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Abstract

The current study was a quantitative, cross-sectional, and exploratory investigation of loneliness and self-control as risk factors for problem gambling behaviour in Australian adult gamblers (N = 134). The survey assessed participants' levels of loneliness using the UCLA Loneliness Scale, their level of self-control using the Self-Control Scale, and their level of gambling using the Problem Gambling Severity Index (PGSI). Results of Pearson's correlation analyses indicated a significant positive relationship between loneliness and gambling, as well as significant negative relationships between self-control and gambling, and self-control and loneliness. Hierarchical regression analysis indicated that self-control and loneliness explained a significant 31% of the variance in gambling behaviour. Whilst these variables accounted for a large and significant portion of variance, self-control did not act as a mediator of the loneliness-gambling relationship. The results suggest that loneliness plays a primary and important role in all levels of problem gambling behaviour.

Keywords: Problem gambling, gambling behaviour, self-control, loneliness

Introduction

The Role of Loneliness and Self-Control in Predicting Australian Gambling Behaviour

The majority of research into gambling behaviour has focussed predominantly on problem gamblers. However, Shaffer and Korn (2002) suggest that gambling behaviour exists on a continuum that ranges from no gambling at one end to problem gambling at the other. Lying along this continuum are those gamblers who are at various levels of risk of becoming problem gamblers. In 2010 the Australian Government Productivity Commission (Productivity Commission) reported that approximately 90,000 to 170,000 (0.5% to 1.0%) of Australian adults experience significant problems due to their gambling. The Productivity Commission (2010) also reported that an additional 230,000 to 350,000 (1.4% to 2.1%) of Australian adults were at moderate risk of developing problem gambling. It was reported by the Productivity Commission (2010) that more than 17% of gamblers in prevalence surveys across Australia indicated that gambling had an adverse effect on their lives.

There is a general consensus amongst researchers that individuals gamble for a myriad of reasons. Such reasons include: a social activity to be enjoyed, the prospect of winning, the excitement of gambling, stress reduction, and an escape from negative mood experiences such as boredom, depression, anxiety, and loneliness (Thomas & Moore, 2001; Thomas & Moore, 2003; Zangeneh, Grunfeld & Koenig, 2008). Although there is empirical research which has suggested that loneliness is a risk factor for gambling, the majority of Australian studies have focused predominantly on loneliness as a risk factor for women who gamble on EGMs (pokies).

While loneliness may be a risk factor for problem gambling, Australian research also suggests that problem gamblers have less success in setting limits and maintaining awareness of the risks posed by gambling (Thomas et al., 2010). The Productivity Commission (2010) reported that a minimum of 4% of Australian gamblers lose track of time or reality while gambling, continue to gamble after reaching a self-imposed limit, or find it hard to resist gambling. The purpose of this study is to extend the current body of research on gambling by investigating the loneliness-gambling relationship in Australian adults across the continuum of problem gambling behaviour and assess whether self-control is a mediating factor in this relationship. It is proposed that people are more likely to gamble if they are lonely due to self-control deficits associated with loneliness and social isolation. This exploratory model is yet to be empirically tested.

Loneliness

Loneliness has been defined as an aversive psychological state that is experienced when there is a perceived discrepancy between the level of interpersonal relationships a person has and the level of interpersonal relationships that the person desires to have (Perlman & Peplau, 1981). There is a general consensus among researchers that loneliness is a subjective experience that varies across different people, is experienced under varying conditions, and has a multitude of causes and consequences (Aanes, Mittelmark & Hetland, 2010; Rokach, 2004; Segrin & Passalacua, 2010). The concept of loneliness can also be viewed as either a temporary emotional state that may be linked to a specific event such as when a person moves to a new community, or a more chronic trait which can result in a person being characterized as a 'lonely person' (Perlman & Peplau, 1981). In a prevalence study of 3,015 Australian adults, Hawthorne (2008) found that 9% of participants reported experiencing some level of social isolation and 7% of participants reported feeling isolated or very isolated.

