

Gambling motives and symptoms of problem gambling in frequent slots players

Vance V. MacLaren,^{1,2} Kevin A. Harrigan,¹ & Michael Dixon^{1,2}

¹Gambling Research Lab, University of Waterloo, Waterloo, Ontario, Canada

²Department of Psychology, University of Waterloo, Waterloo, Ontario, Canada

Email: kevin@uwaterloo.ca

Abstract

Motives for gambling were examined among patrons of slots venues who reported playing electronic gaming machines at least weekly ($N=849$). According to scores on the Problem Gambling Severity Index (PGSI), there were 331 (39.0%) participants at low risk, 330 (38.9%) at moderate risk, and 188 (22.1%) at high risk of Pathological Gambling. Scores on the Coping and Enhancement scales of the Gambling Motives Questionnaire (GMQ) had independent effects on PGSI scores. Cluster analysis of Coping and Enhancement scores identified Low Emotion Regulation (LER; $n=189$), Primarily Enhancement (PE; $n=338$), and Coping and Enhancement (CE; $n=322$) subtypes. More CE gamblers (80.1%) had PGSI scores that suggested problem or Pathological Gambling than the PE (56.8%) or LE (36.0%) subtypes. Gamblers who frequently play slot machines are at elevated risk of Pathological Gambling if they play slots as a means of self-regulating their negative emotional states.

Résumé

Cet article présente les résultats d'une étude sur les motivations au jeu des clients de différents espaces de jeu ayant indiqué utiliser des appareils électroniques de jeux de hasard au moins une fois par semaine ($N=849$). Selon l'Indice de gravité du jeu compulsif (IGJC), 331 (39,0 %) participants à l'étude présentaient un risque faible de développer un problème de jeu pathologique, 330 (38,9 %) un risque moyen et 188 (22,1 %) un risque élevé. Les résultats obtenus sur les échelles du Gambling Motives Questionnaire (Questionnaire sur les motivations au jeu) mesurant l'adaptation et la valorisation ont donné lieu à des effets indépendants sur l'IGJC. Une analyse par grappe des résultats concernant l'adaptation et la valorisation a permis de cerner différents sous-types de motivation : la régulation émotionnelle (RE; $n=189$), la valorisation principalement (VP; $n=338$) et enfin l'adaptation et la valorisation (AV; $n=322$). Les joueurs associés au sous-type AV ont obtenu en plus grand nombre

(80,1 %) un IGJC signalant la possibilité d'un problème de jeu ou de jeu pathologique que les joueurs associés aux sous-types VP (56,8 %) et RE (36,0 %). Les joueurs qui jouent fréquemment aux machines à sous présentent un risque plus élevé de développer un problème de jeu pathologique si le jeu constitue pour eux un moyen de réguler leurs états émotionnels négatifs.

Introduction

Pathological gambling has symptoms that resemble some substance use disorders (Petry, 2002), and it is widely anticipated that the next edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2000) will classify gambling disorder as an addictive disorder (Petry, 2010). The notion of excessive gambling as a mental disorder akin to drug addiction implies that abnormal gambling behavior is sustained by addiction-like motivational dysfunction. People may consume psychoactive drugs or gamble for a variety of reasons, and heterogeneous subtypes have been proposed for both alcohol dependence (Epstein, Labouvie, McCrady, Jensen, & Hayaki, 2002) and problem gambling (Milosevic & Ledgerwood, 2010). The present study investigated this issue by measuring correlations between the symptoms of problem gambling and the social, hedonic enhancement, and emotional coping motives that have been previously found to correlate with symptoms of both alcohol dependence and pathological gambling.

This study focused on the responses of frequent gamblers to the Gambling Motives Questionnaire (GMQ; Stewart & Zack, 2008), which was adapted from the Drinking Motives Questionnaire (DMQ; Cooper, Russell, Skinner, & Windle, 1992). It is a multidimensional self-report instrument with three scales designed to measure *Social* motives for gambling (e.g., "Because it makes a social gathering more enjoyable"), as well as hedonic *Enhancement* (e.g., "Because it's exciting"), and maladaptive strategies for emotional *Coping* (e.g., "To forget your worries"). It should be noted that high scores on the Coping scale do not indicate adaptive coping mechanisms. By contrast, high scores on this scale indicate the maladaptive use of gambling as a means of coping with negative emotional states.

