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## Short Communication

## The intergenerational transmission of problem gambling: The mediating role of parental psychopathology

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## HIGHLIGHTS

- The relationship between parent-and-offspring problem gambling was significant.
- Paternal-offspring relationship was significant after controlling for other factors.
- Paternal problem drinking, maternal drug use mediated paternal-offspring gambling.
- Paternal problem drinking, maternal drug use mediated maternal-offspring gambling.
- The magnitude of transmission risk appears to warrant clinical and policy responses.

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## ABSTRACT

The present study investigated the intergenerational transmission of problem gambling and the potential mediating role of parental psychopathology (problem drinking, drug use problems, and mental health issues). The study comprised 3953 participants (1938 males, 2015 females) recruited from a large-scale Australian community telephone survey of adults retrospectively reporting on parental problem gambling and psychopathology during their childhood. Overall, 4.0% [95%CI 3.0, 5.0] ( $n = 157$ ) of participants reported paternal problem gambling and 1.7% [95%CI 1.0, 2.0] ( $n = 68$ ) reported maternal problem gambling. Compared to their peers, participants reporting paternal problem gambling were 5.1 times more likely to be moderate risk gamblers and 10.7 times more likely to be problem gamblers. Participants reporting maternal problem gambling were 1.7 times more likely to be moderate risk gamblers and 10.6 times more likely to be problem gamblers. The results revealed that the relationships between paternal-and-participant and maternal-and-participant problem gambling were significant, but that only the relationship between paternal-and-participant problem gambling remained statistically significant after controlling for maternal problem gambling and sociodemographic factors. Paternal problem drinking and maternal drug use problems partially mediated the relationship between paternal-and-participant problem gambling, and fully mediated the relationship between maternal-and-participant problem gambling. In contrast, parental mental health issues failed to significantly mediate the transmission of gambling problems by either parent. When parental problem gambling was the mediator, there was full mediation of the effect between parental psychopathology and offspring problem gambling for fathers but not mothers. Overall, the study highlights the vulnerability of children from problem gambling households and suggests that it would be of value to target prevention and intervention efforts towards this cohort.

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## 1. Introduction

It has been estimated that for each problem gambler, at least seven other people may be negatively impacted (Productivity Commission,

1999). Surprisingly few studies, however, have examined the impact of problem gambling on families (Dowling, Smith, & Thomas, 2009; Kourgiantakis, Saint-Jacques, & Tremblay, 2013), particularly on the nature of the intergenerational transmission of gambling problems. It is therefore the focus of this study to investigate some of the potential explanatory mechanisms underpinning the relationship between parental-and-offspring gambling problems.

There is an accumulation of evidence suggesting that children and adolescents are vulnerable to the influence of parental problem

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gambling. The children of problem gamblers report greater gambling frequency (Delfabbro, Lahn, & Grabosky, 2005; Delfabbro & Thrupp, 2003; Jacobs et al., 1989; Vachon, Vitaro, Wanner, & Tremblay, 2004), earlier onset of gambling behaviour (Jacobs, 2000; Jacobs et al., 1989), and elevated incidence of problem gambling (Govoni, Rupcich, & Frisch, 1996; Gupta & Derevensky, 1998) than the children of non-problem gambling parents. Studies consistently report that children who have at least one parent who gambles, irrespective of the level of severity, are 2-to-4 times more likely to develop a gambling problem than their peers with non-gambling parents (Black, Monahan, Temkit, & Shaw, 2006; Jacobs et al., 1989; Langhinrichsen-Rohling, Rohde, Seeley, & Rohling, 2004; Magoon & Ingersoll, 2006). Although limited, there is some evidence that this relationship remains significant after controlling for socio-demographic factors (Vachon et al., 2004). The association between parent-and-offspring gambling may, in part, be explained by the social learning model which views that offspring gambling is promoted by family and friends who act as significant models for gambling behaviour (Gupta & Derevensky, 1997; Haridon & Derevensky, 2001). Indeed, children and adolescents are often introduced to gambling by their parents and family members, becoming involved in gambling activities as part of normal and accepted family social entertainment (Griffiths & Wood, 2000; Jacobs, 2000).