Loneliness has been identified as one of the contributing factors for problem gambling. Research literature suggests that this may be particularly true for adolescents (Gupta & Derevesky, 1998), women (Thomas & Moore, 2001) and older adults (Zaranek & Lichtenberg, 2008). Australian research suggests that adolescents gamble to escape real life problems including emotional and social isolation (King, Delfabbro, & Griffiths, 2010). For older Australians, age-related circumstances such as being without a partner, having a disability, having a low annual income, and no longer participating in the workforce are motivating factors for gambling (Southwell, Boreham, & Laffan, 2008). Australian research that investigated whether women gamble for the same reasons as men found that loneliness, boredom, and stress predicted problem gambling for both men and women (Thomas & Moore, 2001). The question being asked in the current study is whether loneliness is a risk factor for Australian gamblers including social gamblers, problem gamblers, and those at risk of developing problem or pathological gambling.

Self-Control

Current research suggests that the ability to control and regulate one's impulses, desires, emotions, and behaviour is a core feature of the self and an important aspect of people's social relationships (Blackhart, Nelson, Winter & Rockney, 2011). The ability to curb selfish, impulsive and otherwise socially undesirable actions enables humans to coexist and cooperate with each other in a complex and interdependent society (Baumeister, DeWall, Ciarocco, & Twenge, 2005). The ability to self-regulate is also important for successful outcomes in achieving goals (Carver & Scheier, 2000; Zimmerman, 2000), and for securing and maintaining acceptance in social groups (Blackhart et al., 2011).

With research coming from several different theoretical and methodological perspectives and from those in a diversity of fields (Beokaerts, Pintrich & Zeidner, 2000), there does not appear to be a uniform consensus on the definition of self-control. However, several models of self-control have been postulated in research. One such model is the 'strength model' of self-control developed by Baumeister and Heatherton (1996). This model suggests that self-control is a complex and multi-faceted process that describes the extent to which people choose to influence, modify, or control their behaviour. According to this model of self-control, the extent to which people are able to modify or control their behaviour is dependent on several factors including the strength of the relevant impulse, the level of attention or focus the individual gives the impulse and the level of cognitive strength available to the individual to control the impulse. Baumeister and Heatherton (1996) describe cognitive strength as the ability to override undesired impulses or needs. These researchers also suggest that cognitive strength is a limited resource that depletes as one focuses attention on cognitions requiring self-regulatory effort. If regulatory strength is depleted, breakdowns can occur resulting in failure to self-control.

The strength model of self-control suggests that self-control failure can occur through either 'under-regulation' or 'misregulation'. Under-regulation can occur when a person does not have the ability to transcend the negative cognitions associated with feeling lonely which then results in depleted resources of self-regulatory strength. This interplay between cognitive exhaustion and depletion of self-regulatory strength results in the individual not having the cognitive strength to override impulses he or she wants to control (e.g. gambling).

Research on affect regulation suggests that emotional and mood states cannot be altered directly by sheer acts of will and that initial success at thought suppression may result in strong vulnerabilities to resurgences or obsession with the particular thought (Wegner, Schneider, Carter, & White, 1987). According to the strength model of self-control, the consequent cognitive obsession that results from the person trying to control their feelings of loneliness depletes cognitive strength. In this situation the individual fails to effectively self-regulate an impulse to gamble because they are trying to control something that essentially cannot be controlled (i.e. misregulation due to rumination or obsessing on feeling lonely).

Prevalence surveys across Australia suggest that most Australian gamblers have difficulty controlling urges to gamble (Productivity Commission, 2010). In a longitudinal study of problematic online gaming and self-control, Seary and Kraut (2007) found that participants who indicated low levels of self-control also reported significantly higher levels of problematic gambling over the period of the study. Ricketts and Macaskill (2003) found that the participants in their qualitative study reported that they did not believe they would be able to maintain any attempts to control their gambling when confronted with negative emotional triggers. A recent Queensland survey

indicated that 90% of problem gamblers and 4% of no risk to moderate risk gamblers reported that they found it difficult to resist urges to gamble (Productivity Commission, 2010). Research that investigated links between impulsivity, depression, and problem gambling in Australian adults found that impulsivity partially mediates the depression-problem gambling relationship (Haw, 2009). Given that recent research has established links between self-control and gambling, the Victorian government is currently planning to implement self-regulatory legislation in the form of partial pre-commitment in an attempt to reduce the harms experienced by gamblers that result from excessive and uncontrolled expenditure.

