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The Relationship of Problem Gambling to Criminal Behavior in a Sample of Canadian Male Federal Offenders

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Abstract This article examines the prevalence of moderate and severe problem gambling in a sample of 254 incarcerated Canadian male federal offenders (completion rate of 39.0%). The prevalence of disordered gambling was measured using the PGSI, DSM-IV-TR, and SOGS that yielded estimates of 9.4%, 6.3%, and 13.0%, respectively. Severe problem gamblers were significantly more likely to have committed income producing offences, but were neither more nor less likely than other offenders to have committed violent offences. The majority of severe problem gamblers (65.2%) and a fifth of the moderate problem gamblers (20.0%) reported that their criminal activity was a result of their gambling (e.g., to pay off debts). Based on these findings there appears to be a need to offer problem gambling treatment services to offenders in order to help them break the cycle of gambling, debt and crime.

Keywords Problem gambling · Prevalence · Crime · Corrections population

Severe problem gambling often results in a number of serious negative consequences. Among the most troublesome and least understood is gambling-related crime. Williams et al. (2005) report that the rate of severe problem gambling in offender populations is higher than rates found in any other population-studied to-date (Williams et al. 2005). In the present study multiple measures of problem gambling were used in order to determine the prevalence of moderate and severe problem gambling in an offender population in Canada. In addition, interviews were conducted to explore the relationship between criminal behavior and gambling. The labels compulsive gambling (Lesieur 1984), pathological gambling (American Psychiatric Association 2000), level III gambling (Shaffer

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et al. 1999), and severe problem gambling (Ferris and Wynne 2001; Williams and Wood 2004) all refer to the same general disorder. To simplify the presentation of the results, we will use the classification labels recommended by Williams and Wood (2004) for the Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI; Ferris and Wynne 2001). According to this system, a person who scores 8 or more on the PGSI is a severe problem gambler (level III). These people have an impaired ability to control their gambling and have suffered negative consequences from their gambling. A person who scores from 3 to 7 is considered a moderate problem gambler (level II) who has experienced some gambling-related problems and may be at risk for more serious consequences. A person who scores 1 or 2 is called a low risk gambler (level I) because they have suffered little in terms of consequences, but may be at risk for problems. A person who scores 0 but reports gambling in the past year is called a non-problem gambler (level I), and a person who scores 0 and reports not gambling at all in the past year is called a non-gambler (level 0).

The most comprehensive study of prevalence rates in Canada and the United States was a meta-analysis conducted by Shaffer et al. (1999) which found that 1.14% $\pm$ 0.24 of the adult population have a severe gambling problem (level III) in the past year and an additional 2.80% $\pm$ 0.85 of the population have a moderate gambling problem in the past year (level II). More recent studies in Canada (e.g., Ferris and Wynne 2001; Room et al. 1999; Wiebe et al. 2001, 2006) have yielded prevalence numbers that are in general consistent with these estimates.

According to Abbott et al. (2005) between one and two-thirds of problem gamblers engaged in treatment or mutual help groups report having committed gambling-related offences. Several studies have reported high rates of gambling-related criminal activity amongst severe problem gamblers (Blaszczynski and Silove 1996; Blaszczynski et al. 1989; Brown 1987). Studies of correctional samples in the United States, Australia, New Zealand, and the UK tend to yield prevalence rates that are much higher than those in the general population (Abbott and McKenna 2000; Abbott, et al. 2000, 2005; Bellringer 1986; Blaszczynski and Silove 1996; Lahn and Grabosky 2003; Meyer and Stadler 1999; Templer et al. 1993; Walters 1997). According to a review by Williams et al. (2005) the prevalence rates combining moderate and severe problem gambling in the studies reviewed ranged from 11% to 73%, with an average of about 33%. The variation in these estimates is likely due differences in the definition of problem gambling, the measurement instruments, data collection methodology, and security level of the prison. However, even the lowest prevalence estimates are substantially higher than those found in the general population.

Severe problem gambling is most often related to income producing offences such as larceny and embezzlement (Blaszczynski et al. 1989). The Australian Institute of Criminology found that 15% of all serious fraud cases in 1998 and 1999 had gambling as the primary motivation (Sakurai and Smith 2003). A study of the Edmonton Police Service records (Smith et al. 2003) estimated that 27% of counterfeiting reports were gambling-related. According to Williams et al. (2005) the bulk of crimes committed by severe problem gamblers are of a non-violent income producing nature. However, Lahn and Grabosky (2003) have estimated that 28.6% of offenders with gambling problems had committed violent crimes, however the violent crimes were more often committed by offenders who had South Oaks Gambling Screen (SOGS) scores between 5 and 9 (36.9%) than by those who scored above 10 (18.8%). Abbott et al. (2005) found that more than 40% of current problem gamblers had committed violent crimes and that in terms of their lifetime offences, did not differ from other offenders in terms of violent crimes. In

addition, Walters (1997) reported that 36.8% of those who scored above 5 on the SOGS had committed robbery (a violent income producing offence).

