

Poker Mania and Problem Gambling: A Study of Distorted Cognitions, Motivation and Alexithymia

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Published online: 1 August 2009
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Abstract This study examines the relationships between distorted cognitions, motivation, and alexithymia on problem gambling in poker players ($n = 96$). Respondents completed questionnaires containing the Canadian Problem Gambling Index, Gambling Motivation Scale, Gambler's Beliefs Questionnaire, and Toronto Alexithymia Scale-20. The results suggest that problem gambling is significantly related to distorted cognitions, non-self-determined motivation, and difficulty identifying feelings. Implications are drawn for the development of more relevant intervention, prevention, and treatment strategies.

Keywords Poker playing · Gambling · Alexithymia · Distorted cognitions · Motivation

Introduction

Poker tournaments are now a very popular form of gambling that is more socially acceptable than many other traditional gambling activities. It is so socially acceptable that there is some controversy as to whether or not poker tournaments are classed as gambling in the traditional sense. Gambling is defined as the wagering of money or valuable items on the outcome of an uncertain event that is determined by a degree of chance (Blaszczynski et al. 1997) and is frequently viewed as a “disorder” or as “social problem” (Blaszczynski and Nower 2002; McMillen and Wenzel 2006). Many theories attempt to explain gambling, including cognitive distortions (Joukhador et al. 2003; May et al. 2005), and motivation (Chantal and Vallerand 1996; Chantal et al. 1995). There is also some evidence that alexithymia is associated with problem gambling, based on an addiction model (Lumley and Roby 1995; Parker et al. 2005). These theories form the basis for the current study.

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Cognitions and Gambling

Cognitive theory accentuates the importance of thoughts proceeding and determining behavior (Walker 1992). Cognitive distortions are thought to contribute to problem gambling (e.g. Ladouceur and Walker 1996; Toneatto 1999), the main belief emphasizing irrational thinking which embodies the gambler's fallacy and illusion of control. The theoretical perspective of cognitive theory assumes two propositions. First, that gambling is about monetary gains and losses, but without other contributing factors (e.g. gambling in order to make more money or repay past debts). Second, that people are not rational and thus have irrational reasons or "distorted cognitions" around gambling (e.g. "I can beat the odds") (Walker 1992). The gambler's fallacy is the tendency to see links between past and future events, however the two exist independently (Keren and Lewis 1994; Wagenaar 1988). In fact, most people generally have inaccurate perceptions of randomness that results in explanations for events such as winning, which are more appropriately attributed to chance (King 1990; Wagenaar 1988; Wood 1992).

In games where skill plays a role (sports betting, stocks, poker, etc.); it is not difficult to recognise how some gamblers could overestimate their abilities to win (Toneatto et al. 1997; Walker 1992). However, irrational thoughts occupy 80% of thoughts in non-skill gaming (Walker 1992), where overestimations of skill and irrational beliefs are commonly formed around the chances of winning (e.g. poker, blackjack, horses, etc.). As irrational thoughts are often reinforced through frequent small wins (Delfabbro 2004; Wood 1992), a player develops a cause and effect relationship confirming the idea that previous performance will determine future gains.

Illusion of control refers to the belief that one can influence the outcome of a chance-determined event. Langer (1975) concludes that the illusion of control occurs because people inaccurately redefine random outcomes as related to ability, and this belief is more likely to occur in pathological gamblers (Joukhador et al. 2003; Wagenaar and Keren 1988). Gamblers also frequently have an inconsistent understanding of luck and chance (Wohl and Enzle 2002; Wohl et al. 2007). Chance is considered external and uncontrollable, while luck is deemed an intrinsic personal trait and potentially more controllable (Wagenaar and Keren 1988) and seems to be related to psychopathology (Wohl et al. 2007). It is this concept of luck which may be a significant factor in perpetuating problem gambling. Skill games such as poker or blackjack provide repeated small wins, following an intermittent positive reinforcement schedule (Wagenaar and Keren 1988). Hence, gamblers are encouraged to interpret monetary gains as being due to personal skill. Considering that poker involves an element of skill, it seems more conceivable that factors such as irrational beliefs and illusions of control have a stronger impact as maintenance factors for this type of gambling.