Although there is research evidence that suggests that there is a link between self-control failure and gambling there remains gaps in the research such that the self-control strategies employed by gamblers are not well understood. There is some suggestion that the availability and accessibility of gambling venues, and the ecology of gambling contribute to problem gambling across geographical areas (Orford, 2005). However, Thomas, Moore, and Kyrios et al. (2010) suggest that the research, to date, has not adequately considered how accessibility to gaming venues relates to gambling motivation or self-control.

The current body of empirical evidence suggests that there may be a relationship between loneliness, self-control and gambling, however the research is limited and fragmented and focuses predominantly on problem gamblers. Loneliness is a relatively broad construct that may be more observable to gamblers, their family and health professionals. Loneliness has also been linked to problem gambling. This study hopes to extend research on gambling by focussing on loneliness as a risk factor for gambling using a broader demographic of gamblers, and to investigate whether self-control is a mediator in the loneliness-gambling relationship. It is postulated that as self-control involves modifying behaviour in line with social and community expectations, individuals who feel less connected to others will have greater difficulty controlling their gambling behaviour.

Hypotheses

For the current study four specific hypotheses are considered.
Hypothesis 1 proposes that there will be a correlation between loneliness and gambling such that gamblers with higher levels of loneliness will gamble more often compared to gamblers with lower levels of loneliness.
Hypothesis 2 proposes that there will be correlation between self-control and gambling such that gamblers with lowered self-control will gamble more often compared to gamblers with higher levels of self-control.
Hypothesis 3 proposes that there will be a correlation between loneliness and self-control such that those with higher levels of loneliness will have lower levels of self-control.
Hypothesis 4 proposes that the predictive effect of loneliness on gambling will be mediated by self-control.

Method

Participants

Participants for this study were drawn from a general population of Australian adults using personal contacts and snowballing. An advertisement on the University of Ballarat's internal website invited

staff and students from the university to participate in the research. Participation in the research was voluntary, and approval to conduct the research was granted from the University of Ballarat's Ethics Committee prior to commencement of the study.

There were two criteria used in selecting participants for the study. The first criteria was that all participants must have been 18 years or older at the time of the study. The second criteria was that all participants must have gambled at least once within the previous 12 months on horse racing, EGMs (pokies), sports, casino table games, or bingo. All participants who showed interest in participating in the study met the age criteria; however there were thirteen participants who did not meet the criteria for gambling participation. These participants were excluded from the final sample of participants. The final sample comprised 86 females and 48 males (N = 134). Analysis of power as described by Cohen (1992) indicated that the sample size was adequate to achieve a statistical power of .80 (α = .05) with a medium effect size. Demographic data for the final sample of participants is provided in Table 1.

Table 1. Distribution of participant age and living arrangements

	Males (n = 48) n (%)	Females (n = 86) n (%)	Total (n = 134) n (%)
Age group (years)			
18-25	5 (10.4)	41 (47.8)	46 (34.3)
26-35	8 (16.7)	11 (12.8)	19 (14.2)
36-45	5 (10.4)	9 (10.5)	14 (10.4)
46-55	6 (12.5)	11 (12.7)	17 (12.7)
56-65	15 (31.3)	12 (14.0)	27 (20.1)
66 and over	9 (18.7)	2 (2.2)	11 (8.2)
Living arrangements			
I live alone	13 (27.1)	13 (15.1)	26 (11.9)
I live with others	35 (72.9)	73 (84.9)	108 (80.6)

As can be seen from Table 1 the majority of participants (34%) were aged between 18 years and 25 years with most participants (80.6%) living with others. Approximately 43% of the final sample of participants was undergraduate university students.