In a community sample of 39 nonpathological and 154 pathological gamblers, Stewart and Zack (2008) found that all three GMQ scales correlated with gambling frequency and scores on the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987). The interitem reliability of all three scales was acceptable, with Cronbach's $\alpha = .86, .91, \text{ and } .81$ for the Coping, Enhancement, and Social scales, respectively. Regression of SOGS scores onto the three GMQ scales found that the Coping scale explained a substantial proportion of unique variance ($\beta = .365$), Enhancement

accounted for a small but significant proportion of variance ($\beta=.156$), and the Social scale was not a significant predictor of SOGS score variance.

To investigate the similarity of motives for excessive gambling and drinking, Stewart et al. (2008) examined 158 community volunteers who drink when they gamble. These people were sorted into groups according to a cluster analysis of their responses to the Inventory of Gambling Situations (IGS; Turner & Littman-Sharp, 2006). As noted in a review by Milosevic and Ledgerwood (2010), the three groups that emerged (i.e., Low Emotion Regulation gamblers, Enhancement gamblers, and Coping gamblers) corresponded conceptually with Blaszczynski and Nower's (2002) Behaviorally Conditioned, Antisocial Impulsivist, and Emotionally Vulnerable subtypes of problem gamblers, respectively, in their Pathways Model of problem and pathological gambling. The motives for excessive gambling in the Enhancement and Coping groups appear to be similar to the motives for excessive drinking among people with alcohol dependence (Cooper, Frone, Russell, & Mudar, 1995). Despite their label, the Coping gamblers had somewhat elevated scores for positively reinforcing gambling situations from the IGS as well as very high scores for negatively reinforcing gambling situations on the IGS scale. There was no subtype identified with high scores only for gambling in negatively reinforcing situations. The Coping gamblers also had the most severe symptoms of problem gambling, and the Low Emotion Regulation gamblers had the fewest symptoms.

The three-factor structure of the GMQ has also been found among people who do not gamble excessively. Dechant and Ellery (2011) analyzed responses to the GMQ given as part of a telephone population survey of gambling activity and limit-setting (Manitoba Gaming Control Commission, 2009). Although no measure of problem gambling symptoms was included in that study, cluster analysis was conducted in order to classify participants on the basis of their participation in 12 forms of legal gambling. The cluster analysis identified a group of "normal" gamblers (Currie, Hodgins, Wang, el-Guebaly, Wynne, & Chen, 2006) who reported gambling an average of 2.3 times per month. There were also three groups of high-frequency players who reported engaging in some form of gambling 21.04 times per month, 67.37 times per month, or 351.91 times per month, respectively. Dechant and Ellery (2011) examined the factor structure of the GMQ among their normal group ($N=839$) and found support for the three-factor structure identified by Stewart and Zack (2008). Although the interitem reliability of the Coping scale was acceptable (Cronbach's $\alpha=.76$), there was lower reliability of the Enhancement ($\alpha=.57$) and Social ($\alpha=.67$) scales in their sample. Nevertheless, Dechant and Ellery's normal gamblers had substantially lower scores on the Coping ($M=5.59$, $SD=1.34$), Enhancement ($M=7.49$, $SD=2.91$), and Social ($M=7.02$, $SD=2.37$) scales than Stewart and Zack's (2008) sample, who had substantially higher scores on the Coping ($M=10.09$, $SD=4.03$), Enhancement ($M=13.26$, $SD=4.75$), and Social ($M=9.95$, $SD=3.48$) scales. The normal gamblers in Dechant and Ellery appear most similar in terms of their gambling motives to the Low Emotion Regulation type identified by Stewart et al. (2008).

The present descriptive study builds upon previous findings by Dechant and Ellery (2011), Stewart and Zack (2008), and Stewart et al. (2008). We used the GMQ to measure the Coping, Enhancement, and Social motives for gambling in a large sample of patrons of two slots venues in Ontario, Canada. Unlike the Dechant and Ellery (2011) study, which investigated primarily low-frequency normal gamblers, we limited our sample to high-frequency players who reported playing electronic gaming machines weekly or more. Our sample of frequent slots players is very different from Dechant and Ellery's normal gamblers, of whom only 0.8% (i.e., 7 of 839 participants) reported playing casino slot machines weekly or more. To ensure that such "normal" gamblers were not included in the present sample, we analyzed only the responses from those who reported playing slot machines at this very high level. Together, these two studies may give a clear picture of motivational differences between people at these two extremes of gambling involvement.