Research suggests that compared to their peers, children of problem gamblers are also more likely to experience the effects of co-occurring parental psychopathology (Jacobs et al., 1989; Lesieur & Rothschild, 1989). Moreover, the children of problem gambling parents with multiple co-occurring conditions (i.e., alcohol use problems, substance use problems, or overeating behaviours) report more adjustment difficulties, such as smoking, alcohol use, overeating, and psychological distress, than children of problem gambling parents without any co-morbid conditions (Lesieur & Rothschild, 1989). These findings are consistent with research indicating that problem gamblers (Dowling et al., 2014a; Dowling, Rodda, Lubman, & Jackson, 2014b; Dowling et al., 2015; Lorains, Cowlshaw, & Thomas, 2011) and their parents (Lesieur, Blume, & Zoppa, 1986) demonstrate high levels of co-morbid psychopathology, including alcohol use problems, mood disorders, anxiety disorders, substance use problems, and personality disorders.

Children living in problem gambling families may also be exposed to significant psychopathology in their non-gambling parent. The intimate partners of problem gamblers are more likely to report mental health problems, emotional disturbances, and alcohol use problems than their counterparts (Hodgins, Shead, & Makarchuk, 2007; Svensson, Romild, & Shepherdson, 2013). Studies of treatment-seeking family members have also revealed that emotional distress is the most common problem reported by the intimate partners of problem gamblers (Crisp, Thomas, Jackson, & Thomason, 2001; Dowling, Rodda, Lubman, & Jackson, 2014b; Dowling, Suomi, Jackson, & Lavis, 2015).

Taken together, the existing research suggests a positive relationship between parent-and-offspring problem gambling and between parental problem gambling and psychopathology. It remains unclear, however, whether increased parental psychopathology has an explanatory role in the intergenerational transmission of gambling problems. The aim of the present study is therefore to investigate the degree to which parental psychopathology mediates the parent-and-offspring relationship. It is hypothesised that (a) there will be a significant positive relationship between parent-and-offspring problem gambling and that this relationship will remain significant after controlling for socio-demographic characteristics; and (b) the relationship between parent-and-offspring problem gambling will be mediated by parental psychopathology (problem drinking, drug use problems, and mental health issues). An alternative model in which parental problem gambling mediates the relationship between parental psychopathology and offspring problem gambling will also be explored.

## 2. Methods

### 2.1. Participants and procedures

Data for this study were collected from a computer-assisted telephone interview of a sample of 3953 adults (1938 [49.0%] males) living in Australia, retrospectively reporting on the problem gambling and psychopathology of biological, step, or foster parents during their childhood. This project was approved by the Monash University Human Research Ethics Committee (CF07/3951). The data were collected by independent market research providers using a targeted random digit dialling telephone survey methodology to interview adult participants living in Australia. The in scope population for the survey were Australian residents aged 18 years and over who were contactable by a landline telephone. Chi-square goodness of fit tests for age and gender revealed no significant differences between the study sample and the Australian population. Incremental sampling with quota allocation was used to ensure adequate numbers of the target groups. A maximum of 10 contacts were attempted in the event of a live number. Although interviews were completed with 5206 participants, the final sample comprised 3953 participants who fully completed the PGSI and parental problem gambling items.

Participants were most often aged 40 to 49 years (21.2%) or 30 to 39 years (20.6%), with smaller proportions aged 60 to 69 years (16.3%), 50 to 59 years (14.9%), 18 to 29 years (13.8%), and 70 years or older (13.3%). Participants were primarily born in Australia (83.5%) or Europe (10.4%), with fewer participants born in Asia (2.4%), New Zealand (2.4%), Africa (0.9%), or North America (0.4%). The largest proportion of participants was married (58.8%), with smaller proportions never married (18.9%), in a cohabiting relationship (5.8%), separated or divorced (9.4%), and widowed (7.1%). Most participants were working in a full-time (30.9%), part-time (22.5%), or self-employed (6.2%) capacity, or were retired (25.1%). Fewer participants were engaged in full-time home duties (7.6%), unemployed (3.6%), students (3.1%), or on a sick or disability pension (1.0%). Approximately one-third of participants had completed a university or college degree (32.3%), and a further 27.2% had completed primary school as their highest educational qualification. Smaller proportions of participants had completed a trade, technical certificate or diploma (22.0%), completed secondary school as their highest educational qualification (18.2%), or failed to complete primary school (0.1%).

