	5.0	6.0	22.6	23.8
	Less often	95.0*	77.4	94.0*	76.2	95.0	94.0	77.4	76.2
Difference		χ^2 (1, N = 1,582) = 69.32, p < 0.001, Φ = 0.21		χ^2 (1, N = 1,717) = 80.01, p < 0.001, Φ = 0.22		χ^2 (1, N = 2,921) = 1.54, *n.s.*		χ^2 (1, N = 378) = 0.07, *n.s.*	
Interaction		χ^2 (1, N = 3,251) = 0.20, *n.s.*							
N		**135**	**13**	**456**	**103**	**135**	**456**	**13**	**103**
Table games	Weekly	0.0	7.7*	2.0	14.6*	0.0	2.0	7.7	14.6
	Less often	100.0*	92.3	98.0*	85.4	100.0	98.0	92.3	85.4
Difference		χ^2 (1, N = 148) = 10.46, p = 0.001, Φ = 0.27		χ^2 (1, N = 559) = 32.41, p < 0.001, Φ = 0.24		χ^2 (1, N = 591) = 2.71, *n.s.*		χ^2 (1, N = 116) = 0.46, *n.s.*	
Interaction		χ^2 (1, N = 486) = 0.91, *n.s.*							
N		**903**	**41**	**1,438**	**142**	**903**	**1,438**	**41**	**142**
Horse/ harness/ greyhound racing	Weekly	3.2	24.4*	14.7	43.0*	3.2	14.7^	24.4	43.0^
	Less often	96.8*	75.6	85.3*	57.0	96.8^	85.3	75.6^	57.0
Difference		χ^2 (1, N = 944) = 44.42, p < 0.001, Φ = 0.22		χ^2 (1, N = 1,580) = 72.55, p < 0.001, Φ = 0.21		χ^2 (1, N = 2,341) = 79.20, p < 0.001, Φ = 0.18		χ^2 (1, N = 183) = 4.62, p = 0.032, Φ = 0.16	
Interaction		χ^2 (1, N = 2,250) = 2.85, *n.s.*							
N		**110**	**7**	**419**	**72**	**110**	**419**	**7**	**72**
Betting on sports or event results	Weekly	17.3	0.0	12.9	37.5*	17.3	12.9	0.0	37.5
	Less often	82.7	100.0	87.1*	62.5	82.7	87.1	100.0	62.5
Difference		Fisher exact test *n.s.*		χ^2 (1, N = 491) = 27.02, p < 0.001, Φ = 0.24		χ^2 (1, N = 529) = 1.41, *n.s.*		Fisher exact test *n.s.*	
Interaction		χ^2 (1, N = 436) = 7.52, p = 0.006							
N		**141**	**15**	**152**	**13**	**141**	**152**	**15**	**13**
Keno	Weekly	19.1	40.0	10.6	45.8*	19.1^	10.6	40.0	45.8
	Less	80.9	60.0	89.4*	54.2	80.9	89.4^	60.0	54.2