Another issue of interest is the involvement of the offenders in non-regulated games. In Canada, bets on card games and other private bets are not illegal. However such non-regulated games are illegal if they are run in such a way that some unlicensed third party to the bet (e.g., a bookie or the owner of a card room) makes a profit from the betting. Historically, illegal gambling venues often relied upon organized crime for finance, protection, security, and the collection of debts (Asbury 1938; de Champlain 2004). Several authors have noted that the criminal underworld has been dominated by gamblers since well before the twentieth century and that problem gamblers are often their best customers (Asbury 1938; Clarke 1929; Peterson 1952, 1983). In treatment settings, most severe problem gamblers report having problems with slot machines and casino table games in particular (Urbanoski and Rush 2006), however it is expected that problem gamblers in offender population may be engaged in more non-regulated forms of gambling.

Evidence suggests that severe problem gamblers are a heterogeneous group of people (Blaszczynski and Nower 2002; Turner et al. 2006; Turner et al. 2008) and this is likely to also be true for severe problem gamblers in the offender population. Some of these offenders may be severe problem-gamblers who commit crimes out of perceived necessity related to their disorder. Such criminal activities would occur late in the progression of pathological gambling as money becomes scarce (Lesieur 1984). Other offenders appear to have a long history of criminal behavior that often predates their gambling problem (Abbott et al. 2005). Such offenders may suffer from antisocial personality disorders that predispose them to both problem gambling and criminality (Blaszczynski and McConaghy 1994; Meyer and Stadler 1999).

The rate of severe problem gambling is particularly important in a prison context because severe problem gambling may be associated with an increased risk of escape, suicide, debt-related institutional violence, and disciplinary problems (Walters 2005; Zinger and Wichmann 1999) and these risks have important implications for institutional security (Williams et al. 2005; but see Williams 2008 for a alternative view). In addition, the high rate of relapse to gambling problems and the link between gambling debts and crime have implications for rehabilitation and parole.

The present study examined gambling behavior in a sample of incarcerated Canadian male federal offenders. The present study used multiple measures of severe problem gambling to provide a range of estimates for the prevalence of severe problem gambling that could then be compared to those found in the literature. In addition, the nature of the offences typically committed by severe problem gamblers was examined via a review of offenders' correctional files. Finally, the relationship between gambling problems and criminal behavior was examined in face-to-face interviews.

Based on previous research, it was hypothesized that:

(1) The prevalence rates of moderate and severe problem gambling in the offender sample would be significantly higher than in the general population.
(2) Problem gambling would be more strongly related to income producing offences than to violent offences.
(3) The offenders would report participating in more non-regulated forms of gambling than the general public.
(4) Offenders who suffer from more severe cases of disordered gambling would be more likely to report that gambling led to crime.

Method

Participants

Participants were 254 male offenders in an assessment unit of the Correctional Service of Canada. As federal offenders, all participants had been convicted of offences serious enough to result in a sentence of 2 years or more. The assessment unit is the reception centre for recently convicted federal offenders in Ontario and therefore is an ideal location to assess a large representative sample of recently sentenced federal offenders.

Volunteers for the study were solicited from offenders who were taking part in mandatory institutional orientation or educational assessment sessions. Other participants were randomly selected from the assessment unit population. A total of 651 offenders were asked if they would be interested in volunteering for the study. Seven people were excluded from the study because of difficulties with language or excessive missing values. A total of 254 offenders completed the study for a completion rate of 39.0%. In addition 106 offenders were interviewed in more depth about the relationship between gambling and crime.

Procedure and Design

The project was reviewed by the research ethics boards of the Centre for Addiction and Mental Health and Correctional Service of Canada. All participants read and signed a consent form indicating that their participation in the study was voluntary, and that they could withdraw at any time without any negative repercussions.

The participants completed the questionnaires in small groups of from 1 to 10 people, but at separate desks spaced well apart. Participants completed a series of questionnaires designed to screen for severe problem gambling and examine various aspects of gambling behavior. The researchers assisted anyone who needed help completing the questionnaires.

The prevalence of severe problem gambling from our data was compared to Shaffer et al.'s (1999) meta-analysis results using binomial probability (p_b). An online calculator was used to compute 95% confidence intervals (Dimension Research, Inc 2008).

Measures

The questionnaire package for the current study was largely derived from a questionnaire packaged used by Turner et al. (2006, 2008) to study severe problem gamblers in the general population. Severe problem gambling was assessed using the SOGS (Lesieur and Blume 1987) framed in terms of past year ($\alpha = .87$) and lifetime ($\alpha = .89$), a questionnaire based on the 4th edition of the Diagnostic and Statistical Manual (DSM-IV-TR; $\alpha = .85$), and the PGSI from the CPGI (Ferris and Wynne 2001; $\alpha = .93$). In addition, we used a 12-item Harmful Consequences Scale (HCG; Turner et al. 2006, 2008) which asked participants to rate on a seven-point scale the harmful consequences of gambling (e.g., ability to cope with stress, family relationships, physical health; $\alpha = .96$). The use of multiple indicators allowed the examination of discrepancies between these measures.