### 2.2. Measures

Participants were asked to provide their demographic characteristics (gender, age category, country of birth, relationship status, employment status, and highest level of educational qualification). Participants were required to report gambling participation over the past 12 months on a range of gambling activities (raffles, bingo or housie, lotteries, scratch tickets, informal cards for money [not at casino], horse racing, trotting or harness racing, greyhound racing, electronic gaming machines [EGMs] at hotels, EGMs at clubs, EGMs at a casino, casino gambling, off-course sports betting, fixed odds sports betting, soccer pools, keno at club or hotel, Internet gambling, and informal indoor games for money).

The nine-item PGSI of the Canadian Problem Gambling Index (Ferris & Wynne, 2001) was employed to evaluate problem gambling severity using the original scoring (Jackson, Wynne, Dowling, Tomnay, & Thomas, 2010). Scores on the PGSI can be used to classify individuals as non-problem gamblers (score of 0), low risk gamblers (scores of 1 or 2), moderate risk gamblers (scores between 3 and 7), or problem gamblers (scores of 8 or higher). The PGSI has been adopted as the preferred measurement tool for population-level research in Australia and has demonstrated very good psychometric properties (Ferris & Wynne, 2001; Holtgraves, 2009; Neal, Delfabbro, & O'Neil, 2005).

The perceived presence of paternal and maternal problem gambling when growing up was assessed using a single screening item: "When

you were growing up, did any family member have an issue with their gambling?" Participants positively endorsing this item were then asked to specify the family member(s) to whom they were referring.

The perceived presence of paternal and maternal psychopathology (problem drinking, drug use problems, mental health issues) when growing up were evaluated using a series of single screening items: *When you were growing up, did any family member have: (a) an issue with alcohol?, (b) an issue with non-prescription or illegal drugs?, and (c) any mental health issue including depression?* Participants positively endorsing the screening item were then asked to specify the family member(s) to whom they were referring.

### 2.3. Statistical analysis

SPSS (v.22) (IBM Corporation, 2013) was used for preliminary analyses and mediations were conducted in Mplus (v.7.2) (Muthén & Muthén, 1998–2012) using a Weighted Least Squares Mean and Variance adjusted (WLSMV) estimator. The PGSI was categorised into an ordinal variable (i.e., non-gamblers/non-problem gamblers, low risk gamblers, and moderate risk/problem gamblers) for analysis due to high skew. Pearson's chi-square analyses were employed to explore the relationship between parental-and-participant problem gambling and ordinal regression was used to examine whether this relationship persisted after accounting for sociodemographic characteristics (i.e., gender, age, relationship status, employment status, educational qualification, and country of birth). A final series of independent ordinal regression analyses (adjusted for age, gender, and education because of their significant bivariate relationship with participant problem gambling) were conducted to examine whether parental psychopathology (problem drinking, drug use problems, and mental health issues) mediated the relationship between parental-and-participant problem gambling, or whether parental problem gambling mediated the relationship between parental psychopathology and participant problem gambling. Mediated effects were calculated using the product of coefficients approach and indirect effects were deemed significant if their associated 95% bias-corrected bootstrapped confidence interval (1000 bootstrap draws) did not contain zero (Mackinnon, Lockwood, & Williams, 2004).

## 3. Results

### 3.1. Gambling participation and problem gambling prevalence

Overall, 82.4% of participants reported that they had gambled at least once in the previous 12 months. Using the PGSI (Ferris & Wynne, 2001), 92.5% of participants were classified as non-problem gamblers, 4.9% as low risk gamblers, 1.7% as moderate risk gamblers, and 0.9% as problem gamblers. Although the gambling participation rate in this study is slightly higher than that reported in other Australian state/territory and national studies, the rates of low-risk, moderate-risk, and problem gambling are generally consistent with population-representative studies conducted in Australia (Christensen, Dowling, Jackson, & Thomas, 2015; Dowling et al., 2016; Jackson et al., 2010).