Motivation and Gambling

Building on self-determination theory (Deci 1971; Ryan and Deci 2000), recent studies suggest that gambling motivation develops from two essential psychological needs: autonomy and competence. Autonomy represents a self-directed and flexible capacity to make decisions on one's behavior to bring about certain outcomes, while competence refers to a sense of being effective in one's interactions with the environment (Deci 1980; Deci and Ryan 1985). Five types of motivation have been identified by self-determination theory: *intrinsic motivation*, *identified regulation*, *introjected regulation*, *external regulation*, and *amotivation*.

Intrinsic motivation and *identified regulation* are distinguished by an internal locus of control, such as doing a task for its inherent satisfaction and are referred to as self-determined motivation (Ryan and Deci 2000). Conversely, non-self-determined motivation involves an external locus of control, where an activity is accomplished to achieve a particular result which is referred to as *external regulation* and *introjected regulation*. For example, money may be a frequent motivator of behavior (Deci and Ryan 1985; Ryan and Deci 2000). The final type of non-self determined motivation is referred to as *amotivation* which involves activities that are neither intrinsically nor extrinsically motivating, and occurs when a person does not identify contingencies between gambling outcomes and personal behavior (Chantal and Vallerand 1996; Chantal et al. 1995; Ryan and Deci 2000).

Deci and Ryan (1985) propose that as the degree of self-determined motivation increases, feelings of autonomy also increase, which are linked to improved psychological functioning (Brown and Smart 1991; Chantal and Vallerand 1996; Chantal et al. 1995; Ryan 1995). Non-self-determined motivation should be related to increased negative outcomes. However, Chantal et al.'s (1995) research finds that those exhibiting high self-determined motivation reported high levels of gambling involvement. They were also more likely to continue gambling than gamblers with low self-determined motivation who gambled for external reasons, suggesting that both types of motivation are predictors of involvement in gambling. It seems that skill gambling (such as poker, betting on horses, blackjack), is more strongly associated with self-determined motivation while non-skill gambling (such as pokies, bingo, and lotto) is more strongly associated with non-self-determined motivation (Chantal and Vallerand 1996). Thus, it is predicted that poker will be more associated with self-determined motivation.

Harackiewicz et al. (1984) investigated intrinsic motivation in a population of avid pinball players by evaluating the students' game competence. When higher competency is rewarded, intrinsic motivation increases. This effect may be explained by self-determination theory, which suggests that incentives that create feelings of competence will increase intrinsic motivation only if a sense of autonomy or internal locus of control is felt (Ryan and Deci 2000). This theory supports the reasons as to why skill gambling may maintain intrinsic motivation. Intrinsic motivation, in turn, may buffer gamblers from negative psychological functioning, or alternatively may reinforce the extent of their irrational beliefs and illusions of control over a game that continues to incorporate an element of chance.

Alexithymia and Gambling

Alexithymia has generated interest as a possible personality risk factor for a number of psychiatric and psychosomatic disorders (Bagby et al. 1994). It has also been linked to addictive disorders, including gambling (Lumley and Roby 1995; Parker et al. 2005). Alexithymic individuals are described to have difficulty identifying and describing feelings as well as difficulty distinguishing feelings from bodily sensations of emotional arousal (Bagby et al. 1994). It is thought that alexithymic individuals attempt to regulate their emotions through compulsive behaviors (Taylor et al. 1991). The inability to modulate emotions through cognitive processing may explain why alexithymic individuals need to discharge their emotional states through compulsive and impulsive acts (Taylor et al. 1991). It is plausible to assume that in a population of problem gamblers, with cognitive distortions, increased levels of alexithymia draw them to compulsively attempt to regulate negative emotions through gambling.