	often								
Difference		χ^2 (1, N = 156) = 3.53, *n.s.*		χ^2 (1, N = 194) = 20.55, p < 0.001, Φ = 0.33		χ^2 (1, N = 311) = 4.56, p = 0.033, Φ = 0.12		χ^2 (1, N = 39) = 0.13, *n.s.*	
Interaction		χ^2 (1, N = 348) = 1.37, *n.s.*							
N		**3,185**	**127**	**3,091**	**216**	**3,185**	**3,091**	**127**	**216**
Lotto/ Powerball/ Pools	Weekly	40.6	39.4	43.9	40.7	40.6	43.9^	39.4	40.7
	Less often	59.4	60.6	56.1	59.3	59.4^	56.1	60.6	59.3
Difference		χ^2 (1, N = 3,312) = 0.08, *n.s.*		χ^2 (1, N = 3,307) = 0.82, *n.s.*		χ^2 (1, N = 6,276) = 6.89, p = 0.009, Φ = 0.03		χ^2 (1, N = 343) = 0.06, *n.s.*	
Interaction		χ^2 (1, N = 6,894) = 0.10, *n.s.*							
N		**1,194**	**72**	**879**	**71**	**1,194**	**879**	**72**	**71**
Scratch tickets	Weekly	5.7	16.7*	8.5	7.0	5.7	8.5	16.7	7.0
	Less often	94.3*	83.3	91.5	93.0	94.3	91.5	83.3	93.0
Difference		χ^2 (1, N = 1,266) = 13.81, p < 0.001, Φ = 0.10		χ^2 (1, N = 950) = 0.19, *n.s.*		χ^2 (1, N = 2,073) = 6.35, p = 0.012, Φ = 0.06		χ^2 (1, N = 143) = 3.16, *n.s.*	
Interaction		χ^2 (1, N = 2,203) = 6.25, p = 0.012							
N		**224**	**38**	**47**	**10**	**224**	**47**	**38**	**10**
Bingo	Weekly	33.9	36.8	44.7	10.0	33.9	44.7	36.8	10.0
	Less often	66.1	63.2	55.3	90.0	66.1	55.3	63.2	90.0
Difference		χ^2 (1, N = 262) = 0.12, *n.s.*		Fisher exact test *n.s.*		χ^2 (1, N = 271) = 1.95, *n.s.*		Fisher exact test *n.s.*	
Interaction		χ^2 (1, N = 360) = 5.82, p = 0.016							
N		**651**	**22**	**312**	**27**	**651**	**312**	**22**	**27**
Phone or SMS competitions	Weekly	1.2	18.2*	2.2	0.0	1.2	2.2	18.2^	0.0
	Less often	98.8*	81.8	97.8	100.0	98.8	97.8	81.8	100.0^
Difference		χ^2 (1, N = 1,266) = 13.81, p < 0.001, Φ = 0.10		Fisher exact test *n.s.*		χ^2 (1, N = 970) = 1.31, *n.s.*		Fisher exact test, p = 0.035	
Interaction		χ^2 (1, N = 1,071) = 7.81, p = 0.005							
N		**2,772**	**91**	**2,353**	**131**	**2,772**	**2,353**	**91**	**131**
Raffles, sweeps and other competitions	Weekly	2.1	3.3	4.0	7.6*	2.1	4.0^	3.3	7.6
	Less often	97.9	96.7	96.0*	92.4	97.9^	96.0	96.7	92.4
Difference		χ^2 (1, N = 2,863) = 0.61, *n.s.*		χ^2 (1, N = 2,484) = 3.96, p = 0.046, Φ = 0.04		χ^2 (1, N = 5,125) = 16.62, p < 0.001, Φ = 0.06		χ^2 (1, N = 222) = 1.83, *n.s.*	

Interaction		χ^2 (1, N = 5,568) = 0.33, *n.s.*

Note: * indicates differences between non-problem and at-risk gamblers for each gender. ^ indicates differences between each gender separately for non-problem and at-risk gamblers.
No significant differences were observed for either gender between non-problem and at-risk gamblers in terms of frequency of engagement for the following forms: private betting, Lotto/Powerball/Pools, phone or SMS competitions and raffles, sweeps and other competitions. The result for betting on sports or events results for females and bingo for men were based on a small n. Those percentages should be read with caution.

Table IV Results for the predictors in the multivariate analysis for females

		B	Odds Ratio	CI Lower	CI Upper
Predictor	**Level**			**Bound**	**Bound**
Age (ref: 18-24)					
	25-34	0.20	1.22	0.60	2.49
	35-44	0.26	1.30	0.63	2.66
	45-54	0.54	1.71	0.87	3.35
	55-64	0.03	1.03	0.49	2.17
	65 or older	-1.01	0.36*	0.16	0.82
Language other than English at home (ref: no)					
		0.64	1.90*	1.15	3.12
Education (ref: Year 10 or lower)					
	University	-0.36	0.70	0.40	1.21
	TAFE or trade qualification	-0.40	0.67	0.40	1.14
	Year 12	-0.35	0.70	0.43	1.14
Household type (ref: couple with children)					
	Couple without children	-0.11	0.89	0.54	1.49
	Group household	1.45	4.25*	1.89	9.54
	Other	0.21	1.23	0.79	1.92
Employment status (ref: unemployed or not at work)					
	Full-time employment	-0.55	0.58*	0.36	0.94
	Part-time employment	-0.48	0.62*	0.39	0.99
Forms of gambling (ref: do not participate)					
	Private betting	0.87	2.39*	1.02	5.57
	EGMs	2.14	8.49*	5.30	13.58
	Table games	-0.28	0.76	0.36	1.60
	Horse/harness/greyhound	0.09	1.09	0.71	1.67
	Sports or events	0.35	1.42	0.56	3.64
	Keno	0.04	1.04	0.52	2.06
	Lotto/Powerball/Pools	0.06	1.06	0.69	1.63
	Scratch tickets	0.44	1.55*	1.07	2.25
	Bingo	1.11	3.03*	1.81	5.08
	Phone/SMS competitions	-0.07	0.94	0.55	1.60
	Raffles, sweeps, etc	-0.51	0.60*	0.42	0.87
Main reason for gambling (ref: other)					
	Social reasons	-0.94	0.39*	0.23	0.66
	To win money	-0.87	0.42*	0.26	0.67
	General entertainment	-0.63	0.54*	0.32	0.89