### 3.2. Intergenerational transmission of problem gambling

Overall, 4.0% [95%CI 3.0, 5.0] ( $n = 157$ ) of the sample reported paternal problem gambling and 1.7% [95%CI 1.0, 2.0] ( $n = 68$ ) reported maternal problem gambling. There was a significant relationship between paternal-and-participant problem gambling ( $\chi^2(3) = 97.99, p < 0.001$ ). Compared to their peers, participants with problem gambling fathers were 5.1 times more likely to be moderate risk gamblers (7.6% vs. 1.5%) and 10.7 times more likely to be problem gamblers (6.4% vs. 0.6%). Similarly, participants with problem gambling mothers were 1.7 times more likely to be moderate risk gamblers (2.9% vs. 1.7%), and 10.6 times more likely to be problem gamblers (7.4% vs. 0.7%)

relative to their peers, ( $\chi^2(3) = 35.30, p < 0.001$ ). In an ordinal logistic regression (Table 1), controlling for the influence of sociodemographic factors (and including both paternal and maternal PGSI scores), only the relationship between paternal-and-participant problem gambling remained statistically significant ( $\chi^2(8) = 117.68, p < 0.001$ ).

### 3.3. Mediating role of parental psychopathology in the intergenerational transmission of problem gambling

In the mediation analyses (Table 2), both paternal problem drinking and maternal drug use problems partially mediated the relationship between paternal-and-participant problem gambling, but fully mediated the relationship between maternal-and-participant problem gambling. When examining an alternative model, in which parental psychopathology was the predictor and parental problem gambling the mediator, paternal problem gambling significantly mediated all parental psychopathology except maternal mental health issues.

## 4. Discussion

The purpose of this study was to investigate the degree to which parental psychopathology can explain the intergenerational transmission of problem gambling from parents to offspring. The hypothesis that there would be significant positive relationships between parent-and-offspring problem gambling was supported. There were significant relationships between paternal-and-participant problem gambling, as well as maternal-and-participant problem gambling. Compared to their peers, participants reporting a childhood history of paternal problem gambling had 10.7 times greater risk of having a gambling problem, while a childhood history of maternal problem gambling was associated with 10.6 times greater chance of having a gambling problem. These results supported previous studies that have found a significant positive association between parent-and-offspring problem gambling (Black et al., 2006; Jacobs et al., 1989; Langhinrichsen-Rohling et al., 2004; Magoon & Ingersoll, 2006).

The hypothesis that these relationships would remain significant after controlling for socio-demographic characteristics, however, was only partially supported. Only the relationship between paternal-and-participant problem gambling remained statistically significant after controlling for maternal problem gambling and socio-demographic factors. From these findings, it can be inferred that the problem gambling behaviour of fathers, but not mothers, has a unique effect on offspring problem gambling, and that the effect of maternal problem gambling may be accounted for by paternal problem gambling or relevant socio-demographic characteristics. Taken together, the results of this study indicate that the magnitude of risk associated with parental problem gambling for the development of offspring problem gambling, particularly paternal problem gambling, is substantial enough to warrant clinical and policy responses.

**Table 1**

Ordinal logistic regression analysis with parental problem gambling and other sociodemographic characteristics predicting participant problem gambling.

|  | B     | SE B | p     | Odds ratio | 95%CI ratio  |
|--|-------|------|-------|------------|--------------|
| Gender (male)                              | −0.94 | 0.14 | 0.000 | 0.39       | [0.30, 0.51] |
| Age  | −0.07 | 0.02 | 0.001 | 0.93       | [0.89, 0.97] |
| Relationship status (non-cohabiting)       | −0.22 | 0.13 | 0.091 | 0.80       | [0.62, 1.04] |
| Employment (full or part-time)             | 0.03  | 0.14 | 0.826 | 1.03       | [0.78, 1.37] |
| Highest level of educational qualification | −0.15 | 0.04 | 0.000 | 0.86       | [0.80, 0.92] |
| Australian born status                     | 0.10  | 0.17 | 0.531 | 1.11       | [0.80, 1.54] |
| Maternal problem gambling                  | 0.68  | 0.38 | 0.074 | 1.98       | [0.93, 4.17] |
| Paternal problem gambling                  | 0.91  | 0.25 | 0.000 | 2.49       | [1.54, 4.04] |