Recent research has found increased levels of alexithymia linked with substance use (Haviland et al. 1994; Taylor et al. 1991) and eating disorders (Corcos et al. 2000; Taylor et al. 1996). Gambling is considered an addiction (Briggs et al. 1996) and has been significantly correlated with alcoholism, drug abuse, and eating disorders in a large college population (Ladouceur et al. 1994). Only a few studies have directly examined the relationship between alexithymia and pathological gambling (Lumley and Roby 1995; Parker et al. 2005), finding a positive correlation between alexithymia and severity of problem gambling (Bagby et al. 1994; Lesieur and Blume 1987). Lumley and Roby's (1995) study shows that as many as 31.4% of pathological gamblers display both affective and cognitive alexithymic characteristics in comparison to 11.1% of controls. Further, this relationship is shown to be independent of depression and physical illness, and occurs in both sexes. Parker et al. (2005) also find that the 12% of the participants who are classified as alexithymic, also have significantly more gambling problems than non-alexithymic individuals. These studies suggest that there is a relationship between gambling problems and alexithymia.

Hypotheses

1. Cognitive distortions surrounding luck/perseverance and illusion of control have been shown to be associated with problem gambling (Steenbergh et al. 2002; Steenbergh et al. 2004). We predict that problem gambling will be associated with higher scores on luck/perseverance and illusion of control.
2. Given that intrinsic motivation has been found to be linked to skill gambling, and that financial incentives when linked with competence enhance intrinsic motivation, hence self-determined motivation, we predict (a) that self-determined motivation will be related to both problem and non-problem gamblers, but that this link will be stronger for problem gamblers. Furthermore, as research suggests (b) non-self-determined motivation will also be related with gambling, however due to the aforementioned relationship between skill gambling and self-determined motivation, it will not be as strongly related to poker.
3. It is commonly found that those with alexithymia attempt to regulate emotions through compulsive actions. Thus, we predict (a) that problem gambling will be positively related to alexithymia.

Method

Participants

Participants were randomly selected from a population of social poker players at venues of a national poker league as well as a poker room in Sydney, Australia. Australia has two main poker leagues while Sydney has only one poker room outside of the casino that is clearly established. The poker leagues are restricted to three states, only one of which is permitted cash games (New South Wales). Of the venues in New South Wales, a large proportion of them are within greater Sydney area. Therefore, was considered, that the sample being drawn would be relatively representative of non-casino poker players in Australia. The original sample included 106 participants, however due to incomplete surveys, 10 (9.5%) of the respondents were excluded from the analyses. The final sample

($n = 96$) consisted of 75 (78.1%) males and 18 (18.8%) females, with 3 (3.1%) not specifying gender. The mean age was 27.3 (SD = 8.25 and range 18–66 years). While this sample is not large, it is large enough for drawing the statistical conclusions that have been made in the paper.

Seventy-one percent of the sample identified themselves as Caucasian, 9% as Asian, 1% as Aboriginal or Torres Strait Islander, and 19% as other or not specified. The sample consisted of 6 (6.3%) students, 71 (74%) of employed and 8 (8.3%) unemployed participants and 11 (11.5%) unspecified.

Measures

The study was conducted using a questionnaire with the following measures:

Demographics

Respondents were asked to indicate their gender, age, job type that best described them, and their primary ethnic group identification.

Gambling Behavior

Participants indicated the amount of times they had bet or spent money on a list of 20 gambling activities, in the past 12 months. Responses were made on a scale of 0 (never) to 4 (daily). Furthermore, they were asked to estimate the amount of money spent on each activity in a typical month.

Problem Gambling Screen

The Canadian Problem Gambling Index (CPGI) is a 31-item measure of which 9 items are scored to obtain problem gambling prevalence rates (Ferris and Wynne 2001). Items include questions such as “Have you ever bet more than you could really afford?” and “Have you lied to family members or others to hide your gambling?” The scale uses a 4-point rating scale for all items from 0 (never) to 3 (almost always). Items are summed and cut-off scores are applied by which a score of 8 or more identifies problem gamblers. With the current sample, 25% were identified as problem gamblers. The scale has an internal consistency of .84 and test-retest reliability of .78 (Ferris and Wynne 2001). The internal consistency for the current sample was high ($\alpha = .92$).