Characterizing the motives of high-frequency gamblers is important because their heavy involvement in slot machine gambling may place them at risk for developing symptoms of pathological gambling (Dowling, Smith, & Thomas, 2005). As a measure of the severity of problem gambling symptoms, the participants also completed the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). On the basis of the results of Stewart and Zack (2008) and Stewart et al. (2008), we predicted that the Coping and Enhancement motives would be strongly associated with elevated PGSI scores but that the Social motive would not be. Finally, we used cluster analysis to explore the possibility that there might be subgroups of frequent slots players who have different motives for their gambling, as is predicted by the Pathways Model (Blaszczynski & Nower, 2002) and supported by the findings of Stewart et al. (2008).

Method

Participants

Patrons ($N=1503$) of two horse-racing facilities in Ontario, Canada, were recruited upon their entry into the slots areas of the venues. Data from participants without complete age, gender, and questionnaire responses were excluded. To limit the study to frequent players of electronic gaming machines, only data from participants who reported playing slots weekly or more frequently within the past 30 days were included in the analysis. The final sample of high-frequency slots players ($N=849$) included 505 women aged 19–90 years ($M=55.5$ years, median=56.0, $SD=13.68$) and 344 men aged 19–86 years ($M=55.4$ years, median=57.0, $SD=14.83$).

Procedures

All procedures were approved by the University of Waterloo's Office of Research Ethics. Participants were recruited at the entrance of two slots venues in Ontario, Canada, during the baseline testing phase of a larger study (Harrigan, MacLaren, &

Dixon, 2010). A recruitment poster advertised the need for people who gamble “at least once or twice per month” to participate in exchange for a \$20 coffee shop gift card and possible inclusion as a paid participant in the larger study. After signing informed consent letters, the participants were accompanied by research assistants to a testing room where they were seated at tables with laptop computers. They then completed a computer administered test battery that included demographics questions, a measure of gambling frequency, the Gambling Motives Questionnaire (GMQ; Stewart & Zack, 2008), and the Problem Gambling Severity Index of the Canadian Problem Gambling Inventory (PGSI; Ferris & Wynne, 2001).

Measures

Gambling frequency. Participants were asked to indicate “About how many times did you gamble at a slot machine venue in the past 30 days?” with six response options: (1) never, (2) once, (3) twice, (4) once a week, (5) more than once a week, and (6) everyday. Participants who indicated that they had gambled at a slots venue once a week ($N=433$), more than once a week ($N=396$), or everyday ($N=20$) were identified as “frequent” slots players. Those who reported playing never, once, or twice in the past 30 days were excluded from further analyses.

Problem Gambling Severity Index. The nine-item Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) is a self-report scale used to assess symptoms of problem gambling. The scale is reliable and valid when used in nonclinical settings, and its questions concern problematic gambling behavior in the past 12 months. The nine items are about the following pathological gambling symptoms: exceeding spending limits, increasing expenditures, chasing losses, incurring debt or selling possessions, self-identification as a problem gambler, criticism from others about gambling, feelings of guilt, health problems from gambling, and financial insufficiency. Items were rated on a four-point Likert scale: (0) never, (1) sometimes, (2) most of the time, and (3) almost always. Participants were classified into one of three levels of gambling severity according to their PGSI scores: those with scores of 0, 1, or 2 were classified as being at “Low” risk of being pathological gamblers, those with scores of 3–7 as being at “Moderate” risk of being pathological gamblers, and those with scores of 8–27 as being at “High” risk of being pathological gamblers. Internal consistency of the PGSI across the two venues was Cronbach’s $\alpha=.91$.

Gambling Motives Questionnaire. The Gambling Motives Questionnaire (GMQ; Stewart & Zack, 2008) is an adaptation of the Drinking Motives Questionnaire (Cooper, Russell, Skinner, & Windle, 1992) that measures Coping, Enhancement, and Social motives for gambling. Each of the three subscales contains five items that were rated on a four-point Likert scale: (1) never, (2) almost never, (3) sometimes, and (4) almost always. The internal consistencies of the Coping, Enhancement, and Social scales were all acceptable at .78, .75, and .73, respectively.