Reference category for dependent variable = Non-Gamblers/Non-Problem Gamblers  
Overall model:  $\chi^2(8) = 117.68, p < 0.001$

**Table 2**

Regression analyses exploring the mediating role of parental psychopathology and problem gambling on the intergenerational transmission of gambling problems.

| Predictor  | Mediator                       | Outcome         | a      | b      | c'     | Indirect effects |               |      |      |
|--|--------------------------------|-----------------|--------|--------|--------|------------------|---------------|------|------|
|  |                                |                 |        |        |        | ab               | 95% Cis       | SE   | p    |
| <i>Analyses in which parental psychopathology acts as the mediator:</i>  |                                |                 |        |        |        |                  |               |      |      |
| Paternal problem gambling and paternal psychopathology                   |                                |                 |        |        |        |                  |               |      |      |
| Paternal problem gambling  | ⇨ Paternal problem drinking    | ⇨ PGSI category | 0.22** | 0.10*  | 0.08** | 0.02*            | [0.00, 0.04]  | 0.01 | 0.04 |
| Paternal problem gambling  | ⇨ Paternal drug use problem    | ⇨ PGSI category | 0.12** | 0.06   | 0.09** | 0.01             | [-0.03, 0.05] | 0.02 | 0.73 |
| Paternal problem gambling  | ⇨ Paternal mental health issue | ⇨ PGSI category | 0.12** | 0.09   | 0.09** | 0.01             | [-0.00, 0.03] | 0.01 | 0.15 |
| Paternal problem gambling and maternal psychopathology                   |                                |                 |        |        |        |                  |               |      |      |
| Paternal problem gambling  | ⇨ Maternal problem drinking    | ⇨ PGSI category | 0.12** | 0.10   | 0.09** | 0.01             | [-0.01, 0.03] | 0.01 | 0.16 |
| Paternal problem gambling  | ⇨ Maternal drug use problem    | ⇨ PGSI category | 0.15** | 0.21*  | 0.07*  | 0.03*            | [0.00, 0.06]  | 0.01 | 0.03 |
| Paternal problem gambling  | ⇨ Maternal mental health issue | ⇨ PGSI category | 0.05*  | -0.04  | 0.10** | -0.00            | [-0.01, 0.00] | 0.00 | 0.49 |
| Maternal problem gambling and paternal psychopathology                   |                                |                 |        |        |        |                  |               |      |      |
| Maternal problem gambling  | ⇨ Paternal problem drinking    | ⇨ PGSI category | 0.09** | 0.13** | 0.05   | 0.01*            | [0.00, 0.02]  | 0.01 | 0.02 |
| Maternal problem gambling  | ⇨ Paternal drug use problem    | ⇨ PGSI category | 0.08   | 0.09   | 0.05   | 0.01             | [-0.03, 0.05] | 0.02 | 0.68 |
| Maternal problem gambling  | ⇨ Paternal mental health issue | ⇨ PGSI category | 0.05   | 0.12   | 0.05*  | 0.01             | [-0.00, 0.02] | 0.00 | 0.20 |
| Maternal problem gambling and maternal psychopathology                   |                                |                 |        |        |        |                  |               |      |      |
| Maternal problem gambling  | ⇨ Maternal problem drinking    | ⇨ PGSI category | 0.19** | 0.13   | 0.04   | 0.02             | [-0.00, 0.05] | 0.01 | 0.07 |