Gambler's Beliefs

The Gambler's Beliefs Questionnaire (GBQ; Steenbergh et al. 2002) is a 21-item scale which measures two closely related central beliefs, which are associated with problem gambling. There are two subscales: *luck/perseverance* (e.g. “If I am gambling and losing, I should continue because I don't want to miss a win”) and *illusion of control* (e.g. “My knowledge and skill in gambling contribute to the likelihood that I will make money”). The questionnaire consists of a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Problem and pathological gamblers score higher on the two subscales than non-problem gamblers.

Gambling Motivation

The Gambling Motivation Scale (GMS) was created to assess intrinsic and extrinsic forms of motivation toward gambling (Chantal et al. 1994), which consists of a 28-item scale with each subscale containing 4 items. There are seven sub-scales: *Intrinsic Motivation toward knowledge*, *Intrinsic Motivation toward stimulation*, and *Intrinsic Motivation toward accomplishment and identified regulation* were combined to obtain a measure of self-determined motivation. *External regulation*, and *introjected regulation* were combined to obtain a measure of non-self-determined motivation. *Amotivation*, where the gambler does not form nor recognise contingencies was the final sub-scale. All statements are rated on a 7-point Likert scale ranging from 1 (does not correspond at all) to 7 (corresponds exactly). The internal consistency of the subscales were .84 for intrinsic motivation to know, .78 for intrinsic motivation toward accomplishment, .80 for intrinsic motivation toward stimulation, .77 for identified regulation, .77 for introjected regulation, .89 for external regulation, and .80 for amotivation (Chantal and Vallerand 1996; Chantal et al. 1994). Internal consistency scores for the current sample were .84 for intrinsic motivation to know, .78 for intrinsic motivation toward accomplishment, .79 for intrinsic motivation toward stimulation, .75 for identified regulation, .84 for introjected regulation, .81 for external regulation and .84 for amotivation. Further, the Cronbach alphas for self-determined motivation and non-self-determined motivation were .88 and .74, respectively.

Alexithymia

The Toronto Alexithymia Scale (TAS-20; Bagby et al. 1994) is a widely used self-report measure of alexithymia. It uses a 5-point Likert rating scale from 1 (Strongly disagree) to 5 (Strongly agree). It assesses three factors: *difficulty identifying feelings*, *difficulty describing feelings* and *externally oriented thinking*. These factors were used to determine overall levels of alexithymia. The TAS-20 displays an internal consistency of .81, as well as internal consistencies of .78, .75, and .66 for difficulty identifying feelings, difficulty describing feelings and externally oriented thinking, respectively (Bagby et al. 1994). It also showed test-retest reliability of $r = .77$ ($p < .01$). The current sample had an overall alpha of .88 and alphas of .83, .66 and .79 for the three subscales of difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking, respectively.

Procedure

Respondents were approached while registering at poker tournaments and games in Sydney, Australia. The data was collected at various establishments 3–5 nights per week for a period of a month in May–June 2007. The poker games ranged from being free, to costing \$10, \$20, \$30, and \$100 to enter. All respondents received information/consent sheets describing the study, a copy of the questionnaire and a pencil. Participants were informed of anonymity and the voluntary basis for the completion of the survey. Participants were allowed to respond in three different ways: paper-and-pencil at the venue, a mail-back envelope, or the option of completing the questionnaire online. 85 (80.2%) of participants responded paper-and-pencil at the venue, 4 (3.8%) responded via mail-back envelope and 17 (16%) responded online. Overall response rates were difficult to assess as flyers that included the website details were taken by all respondents. However, of all the players approached to participate, 24 did not want choose to fill out a questionnaire, giving an estimated response rate of 80%. Respondents were also given the opportunity to enter a

draw to win one of four movie tickets. Only 12 (11.3%) of participants entered the draw. All personal details for the draws were collected separately to the responses.