Results

Among this sample of 849 frequent slots venue patrons, there were 331 (39.0%) with PGSI scores indicating low risk for pathological gambling, 330 (38.9%) with moderate risk of pathological gambling, and 188 (22.1%) who were at high risk for pathological gambling. The average PGSI scores of these three gambling severity groups were $M=1.0$ ($SD=0.80$), $M=4.5$ ($SD=1.36$), and $M=12.3$ ($SD=4.75$), respectively. The GMQ scores for the three groups are given in Table 1.

All statistical tests were performed with α at .001 to minimize type I errors in this large sample. There were significant Pearson correlations between continuous PGSI scores and the Coping ($r=.42$), Enhancement ($r=.32$), and Social scales ($r=.13$). The three GMQ scales were also intercorrelated, with significant correlations between the Coping and Enhancement ($r=.55$), Coping and Social ($r=.40$), and Enhancement and Social ($r=.35$) scales.

Those in the High PGSI group had significantly higher scores on Coping, Enhancement, and Social scales than those in the Moderate and Low groups. The Moderate group had significantly higher Coping and Enhancement scores than the Low group (see Table 1).

To assess the independent contributions of the GMQ scales as determinants of PGSI scores, a regression analysis was conducted using simultaneous entry of the three GMQ scales. The equation was significant [$R^2=.19$, $F(3, 845)=65.73$, $p<.001$]. The Coping scale explained the largest proportion of unique variance ($\beta=.367$, $t=9.52$, $p<.001$), followed by Enhancement ($\beta=.140$, $t=3.73$, $p<.001$). The Social scale ($\beta=-.065$, $t=-1.90$, $p=.057$) did not uniquely predict PGSI score variance.

Cluster analysis was used to explore the possibility that there might be three subtypes of frequent slots players with different motives for their gambling, as is predicted by the Pathways Model (Blażczynski & Nower, 2002; Milosevic & Ledgerwood, 2010) and supported in the findings of Stewart et al. (2008). We performed a K-means cluster analysis (SPSS v19, SPSS, Inc., Chicago, IL), on the GMQ Enhancement and Coping

Table 1
Problem gambling severity and mean (SD) scores on the Gambling Motives Questionnaire among 849 frequent slots players

GMQ scale	PGSI group			$F_{(2,846)}$	p	$d_{(M-L)}$	$d_{(H-L)}$	$d_{(H-M)}$
	Low	Moderate	High					
Enhancement	12.8 (3.26) ^A	14.3 (2.62) ^B	15.4 (2.94) ^C	52.8	<.001	.49	.76	.39
Coping	8.7 (3.23) ^A	10.3 (3.37) ^B	12.9 (3.71) ^C	91.9	<.001	.47	1.06	.70

Note: Superscripts indicate significant Bonferroni-adjusted group differences with overall $p<.001$. Cohen's d indicates effect size of contrasts between Low (L), Moderate (M), and High (H) groups.

scores (the Social scores were not used because the previous regression analysis found the Social scale to be a nonsignificant predictor of gambling problem severity). The cluster analysis was constrained to a three-cluster solution following the previous findings by Stewart et al. (2008) and Dechant and Ellery (2011). The GMQ scores of the three clusters are given in Table 2. The first cluster represented 22.3% of the sample ($n=189$) and was characterized by relatively low scores on both the Enhancement and Coping scales. Following the terminology of Stewart et al. (2008), this cluster was labeled “Low Emotion Regulation” (LER). The second cluster represented an additional 39.8% of the sample ($n=338$) and was characterized by high scores on Enhancement but not on Coping. This cluster was labeled “Primarily Enhancement” (PE). The third cluster represented the final 37.9% of the sample ($n=322$) and was characterized by elevated scores on both Enhancement and Coping. This cluster was labeled “Coping and Enhancement” (CE). As in Stewart et al. (2008), no cluster having high Coping but low Enhancement was observed in this data set. However, also like Stewart et al. (2008), the greatest magnitude difference between the CE and PE groups was on the Coping scale (see Table 2).

A one-way ANOVA conducted on PGSI scores of the LER ($M=2.78$, $SD=4.23$), PE ($M=3.91$, $SD=3.74$), and CE ($M=6.99$, $SD=5.52$) groups was significant [$F(2, 846)=61.01$, $p<.001$]. Bonferroni-adjusted post hoc tests with overall $\alpha=.05$ found significant contrasts between the LER and PE gamblers ($p=.021$), LER and CE gamblers ($p<.001$), and PE and CE gamblers ($p<.001$).