| Maternal problem gambling  | ⇨ Maternal drug use problem    | ⇨ PGSI category | 0.13** | 0.22** | 0.03   | 0.03*            | [0.00, 0.05]  | 0.01 | 0.02 |
| Maternal problem gambling  | ⇨ Maternal mental health issue | ⇨ PGSI category | 0.08** | -0.04  | 0.06*  | -0.00            | [-0.01, 0.01] | 0.00 | 0.43 |
| <i>Analyses in which parental problem gambling acts as the mediator:</i> |                                |                 |        |        |        |                  |               |      |      |
| Paternal psychopathology and paternal problem gambling                   |                                |                 |        |        |        |                  |               |      |      |
| Paternal problem drinking  | ⇨ Paternal problem gambling    | ⇨ PGSI category | 0.31** | 0.22** | 0.02   | 0.07**           | [0.03, 0.11]  | 0.06 | 0.00 |
| Paternal drug use problem  | ⇨ Paternal problem gambling    | ⇨ PGSI category | 0.07*  | 0.23** | 0.01   | 0.02*            | [0.00, 0.03]  | 0.01 | 0.04 |
| Paternal mental health issue   | ⇨ Paternal problem gambling    | ⇨ PGSI category | 0.12** | 0.23** | 0.03   | 0.03**           | [0.01, 0.05]  | 0.01 | 0.01 |
| Maternal psychopathology and paternal problem gambling                   |                                |                 |        |        |        |                  |               |      |      |
| Maternal problem drinking  | ⇨ Paternal problem gambling    | ⇨ PGSI category | 0.11** | 0.22** | 0.04   | 0.03**           | [0.01, 0.04]  | 0.01 | 0.01 |
| Maternal drug use problem  | ⇨ Paternal problem gambling    | ⇨ PGSI category | 0.10** | 0.22** | 0.05*  | 0.02**           | [0.01, 0.04]  | 0.01 | 0.01 |
| Maternal mental health issue   | ⇨ Paternal problem gambling    | ⇨ PGSI category | 0.04   | 0.10** | -0.02  | 0.00             | [-0.00, 0.01] | 0.00 | 0.09 |
| Maternal psychopathology and maternal problem gambling                   |                                |                 |        |        |        |                  |               |      |      |
| Maternal problem drinking  | ⇨ Maternal problem gambling    | ⇨ PGSI category | 0.22** | 0.05   | 0.05   | 0.01             | [-0.00, 0.02] | 0.01 | 0.11 |
| Maternal drug use problem  | ⇨ Maternal problem gambling    | ⇨ PGSI category | 0.12** | 0.05   | 0.06** | 0.01             | [-0.00, 0.01] | 0.00 | 0.16 |
| Maternal mental health issue   | ⇨ Maternal problem gambling    | ⇨ PGSI category | 0.07** | 0.06*  | -0.17  | 0.01             | [-0.00, 0.01] | 0.00 | 0.11 |
| Paternal psychopathology and maternal problem gambling                   |                                |                 |        |        |        |                  |               |      |      |
| Paternal problem drinking  | ⇨ Maternal problem gambling    | ⇨ PGSI category | 0.07** | 0.05   | 0.8**  | 0.04             | [-0.00, 0.01] | 0.00 | 0.10 |
| Paternal drug use problem  | ⇨ Maternal problem gambling    | ⇨ PGSI category | 0.06   | 0.06*  | 0.02   | 0.00             | [-0.00, 0.01] | 0.00 | 0.26 |
| Paternal mental health issue   | ⇨ Maternal problem gambling    | ⇨ PGSI category | 0.04   | 0.06*  | 0.05   | 0.00             | [-0.00, 0.01] | 0.00 | 0.24 |