Results

Internal Consistency and Normality Checks

Table 1 shows the means and standard deviations for the self-report scales comparing problem and non-problem gamblers, together with the univariate F results. The univariate analyses indicate that there is a significant difference between problem and non-problem gamblers on self-determined motivation ($F = 4.54, p < .05$), non-self-determined motivation ($F = 19.69, p < .001$), the GBQ scale of luck/perseverance ($F = 13.56, p < .001$), and the difficulty identifying feelings scale of the TAS-20 ($F = 8.1, p < .05$). The *introjected regulation* subscale of the GMS and the TAS-20 are positively skewed. Consequently, both parametric and non-parametric statistics are used for the analysis. However, only parametric test results are quoted, unless non-parametric results indicate a change in significance.

Hypothesis 1: Cognitive Distortions and Problem Gambling

We predict in hypothesis 1 that problem gambling will be associated with higher scores on luck/perseverance and illusion of control. Pearson’s product moment correlations indicate significant correlations between luck/perseverance and illusion of control (from GBQ) with the total scores on CPGI (see Table 2). Luck/perseverance is moderately correlated with problem gambling scores ($r = .49, p < .0005$) and illusion of control is weakly correlated with problem gambling scores ($r = .22, p = .04$). Hence, as the distorted cognitions increase, so do problem gambling scores.

Table 1 Univariate analyse of problem versus non-problem gamblers on experimental variables

	Problem gambler (<i>n</i> = 24)		Non-problem gambler (<i>n</i> = 72)		Range of scores	Univariate <i>F</i>	Sig.
	M	SD	M	SD			
<i>Motivation</i>							
Self-determined motivation	3.16	1.49	2.54	1.12	1–6.13	4.54	.04*
Non-self-determined motivation	3.08	1.26	2.00	.94	1–5.92	19.69	.00**
<i>Beliefs</i>							
Luck/perseverance	48.75	23.11	32.96	16.28	15–90	13.56	.00**
Illusion of control	31.28	12.35	29.30	11.30	8–51	.53	.47
<i>Alexithymia</i>							
Total	52.54	13.52	47.15	13.36	20–77	2.91	.09
Difficulty identifying feelings	16.54	6.01	12.94	4.89	7–35	8.10	.01*
Difficulty describing feelings	12.29	4.11	11.82	3.88	5–20	.26	.61
Externally oriented thinking	23.71	5.94	22.48	6.96	8–39	.60	.44

* $p < .05$, ** $p < .0005$

Table 2 Correlation matrix for self-report measures, $N = 96$

	Problem gambling	SDMOT	NSDMOT	LP	IOC	ALEX	DIF	DDF	EOT
Motivation									
SDMOT	.34**	1.00	–	–	–	–	–	–	–
NSDMOT	.61**	.71**	1.00	–	–	–	–	–	–
Beliefs									
LP	.49**	.64**	.66**	1.00	–	–	–	–	–
IOC	.22*	.60**	.46**	.68**	1.00	–	–	–	–
Alexithymia									
ALEX	.26**	.37**	.39**	.40**	.46**	1.00	–	–	–
DIF	.39*	.29**	.44**	.47**	.37**	.81	1.00	–	–
DDF	.22 ^a *	.31**	.33**	.34**	.39**	.88**	.69**	1.00	–
EOT	.10	.33**	.23*	.19 ^a	.39**	.84**	.40**	.63**	1.00

* $p < .05$, ** $p < .01$

^a r_s

In addition to the testing of the hypothesis, further analysis was used to determine if various types of gambling are affecting the significant results obtained earlier. First, regularity of gambling across the 20 types of listed gambling activities was separated into skill and non-skill gambling and then each group's score was summed based on the number of times participants bet or spent money on the activity. Poker playing frequency was also created as an individual variable for both casino and non-casino playing. Partial correlations were carried out, controlling for non-skill gambling (as poker is considered to be skill gambling).