Materials

Participants voluntarily completed an anonymous self report survey questionnaire comprising 70 items. Items 1-20 assessed the participants' experience of loneliness using the Revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). This 20-item scale is designed to detect variations in loneliness that occur in everyday life. Each item is rated using a 4-point scale ranging from 1 (*Never*) to 4 (*Often*) and includes questions such as "I feel in tune with the people around me", "I lack companionship", and "I feel part of a group of friends". A total score is calculated by summing the scores of the 20 items. Psychometric data for this scale indicated high internal consistency with α = .92 (Russell, Peplau, & Cutrona, 1980). Calculation of Cronbach's alpha for the current study indicated that internal consistency (α = .92) was maintained.

Items 21-56 of the survey questionnaire assessed the participant's level of self-control using the Self Control Scale (Tangney, Baumeister, & Boone, 2004). This 36-item scale was developed to assess participants' level of self-control and assesses a broad range of domains including achievement and task performance, impulse control, adjustment, interpersonal relationships, and moral emotions such as shame and guilt. Items in the Self-Control Scale are rated on a 5-point scale ranging from 1 (*Not at all like*) to 5 (*Very much like me*) and includes statements such as "I am good at resisting temptation", "I have a hard time breaking bad habits", and "I do many things on the spur of the moment". A total score is calculated by summing responses to each item. Psychometric data for this scale indicated high internal consistency of α = .89 (Tangney, Baumeister, & Boone, 2004). Calculation of Cronbach's alpha for the current study indicated that internal consistency was maintained (α = .89).

Items 57-70 sought data on the participant's gambling behaviour demographic information and gambling preferences. Embedded in this section of the questionnaire were nine standard items of the Problem Gambling Severity Index (PGSI) from section 2 of the Canadian Problem Gambling Index (CPGI, Ferris & Wynne, 2001). These nine items were used to assess the prevalence rates for gambling for the current study. A total score of 0 indicates non-problem gambling. A total score of 1-2 suggests low risk of problem gambling. A total score of 3-7 suggests moderate risk of problem gambling, and a total score of 8 or more suggests problem gambling. Prevalence rates for gambling are given in Table 2. Calculation of Cronbach's alpha for the current study was α = .94.

Table 2. Prevalence rates for gambling

	Males (n = 48) n (%)	Females (n = 86) n (%)	Total (n = 134) n (%)
No risk of problem gambling	7 (14.6)	41 (47.8)	48 (35.8)
Low risk of problem gambling	5 (10.4)	15 (17.4)	20 (14.9)
Moderate risk of problem gambling	14 (29.2)	15 (17.4)	29 (21.6)
Problem gambling	22 (45.8)	15 (17.4)	37 (27.6)

One item in the questionnaire, "Have you ever gambled because you felt alone or lonely?" directly asked whether the respondent had gambled due to loneliness. Thirty-six (26.9%) of the respondents answered "Yes" to this question. Also included in the questionnaire was a question that asked respondents to indicate their preferred form of gambling. Aggregated responses are provided in Table 3. The last three questions on the survey questionnaire related to participant demographics (age, sex, and living arrangements).

Table 3. Frequency of preferred forms of gambling

	Males (n = 48) n (%)	Females (n = 86) n (%)	Total (n = 134) n (%)
Pokies	12 (25.0)	55 (64.0)	67 (50.0)
Horse racing	30 (62.5)	15 (17.4)	45 (33.6)
Sports betting	2 (4.2)	2 (2.3)	4 (3.0)
Casino Games	3 (6.3)	5 (5.8)	8 (6.0)
Bingo	1 (2.0)	9 (10.5)	10 (7.5)

Procedure

All participants who agreed to complete the survey questionnaire were able to access the questionnaire either online or in paper-and-pencil format. Students at the University of Ballarat were able to participate in group sessions to complete the questionnaire in paper-and-pencil format. A plain language information statement included with the survey questionnaire provided details of the research and explained that informed consent was assumed when the participant returned the completed survey. The informed consent format was adopted to assure consistency between the paper-and-pencil and online administration of the questionnaire.