Notes: Asterisks (*) indicate significant predictors in the regression model. The statistics reported are B, Odds ratio (with asterisks indicating significant predictors) and the lower and upper bounds for the 95% confidence interval for each predictor. Thus, a positive B indicates that the predictor is associated with at-risk gamblers (compared to the reference group) for that gender, whereas a negative B indicates that the predictor is associated with non-problem gamblers. Those who were excluded from the analyses due to missing data were compared to those who were included. There were some minor demographic and behavioural differences between the groups, but the effect sizes were small and most differences were in the order of 3%, indicating that the differences were likely to be due to the large sample size. Thus, the missing data were not considered to be particularly problematic for this model.

Table V Results for the predictors in the multivariate analysis for males

Predictor	Level	B	Odds Ratio	CI Lower Bound	CI Upper Bound
Age (ref: 18-24)					
	25-34	-0.09	0.92	0.56	1.51
	35-44	-0.19	0.82	0.48	1.42
	45-54	-0.37	0.69	0.39	1.23
	55-64	-0.17	0.84	0.46	1.54
	65 or older	-1.34	0.26*	0.13	0.55
Language other than English at home (ref: no)					
		0.84	2.32*	1.61	3.35
Education (ref: Year 10 or lower)					
	University	-0.87	0.42*	0.27	0.66
	TAFE or trade qualification	-0.34	0.71	0.48	1.06
	Year 12	-0.46	0.63*	0.42	0.94
Household type (ref: couple with children					
	Couple without children	-0.19	0.83	0.55	1.25
	Group household (not related)	1.14	3.13*	1.75	5.59
	Other	0.14	1.15	0.79	1.68
Employment status (ref: unemployed or not at work)					
	Full-time employment	-1.09	0.34*	0.21	0.53
	Part-time employment	-0.51	0.60	0.35	1.02
Forms of gambling (ref: do not participate)					
	Private betting	0.29	1.34	0.87	2.06
	EGMs	1.66	5.25*	3.77	7.31
	Table games	0.87	2.38*	1.63	3.46
	Horse/harness/greyhound	0.45	1.56*	1.13	2.16
	Sports or events	0.69	1.99*	1.34	2.98
	Keno	-0.16	0.85	0.47	1.55
	Lotto/Powerball/Pools	0.99	2.68*	1.83	3.92
	Scratch tickets	-0.26	0.78	0.54	1.11
	Bingo	0.54	1.71	0.51	5.76
	Phone/SMS competitions	-0.07	0.94	0.57	1.54
	Raffles, sweeps, etc	-0.33	0.72*	0.53	0.98
Main reason for gambling (ref: other)					
	Social reasons	-0.62	0.54*	0.34	0.86
	To win money	-0.74	0.48*	0.31	0.74
	General entertainment	-0.72	0.49*	0.30	0.78

Notes: Asterisks (*) indicate significant predictors in the regression model. The statistics reported are B, Odds ratio (with asterisks indicating significant predictors) and the lower and upper bounds for the 95% confidence interval for each predictor. Thus, a positive B indicates that the predictor is associated with at-risk gamblers (compared to the reference group) for that gender, whereas a negative B indicates that the predictor is associated with non-problem gamblers. Those who were excluded from the analyses due to missing data were compared to those who were included. There were some minor demographic and behavioural differences between the groups, but the effect sizes were small and most differences were in the order of 3%, indicating that the differences were likely to be due to the large sample size. Thus, the missing data were not considered to be particularly problematic for this model.