The correlations indicate that poker playing has a weak positive relationship with luck/perseverance for both non-casino playing ($r = .25$, $p = .01$) and casino playing ($r = .20$, $p = .05$). However, poker playing is not significantly related to illusion of control for both non-casino and casino poker playing. When controlling for non-skill gambling, no significant relationships with either GBQ subscale was established. Nevertheless, CPGI scores remain significant with both illusion of control and luck/perseverance, even though the correlations are slightly reduced. Hence, non-skill gambling does not account for the relationship between distorted cognitions and CPGI in poker players.

Hypothesis 2: Motivation and Problem Gambling

We predict in hypothesis 2 that (a) self-determined motivation will be related to both problem and non-problem gamblers, but that this link will be stronger for problem gamblers. Correlations were calculated between self-determined motivation, non-self-determined motivation and the total score on the CPGI. These results indicate a significant positive relationship between both types of motivation and the CPGI. Self-determined motivation has a moderate positive correlation ($r = .34$, $p < .005$) and non-self-determined motivation has a strong positive correlation ($r = .61$, $p < .0005$). Thus, as motivation to gamble increases, so too does severity of problem gambling. Given that self-determined motivation and non-self-determined motivation are strongly correlated with one another ($r = .71$, $p < .0005$), they have roughly 50% of variance in common.

The CORCOR program (based on formulae given; Steiger 1980) was used in order to assess whether there is a significant difference in correlation size between self-determined motivation and non-self-determined motivation with the CPGI. The results indicated that there is a significant difference between self-determined motivation and non-self-determined motivation with the CPGI ($t(93) = 4.37, p < .0005$), confirming that non-self-determined motivation is significantly more related to CPGI than self-determined motivation.

Further analyses were conducted to examine if non-skill gambling and the location of the poker influenced the results. The results indicated that there is a significant weak positive relationship between self-determined motivation and non-casino poker playing ($r = .23, p = .02$), but not with poker at casinos. Non-self-determined motivation was not significantly related to either casino or non-casino poker playing. When controlling for non-skill gambling, neither non-casino nor casino poker were related to self-determined motivation or non-self-determined motivation. Further, CPGI's relationship with self-determined motivation and non-self-determined motivation was reduced but remained significant ($r = .26, p = .01$ and $r = .50, p < .0005$, respectively). This suggests that non-skill gambling does not account for the relationship between motivation and severity of problem gambling.

Hypothesis 3: Alexithymia and Problem Gambling

We predict in hypothesis 3 that problem gambling will be positively related to alexithymia. Bivariate correlations suggest a weak positive relationship between TAS-20 and CPGI ($r = .26, p = .01$), a moderate positive relationship between difficulty identifying feelings and CPGI ($r = .39, p < .0005$), a weak positive relationship between difficulty describing feelings and CPGI ($r_s = .22, p = .03$) and no significant relationship between externally oriented thinking and CPGI (see Table 2). Hence, it appears that increases in alexithymic characteristics are related to an increase in severity of problem gambling, except for externally oriented thinking which had no relationship with CPGI.

Independent samples *t* test indicated that there was no significant difference between those who score high on alexithymia and non-alexithymic participants on scores on the CPGI ($t(94) = -1.19, p = .24$). Thus, alexithymia does not have a significant association with severity of problem gambling.

Post Hoc Analyses

Due to a large proportion of measures being significantly correlated, post hoc analyses were performed to address this potential problem. A liner regression was used to determine which variables were most relevant when all significant relationships were considered.