Design – Mediation Model

Mediation analysis, as described by Baron and Kenny (1986) was used to evaluate whether self-control mediates the loneliness-gambling relationship. Baron and Kenny (1986) suggest that a given variable may function as a mediator to the extent to which it accounts for the relationship between a predictor variable and an outcome variable. Their model assumes a three-variable system in which there are two causal paths that feed into the outcome variable: a direct path from independent to dependent variable and an indirect path through the mediator variable. According to Baron and Kenny (1986) a variable functions as a mediator when it meets three conditions. First, variations in levels of the independent variable significantly account for variations in the mediator (path a). Second, variations in the mediator significantly account for variations in the dependent variable (path b), and third when path a and path b are controlled, a previously significant relationship between the independent and dependent variables (path c) is no longer significant. Baron and Kenny (1986) also suggest that the strongest demonstration of mediation occurs when path c is zero. A mediation model for the current study based on Baron and Kenny's (1986) model is depicted in Figure 1.

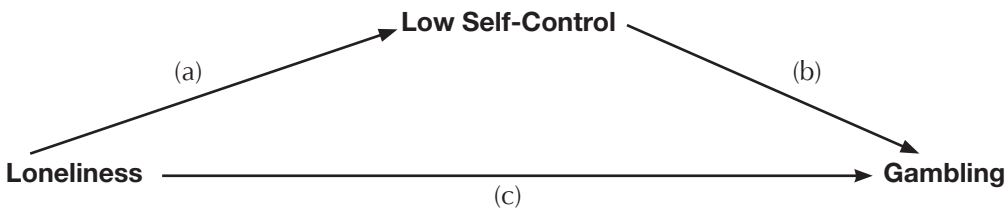

Figure 1. According to the Baron and Kenny (1996) model of mediation, the experience of loneliness should predict lowered self-control as depicted by path (a). Low self-control should predict increased gambling as depicted by path (b). Loneliness should predict increased gambling as depicted by path (c). If loneliness is no longer significant after path (a) and path (b) are controlled, then self-control fulfils the criteria for a mediator.

Results

Main Findings

Predictive Analytics Software (PASW) by SPSS, Version 18.0 was used to analyse the data. Regression analysis was performed to test whether self-control mediates the loneliness-gambling relationship. Preliminary analyses were performed to ensure that there were no violations of the assumptions for normality, linearity, and homogeneity of error variance. Total gambling scores showed some skewness however scores were not transformed to assist with interpretation of results. As such, total gambling scores should be interpreted with caution. Bivariate correlations of relationships among each of the variables (i.e. Loneliness, Self-Control, and Gambling) using Pearson's Product Moment Correlation showed linear relationships among all variables. The bivariate correlations from this analysis are provided in Table 4.

Table 4. Bivariate correlations among Loneliness, Self-Control, and Gambling

Scale (Total Scores)	Pearson Correlation (*r*)	*p* (2-tailed)	*N*
Gambling and Self-Control	– .31	<.001	134
Gambling and Loneliness	.55	<.001	134
Self-Control and Loneliness	– .35	<.001	134

As can be seen from Table 4 there is a statistically significant negative relationship between gambling and self-control and between self-control and loneliness. There is also a statistically significant positive relationship between gambling and loneliness. These findings are consistent with the proposed mediation model. According to Cohen's (1992) conventions, there are medium effect sizes for both the self-control-gambling relationship and for the self-control-loneliness relationship. The effect size for the loneliness-gambling relationship, according to Cohen's convention is large.

Relatively high tolerances for each predictor in the regression model indicated that multicollinearity would not be an issue in interpreting results. Inspection of the normal P-P plot and scatterplot of regression standardized residuals indicated that the assumptions of homoscadasticity

and independence of residuals were also supported for the sample. Mahalanobis distances did not exceed the critical level, indicating that multivariate outliers in the sample data were not problematic. There was no missing data in the sample.

In developing the regression model, self-control was regressed on loneliness (Model 1); gambling was regressed on loneliness (Model 2); and gambling was regressed on both loneliness and self-control (Model 3). The results of the regression analyses indicated that loneliness explained 12% of the variance in self-control and that this variance was significant $F(1,132) = 18.21$, $p < .0005$. Results also indicated that loneliness explained 29.5% of the variance in gambling for the sample and that this variance was significant $F(1,132) = 56.8$, $p < .0005$. Loneliness and self-control accounted for 31% of the variance in gambling which was significant $F(2,131) = 30.26$, $p < .0005$. In the final model, loneliness was the only factor that was statistically significant, ß = .50, $p < .0005$. Coefficients for the regression analyses are provided in Table 5.