The frequencies of respondents within the LER, PE, and CE subtypes who were at low, moderate, and high risk of pathological gambling are given in Table 3. The percentage of people at either moderate or high risk of pathological gambling (i.e., so-called “problem gamblers”) was higher among the CE subtype (80.1%) than the PE group [56.8%; $\chi^2(1)=87.3$, $p<.001$] or the LER group [36.0%, $\chi^2(1)=38.9$, $p<.001$]. The difference between PE and LER subtypes was nonsignificant [$\chi^2(1)=0.09$, $p=.760$].

Table 2
Mean (SD) GMQ scores of respondents in three motivation clusters

GMQ scale	GMQ cluster			$F_{(2,846)}$	p	$d_{(PE-LER)}$	$d_{(CE-LER)}$	$d_{(CE-PE)}$
	Low Emotion Regulation	Primarily Enhancement	Coping and Enhancement					
Enhancement	9.5 (2.00) ^A	14.5 (1.71) ^B	15.9 (2.18) ^C	653.3	<.001	1.66	1.72	.68

Note: Superscripts indicate significant Bonferroni-adjusted group differences with overall $p<.001$. Cohen’s d indicates effect size of contrasts between Low Emotion Regulation (LER), Primarily Enhancement (PE), and Coping and Enhancement (CE) groups.

Table 3
Frequencies of respondents at three levels of gambling severity within each cluster

Gambler subtype	PGSI severity		
	Low	Moderate	High
Low Emotion Regulation	121 (64%)	51 (27%)	17 (9%)
Primarily Enhancement	146 (43%)	148 (44%)	44 (13%)

Discussion

This study tested associations between the three subscales of the GMQ and vulnerability to pathological gambling measured by the PGSI in a large sample of frequent slots players. The participants in this study were recruited and tested inside two slots venues, and all of the included cases reported that they had played slot machines weekly or more frequently within the previous 30 days. This supports their status as frequent slots gamblers, and our results give important insights into the motives for gambling in this at-risk population. These results complement the findings of Dechant and Ellery (2011) of low-frequency normal gamblers. The stability of our findings is likely to be very high because of the large sample, but there is a possible sampling bias that may have been introduced by our methods of selecting and recruiting participants. The sample consisted mostly of older adults who play very frequently, which may have contributed to an overrepresentation of individuals with Enhancement and Coping motives, as some retired people might visit slots venues in search of excitement or to alleviate their boredom. However, the results of Stewart and Zack (2008) and Stewart et al. (2008) converge very well with the present findings and suggest minimal sampling bias in these studies which used very different sampling methods.

The degree to which the current study replicated Stewart and Zack (2008) and Stewart et al. (2008) is striking. The GMQ scores of this sample were similar to those of Stewart and Zack (2008) and were substantially higher than the “normal” gamblers examined by Dechant and Ellery (2011). Respondents with PGSI scores indicating high risk of pathological gambling had significantly higher scores on the Coping, Enhancement, and Social scales than those in the moderate-risk and low-risk groups. Furthermore, the moderate-risk group had significantly higher Coping and Enhancement scores than the low-risk group. When viewed as a continuous variable, regression of gambling severity (i.e., PGSI scores) onto the three GMQ scales found results very similar to those of Stewart and Zack (2008), with similar β weights for Coping (i.e., .350 vs. .365) and Enhancement (i.e., .136 vs. .156). The Social scale was not a significant predictor in either study.

We also examined the possibility that there might be distinct subtypes among the population of frequent slot players who differ in their motives for gambling

excessively. Cluster analysis identified the LER, PE, and CE subtypes which appear to correspond with the Low Emotion Regulation, Enhancement, and Coping subtypes identified by Stewart et al. (2008) using the IGS (although we acknowledge that we made the *a priori* decision to limit our cluster analysis to a three-cluster solution). Furthermore, our results replicated their finding that Coping gamblers are at greatest risk for pathological gambling. Among the CE gamblers, 39% had PGSI scores indicating high risk of pathological gambling compared to 13% of PE gamblers and 9% of LER gamblers. Even among this population of high-frequency slots players, the CE gamblers were over four times as likely to be at high risk for pathological gambling as the LER gamblers.