A linear regression was run with the subscales of the GBQ (illusion of control and luck/perseverance), self-determined motivation, non-self-determined motivation and difficulty identifying feelings (from the TAS-20), as well as skill- and non-skill gambling. The difficulty identifying feelings subscale was used rather than alexithymia score because it had the highest correlation of all the alexithymia subscales and was the only one that separated problem from non-problem gamblers. The full model accounted for 56.3% of variance in problem gambling score. However, simple forward regression reduced the model to non-self-determined motivation and non-skill gambling and accounted for 52.8% of variance in problem gambling. Hence, non-self-determined motivation and involvement in non-skill gambling accounted for 52.8% of variance in problem gambling score in poker

players. It is important to note that when non-skill gambling is removed from the model, the model predictability reduced by 15.6% indicating that involvement in non-skill gambling is a significant factor to the development of problem gambling.

Discussion

The primary aim of the present study is to explore motivation, beliefs, behaviors, and feelings that might contribute to problem gambling in a population of social poker players. The predictive factors considered were distorted cognitions (luck/perseverance and illusion of control), motivation (self-determined motivation and non-self-determined motivation), and alexithymia (Total alexithymia, difficulty identifying feelings, difficulty describing feelings and externally oriented thinking). The first hypothesis was completely supported; beliefs related to luck/perseverance and illusion of control was positively related to gambling and significantly separated problem from non-problem gamblers. The second hypothesis was only partially supported, with internal and external motivation related to involvement in gambling, but only self-determination significantly separating problem from non-problem gamblers. Finally, the third hypothesis was only partially supported. While there was a relationship between involvement in gambling and alexithymia, only difficulty identifying feelings separated problem from non-problem gamblers. A post hoc regression analysis indicated that only involvement in non-skill gambling and non-self-determined motivation was relevant predictive factors.

The positive relationship between luck/perseverance and illusion of control and involvement in gambling, even after controlling for non-skill gambling involvement, supports the importance of distorted cognitions in the development, maintenance, and treatment of problem gambling (e.g. Joukhador et al. 2004; MacKillop et al. 2006; Wohl et al. 2007). Contrary to literature that suggests an inflation of cognitive distortions in games with a potential skill component (Toneatto et al. 1997), the results show that when controlling for non-skill gambling involvement, the relationship between distorted cognitions and poker playing disappears.

Given that Toneatto et al. (1997) analyses verbalisations of gamblers in order to assess cognitive distortions, the conflicting results are probably unrelated to social desirability, but may suggest that the GBQ is not adequately assessing cognitive distortions. It should be noted that Toneatto et al.'s study was based on a small ($n = 38$) sample responding to an advertisement that was restricted to primarily older, un-married, educated males. There were also a number of methodological issues such as non-structured assessments and the use of data recalled from the past.

With regard to motivation, self-determined motivation and non-self-determined motivation are related to gambling, but self-determined motivation significantly more so. This finding supports research, suggesting that financial reinforcement of behavior that is attributed to skill increases involvement (Haraczkiwicz et al. 1984; Ryan and Deci 2000). However, the suggestion that self-determination is related to enhanced psychological functioning (e.g. Brown and Smart 1991; Chantal and Vallerand 1996) is not supported by this study.

In the current study, non-self-determined motivation was not related to poker involvement. However, results indicate that both types of motivation are equally related to involvement in gambling when controlling for non-skill gambling. This is an interesting and unexpected finding. Chantal and Vallerand (1996) suggest that skill gambling is related to self-determination while non-skill gambling is associated with non-self-determination.

Due to the present population's evident exposure to both skill and non-skill gambling, they have an unclear pattern of motivation.

Contrary to previous studies (Lumley and Roby 1995; Parker et al. 2005), not all aspects of alexithymia discriminated between problem and non-problem gamblers. The studies found significant relationships between problem gambling score on the SOGS and alexithymia total score and subscales. In the present study, the only subscale of the TAS-20 that discriminated between non-problem and problem gambling groups was difficulty identifying feelings.

Previous studies focused on large university-based samples (Lumley and Roby 1995; Parker et al. 2005), whereas this study used a sample of active gamblers. The current sample's problem gambling is related to difficulty identifying feelings.