Table 5. Hierarchical Regression analysis for direct and indirect effects of Loneliness on Gambling Behaviour via Self- Control

	ß	SE ß	ß	*p*
Model 1: Regression of self-control on loneliness				
Constant	74.05	2.62		< .001
Loneliness	– .26	.06	– .35	< .001
Model 2: Regression of gambling on loneliness				
Constant	– 7.06	1.60		< .001
Loneliness	.28	.04	.55	< .001
Model 3: Regression of gambling on self-control and loneliness				
Constant	– .36	4.24		.93
Self-control	– .09	.05	–.13	.90
Loneliness	.26	.04	–.50	< .001

$N = 134$

Gender Differences

An independent groups t-test was also performed to investigate whether there were any significant differences between males and females in regard to gambling, self-control and loneliness scores. Results indicated that there were significant differences in scores for gambling between males ($M = 6.88$, $SD = 5.90$) and females ($M = 3.35$, $SD = 5.27$; $t(132) = 3.56$, $p = .001$, 2-tailed) suggesting that males gamble more often than females. The magnitude of this difference (mean difference = 3.53, 95% *CI*: 1.57 to 5.49) was $d = 5.5$ which according to Cohen's conventions is relatively large. Results of the t-test also indicated significant differences in scores for loneliness for males ($M = 44.56$, $SD = 9.88$) and females ($M = 39.87$, $SD = 11.60$; $t(132) = 2.36$, $p = .02$, 2-tailed) suggesting that Australian males are generally lonelier than Australian females although the magnitude of this difference (mean difference = 4.69, 95% *CI*: .765 to 8.616) was small ($d = 0.43$) according to Cohen's conventions. Results of analyses also indicated that there was no significant differences in self-control scores for males ($M = 63.13$, $SD = 6.62$) and females ($M = 63.35$, $SD = 9.21$; $t(123.62) = -.16$, $p = .87$, 2-tailed). The magnitude of the difference (mean difference = -.22, 95% *CI*: -2.95 to 2.50) according to Cohen's conventions was very small with

d = -0.03. This statistically non-significant result suggests that there are no gender differences in self-control for Australian adults.

Separate hierarchical regression analyses for men and women were not undertaken based on the small sample sizes, particularly for men. Also, gender differences relating to the relationship between loneliness, self-control and gambling was not the focus of this particular study. Future research that focuses on gender differences particularly with regard to the loneliness-gambling relationship across the gambling continuum may be useful in developing a more comprehensive understanding of gambling behaviours across different cohorts of Australian gamblers.

Discussion

The aim of this study was to investigate whether loneliness and self-control predicted gambling behaviour. A secondary aim of the study was to explore a mediation model of gambling which posits that loneliness is a risk factor for gambling behaviour and that self-control mediates the loneliness-gambling relationship. Analyses of the data showed mixed results with regard to the four postulated hypotheses. The first three hypotheses were supported by findings. Gambling and loneliness were positively related with a large effect size. Gambling and self-control were negatively related with a medium effect size as were loneliness and self-control. Each of these results support previous research that suggests that both loneliness and self-control are implicated in problem gambling behaviour.

Qualitative Australian research has suggested that loneliness is a particular risk factor for gambling for individuals from non-English speaking background communities (Scull & Woolcock, 2005), and women (Holdsworth, Nuske, & Breen, 2011). Scull and Woolcock (2005) reported that migrants from non-English speaking backgrounds often experience loneliness from an inability to "engage in the community" (p. 35) and socialize in Australian society. These researchers found that participants in their study often began gambling because they realised that gambling required few language skills and offered a comfortable environment among other people. Australian research also suggests that for lonely women, EGMs (pokies) are the preferred form of gambling as the venues enable women to feel safe, escape from their problems, and have social contact with others (Holdsworth, Nuske, & Breen, 2011). Similar findings have been reported in overseas studies. Clarke et al. (2006) found that loneliness was a risk factor to commence gambling for many participants in their study who were from ethnic minority groups in New Zealand. The majority of studies that have investigated loneliness and gambling however, have focussed on problem gamblers (see Holdsworth, Nuske & Breen, 2011; Porter, Ungar, Frisch, & Chopra, 2004; Thomas & Moore, 2003; Trevorrow & Moore, 1998). The results of the current study help extend our knowledge in suggesting that loneliness is a risk factor for problem gambling across the broader community.