Note: all reported coefficients are standardised, and all mediations we adjusted for Age, Gender and Education; a = independent variable → mediator; b = mediator → dependent variable (adjusting for IV); c' independent variable → dependent variable (adjusting for mediator); \*Significant at the p = 0.05 \*\*Significant at the p = 0.01



The hypothesis that the relationship between parent-and-offspring problem gambling would be mediated by parental psychopathology (problem drinking, drug use problems, and mental health issues) was also partially supported. Mediation analyses revealed that maternal drug use problems and paternal problem drinking fully mediated the relationship between maternal-and-offspring problem gambling and partially mediated the relationship between paternal-and-offspring problem gambling. These findings imply that the intergenerational transmission of gambling problems is explained, at least in part, by the subsequent development of alcohol and drug use problems in either the problem gambling or non-problem gambling parent. These findings are consistent with a stress and coping perspective (Rychtarik & McGillicuddy, 2006), whereby mothers may consume drugs and fathers may drink excessively as a result of ineffective skills to repeatedly cope with the difficulties created by, not only their own gambling problem, but also their partner's gambling problem.

Interestingly, when parental problem gambling was assessed as a mediator, paternal problem gambling fully mediated the relationship between all paternal psychopathologies and offspring problem gambling. The only form of parental psychopathology that continued to predict offspring problem gambling independent of paternal problem gambling was maternal drug use problems. These findings therefore provide preliminary cross-sectional evidence of the potential mechanisms by which parents confer risk for problem gambling to their offspring, suggesting that mothers and father differs in the potential pathway by which the intergenerational transmission of problem gambling occurs. Specifically, maternal problem gambling may act as the potential trigger for maternal psychopathology, which in turn is associated with greater problem gambling in offspring. In contrast, these data suggest that for fathers, problem gambling may actually be the consequence of psychopathology which in turn is associated with increased offspring problem gambling.

Notably, neither maternal nor paternal mental health issues served to mediate the relationship between parent-and-offspring problem gambling. Although these findings suggest that parental mental health issues do not affect the parental transmission of gambling problems, problems with mental health could be considered a broader and less tangible issue for participants to define than problem drinking or drug use problems. It would be of value for future research to investigate whether specific forms of mental health issues, such as depression and anxiety, contribute to the parent-child gambling relationship.

The results of this study should be viewed with consideration of its limitations. Chief among them was the reliance on retrospective data that may be subject to memory recall biases (Hassan, 2006). Furthermore, only single items and no direct assessment of parental problem gambling or psychopathology was undertaken. Prospective longitudinal research designs, particularly those involving parent-offspring dyads, are required to understand the temporal order of these variables. Finally, despite the large overall sample employed in this study, there were only small samples of participants reporting problem gambling, paternal problem gambling, or maternal problem gambling. This is not unexpected in a population-based study, and may make the identified significant relationships even more meaningful.

Despite these limitations, this study supports the evidence for the strong intergenerational transmission of problem gambling in a large national sample, and is the first to investigate the mediating role of comorbid parental psychopathology in this transmission. The findings have implications for the development of effective, targeted interventions for individuals raised in problem gambling families. They suggest there is a need for prevention efforts such as multi-media campaigns designed to influence generational change in attitudes to gambling consumption; school-based education sessions and interventions with children raised by problem gambling parents; secondary prevention efforts across a range of settings, such as mental health services, alcohol and drug services, family service agencies, relationship counselling agencies, health care settings, criminal justice settings, and youth agencies;

treatment interventions for individuals raised in problem gambling families; and family-oriented treatment programs (Williams, 1990). Relevant messages in these programs should include the risks facing children raised in problem gambling families and the role of both paternal and maternal problem drinking, drug use problems, and mental health issues in the development of offspring gambling problems.

There is, however, a clear gap in relation to the development and evaluation of high quality, theory-driven primary, secondary, and tertiary prevention efforts for the offspring of problem gamblers. Interventions for the offspring of problem gamblers are much more underdeveloped than interventions for individuals affected by parental alcohol use problems. Programs targeted towards problem drinking parents and their offspring (Williams, 1990) may provide useful models for the development of programs designed to prevent the intergenerational transmission of gambling problems. Further research is required to develop and evaluate the efficacy of such interventions, with a specific emphasis on parental psychopathology.

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#### Contributors

ND, AJ, EF, and ST designed and conducted the study. ND prepared the first draft of the *Children at Risk Study* report and KS prepared the first draft of this manuscript. EO and GY conducted the statistical analysis. All authors contributed to and have approved the final manuscript.

#### Conflict of interest

All authors declare that they have no conflicts of interest. At the time of data collection, several authors (ND, AJ, ST) were employed at the Problem Gambling Research and Treatment Centre, which was funded by the Victorian Government Department of Justice. The Victorian Government Department of Justice had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

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