As a post hoc analysis, modeling regression showed that the best predictors of problem gambling in the present study's population were involvement in non-skill gambling and non-self-determined motivation. It is interesting that during model reduction, distorted cognitions were removed from the model when they have previously been found to be related to problem gambling and were even expected to be inflated in the current population. This finding suggests that distorted cognitions may not be central to the development or existence of problem gambling in poker players. Due to the strong correlations between distorted cognitions and motivations, it may be an indication that the scales are measuring very similar psychological processes. The present study has shown that motivations hold a stronger predictive component of problem gambling in poker players.

Gambling literature has predominantly focused on determining psychological factors associated with problem gambling in non-skill gamblers (e.g. Walker 1992), with only a few studies attempting to establish commonality of psychological factors across types of gambling (Rae and Haw 2005; Smith 1992; Wood 1992). Dickerson (1993) stresses the importance of not assuming the same psychological models across different forms of gambling. Building on Dickerson's (1993) proposal, it is possible that the current population may have formed two gambling identities, one for skill, and the other for non-skill gambling. If this is the case, the results could simply be a representation of the different psychological processes active across these forms of gambling. Although respondents were asked to answer the questionnaire in relation to poker playing, it is possible that the responses were still confounded with pre-existing psychological processes that apply to other forms of gambling.

Aside from the cognitive and attributional differences between skill and non-skill gamblers, it is vital to acknowledge the social environment. Research has suggested that poker and casino table players form a "sub cultural core" that provides them with social interaction (Hayano 1982; Ocean and Smith 1993). This interactive, social reinforcement could affect the cognitive and motivational factors that facilitate and/or prevent the development of problem gambling. The social nature of playing poker and the way that it is incorporated across social venues such as social clubs could be influencing the way which players are creating their gambling identity. This message of gambling as a social activity could be a moderating factor which has prevented a direct link being formed between poker and distorted cognitions due to players not directly identifying poker as gambling.

The results have not replicated past research sufficiently to transfer current gambling theories to poker. The question remains as to what psychological factors truly underlie the development of problem gambling in poker. Although it is evident that non-self-determined motivation holds a strong predictive factor for problem gambling, the involvement in non-skill gambling continues to confound the interpretation of the current results. Research on constructing models of problem and pathological gambling have been

impeded by many practical factors such as the difficulty to recruit subjects, ethical concerns with offering monetary incentives, and differing definitions of pathological gambling (Blaszczynski and Nower 2002; Toneatto 2005).

Blaszczynski and Nower (2002) suggest that three subpopulations of gambler exist, each with various psychological models and that require different modes of therapy. Research proports that the most effective form of therapy for problem gambling is CBT (e.g. Echeburúa et al. 1996; Sharpe and Tarrier 1992, 1993; Sylvain et al. 1997; Toneatto and Millar 2004). However, if distorted cognitions are not playing a significant role in the development of problem gambling in poker players and self-determined motivation is, alternate models of therapy may need to be evaluated and considered. For example, utilising therapeutic approaches such as interpersonal psychotherapy (Stuart and Robertson 2003), existential therapy (Frankl 1967; Yalom 1980), or person centred therapy (e.g. Kahn 1999; Corey 2005) where the focus is focussed on self-awareness, choices, and responsibility may be more appropriate. However these other forms of therapy would need to be adequately evaluated with problem gamblers before advocating for such a change.

Conclusion

In conclusion, this is the first study to explore psychological factors influencing problem-gambling development in poker players. Though limited by a number of factors, it has nevertheless produced some significant results. Specifically, the results suggest that poker players do not strictly adhere to previous research, which suggests the importance of distorted cognitions in relation to problem gambling. Problem gambling is best predicted by involvement in non-skill gambling, and non-self-determined motivation in the current population. If specific factors which contribute to problem gambling in poker players can be identified, this may result in possible interventions for the prevention and treatment. Though interpretations of this study must be drawn with caution, the results certainly suggest a range of research possibilities in an area where research is scarce.

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