There are relatively few studies that have investigated the links between self-control and gambling. Research that is available has focussed predominantly on problem gamblers. The results of the current study both support and extend previous research in demonstrating that there is a direct relationship between self-control and problem gambling behaviour. Australian research that investigated self-control in female EGM gamers has suggested that control over gambling is not related to age, employment, relationship status, education, or distress but to the duration and frequency of EGM play (Scannell, Quirk, Smith, Maddern, & Dickerson, 2000). In a longitudinal

study of 2,790 online gamers, Seary and Kraut (2007) found participants' motivations to gamble were overshadowed by self-regulation in managing both the timing and amount of play. These researchers also found that the individual's level of self-regulatory activity was shown to be important in avoiding negative outcomes such as problematic play and that failure to manage play behaviour was implicated in feelings of dependency on gambling.

Given this research, an unexpected finding in the current study was that the hypothesised mediation model was not supported. This finding suggests that while the three variables are interrelated, self-control does not mediate the loneliness-gambling relationship. Contrary to expectations, when self-control was entered into the mediation model with loneliness, the effect of loneliness was not significantly reduced. This result suggests that rather than mediating the relationship between loneliness and gambling, the effect of self-control had been subsumed within loneliness as a predictor. Moreover, while self-control improved the predictive power of the model compared to loneliness alone, this change was relatively small. It was concluded that loneliness is a primary factor which contributes significantly to the prediction of problem gambling behaviour. Self-control is a related factor and predictor but derives its smaller effect through its relationship with loneliness. The findings suggest that in terms of prevention and interventions in problem gambling, we need to address people's connection needs first. It also suggests that for many Australians, pokies and gambling establishments serve a social function. This social function may be able to be simulated in other non-gambling contexts.

This exploratory research supports past findings that loneliness is a powerful contributor to problem gambling behaviour. Further, it suggests that other mechanisms not considered here may mediate and explain why lonely people are more likely to gamble. Qualitative explorations may also be beneficial. Future research that investigates the interplays between loneliness, depression, impulsivity and gambling may be valuable given that Haw (2009) found that impulsivity partially mediated the depression-problem gambling relationship and loneliness has been compared to affective states such as depression and anxiety (Russell, Cutrona, Rose & Yurko, 1984).

Although this study has several significant statistical and theoretical findings, there were some limitations. First, the study used a cross-sectional convenience sampling design and a self-administered survey which may have resulted in methodological problems such as sampling and selective bias. Second, Baron and Kenny's (1986) mediation model infers but does not test causation and it is possible that the variables may be influencing each other simultaneously or reciprocally, or that the temporal order of variables may be reversed (Gelfand, Mensinger, & Tenhave, 2009). Although gender differences were analysed in this study, they were not the focus of discussion and due to sample size and having significantly more women than men, separate models were not investigated. Similarly, factors such as age were not controlled for in this study.

Conclusion

Despite these limitations, this study is the first to explore both direct and indirect relationships among loneliness, self-regulation, and problem gambling. Given that the Victorian government is proposing to implement partial self-regulation policy as a harm minimization strategy for gamblers, this study raises the question of whether self-regulation on its own will make a significant impact in reducing problem gambling. Although self-control was directly related to gambling, loneliness was the primary and most important predictor of problem gambling behaviour. While this research

supports previous studies that have suggested that the inability to self-control is implicated in problem gambling, the current study also suggests that self-control is less salient than loneliness in predicting problem gambling behaviour in Australian adults. It is suggested that future research and policy needs to consider people's social connection needs in relation to problem gambling behaviour.

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