It is possible that individual differences may contribute to vulnerability to pathological gambling through distinct motivational pathways. The content of the Enhancement scale (e.g., “To get a ‘high’ feeling”) suggests that it might tap the elevated impulsivity and reward sensitivity of frequent gamblers (Goudriaan, Oosterlaan, deBeurs, & van den Brink, 2006; Loxton, Nguyen, Casey, & Dawe, 2008; MacLaren, Fugelsang, Harrigan, & Dixon, in press; Mercer & Eastwood, 2010; O’Connor, Stewart, & Watt, 2009). Likewise, the Coping scale (e.g., “Because it helps when you are feeling nervous or depressed”) might mediate the effects of negative affective traits found in pathological gamblers. As is the case with substance use disorders (Kotov, Gamez, Schmidt, & Wilson, 2010), pathological gambling coincides with substantially elevated scores on traits similar to Neuroticism, as well as low Agreeableness and Conscientiousness (MacLaren, Fugelsang, Harrigan, & Dixon, 2011; see also Reid, Li, Lopez, Collard, Parhami, Karim & Fong, 2011). This same pattern of personality traits is found in people who tend to rely on maladaptive ways of coping with their problems, such as “disengagement” or substance use (Connor-Smith & Flachsbar, 2007).

High Neuroticism and low Conscientiousness have effects on alcohol use that are mediated by Coping and Enhancement measured by the DMQ (Goldstein & Flett, 2009; Kuntsche, von Fischer, & Gmel, 2008; Mezquita, Stewart, & Ruiperez, 2010; Theakston, Stewart, Dawson, Knowlden-Loewen, & Lehman, 2004). Future research may explore the relationships between individual player characteristics, motives, and involvement in various forms of gambling. The mechanisms by which different forms of gambling satisfy a pathological gambler’s mood enhancement or emotional coping needs are largely unknown. Specific game features that satisfy such needs (e.g., frequency of reinforcement, near misses, etc.) may contribute to the potential addictiveness of the games if they have differential effects on the most vulnerable players.

The present study replicated the results of Stewart and Zack (2008) and Stewart et al. (2008) in a large and unique sample of slots venue patrons. However, it should be remembered that these were self-report data that have not been corroborated by behavioral measures of gamblers’ motives and behavior. It is also not known how many of the participants in this study were primarily slot machine gamblers and how

many were primarily horse-racing betterers who also play slots because the slots venues are co-located at horse-race tracks. It is possible that different patterns might emerge if the motives of gamblers who prefer different types of gambling were examined. The frequent slots players in this study are likely to represent an extreme subgroup within the larger population of gamblers and these results may not generalize to less involved gamblers. Nevertheless, this study gives insight into the motives of people who play electronic gambling machines weekly or more and who are a particularly high-risk population in terms of their vulnerability to pathological gambling.

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For correspondence: Kevin Harrigan, Canadian Center for Arts and Technology and Head of Gambling Research Team, University of Waterloo, 200 University Ave West, Waterloo, Ontario, Canada, N2L-3G1. E-mail: kevinh@uwaterloo.ca

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Dr. MacLaren was a postdoctoral fellow in the University of Waterloo gambling lab. His research focuses on individual characteristics that may increase vulnerability to addictive behavior and on the mechanisms by which disinhibition may interact with situational influences to create compulsion.

Dr. Harrigan is the Head of the Gambling Research Team at the University of Waterloo. His primary research interest is in gambling addictions with a focus on why so many slot machine gamblers become addicted. Topics of interest include the structural characteristics of slot machine games, alternative designs for slot machine games, slot machine player education, gaming regulations, PAR Sheets, near misses, losses disguised as wins (LDWs), limitations of random number generators (RNGs), and computer algorithms used in slot machine games.

Mike Dixon is a Full Professor of Psychology at the University of Waterloo. He has served as the Chair of the Department of Psychology at the University of Waterloo from 2005 to 2007. Dixon has been continuously funded by Natural Sciences and Engineering Research Council since 1997 and has also received grants from the Heart and Stroke Foundation of Canada, the Alzheimer's Society of Canada, and the Ontario Problem Gambling Research Centre. He has published over 70 articles in journals such as *Nature*, *Addiction*, *Journal of Cognitive Neuroscience*, *Cognitive Neuropsychology*, and *Cortex*.