To examine aspects of gambling behavior, a gambling history questionnaire (Turner et al. 2006) was included which asked the participants to indicate how often they played 16 different types of games (e.g., once a week, three times a month, etc.), how much they typically risked per occasion (e.g., "how much money do you bring to a session") on each game, and if that game was a problem for them. Offenders were asked to answer the gambling frequency questions in terms of their "last 12 months on the street" (not in jail).

The questionnaire asked for the typical amount risked per session (money brought to the session) rather than amount spent because of the inherent ambiguity of spending caused by the occasional win. A total number of gambling episodes per year and amount of money risked per year (money risked per game times gambling frequency) were computed and then logarithmically transformed to correct for skew. Participants also completed a second questionnaire about their gambling in prison.

For each participant, a correctional file review was carried out to verify demographic data and criminal history information.

Interviews

All those classified as moderate or severe problem gamblers were asked to participate in an interview in a second session. In addition, non-problem gamblers were interviewed if gambling was mentioned in their institutional file (e.g., institutional charges for gambling, bookmaking, fights related to gambling) or if other questionnaires (e.g., gambling frequency, lifetime SOGS) suggested that gambling might have been an issue. As a comparison group, 1/6 of the remaining participants were randomly selected for an interview ($n = 23$).

It was not possible to interview all subjects selected because some offenders were transferred to their parent institutions prior to being interviewed. Interview completion rate was 81% for the non-problem gamblers, 75% for the moderate problem gamblers and 96% for the severe problem gamblers. Participants were interviewed jointly by two researchers (CS & SM) to ensure consistent, accurate and complete data collection as well as the safety of the interviewers. The sample sizes of low risk and non-problem participants within the random and non-random groups were too small for separate analysis, thus for the interview analysis the low risk and non-problem groups were combined. In total, 106 participants were interviewed: 23 severe problem gamblers, 30 moderate problem gamblers, and 53 who did not have a gambling problem according to the PGSI (23 random; 30 non-random).

In the interview, offenders were asked additional questions about their gambling behavior, particularly as it related to their criminal histories, in an attempt to determine if there was a relationship between the onset of their criminal behavior and problem gambling. A semi-structured interview format was used and the interview results were coded and analyzed statistically.

Results

The mean age of the offender sample was 34.6 years ($SD = 10.8$) which is within one year of CSC population figures (Cormier, 2005). The sample was 68% Caucasian, 8.2% Black, 1.2% East Asian, 7% First Nations, 3.9% Latin American, and 2.4% of mixed origin. Prior to incarceration, 52.5% of the sample reported being married, 30% were single, and 14.8% were separated or divorced. The majority of the sample (64.6%) reported less than a complete secondary education. Prior to incarceration, 48.2% of the sample reported having been employed full time.

In Canada offenders fall under either provincial or federal jurisdiction according to sentence length. Offenders who receive a sentence of 2 years or more are classed as federal offenders. In the present sample, 19.5% were first time offenders, 65.7% had prior convictions, but were serving their first federal sentence, and 14.8% were repeat federal offenders. Most of the offenders (81.6%) had committed at least one violent offence and

77.4% had committed at least one income producing offence. On average participants reported 36.0 weeks ($SD = 36.8$) since last being on the street (time since arrest or incarceration).

Prevalence

Four measures were used to assess the prevalence of disordered gambling: PGSI, DSM-IV-TR, SOGS (past year) and SOGS (lifetime). The correlations between the four scores were all highly significant and ranged from .76 to .90. According to the SOGS (past year) 13% of the sample scored as probable pathological gamblers (5 or more on SOGS). The SOGS lifetime measure indicated a prevalence rate of 15.0% as probable pathological gamblers. The DSM-IV-TR indicated a prevalence rate of 6.3% as pathological gamblers (5 or more). Finally, the PGSI indicated that 9.4% of the sample scored as severe problem gamblers (8 or more). Although each of these measures provided different estimates of the prevalence of moderate and severe problem gambling, all estimates are significantly higher ($p_b < .01$) than would be expected in the general population (e.g., Shaffer et al. 1999). These various estimates are shown in Table 1.

Participant Groups

The PGSI was selected as a compromise between the very conservative DSM-IV-TR scores and the fairly liberal SOGS-past year. To examine the relationship of crime to gambling status, offenders were divided into five groups based on their PGSI scores: (1) Severe problem gamblers ($n = 24$; PGSI ≥ 8), (2) Moderate problem gamblers ($n = 40$; PGSI ≥ 3 and PGSI ≤ 7), (2) Low risk gamblers ($n = 57$; PGSI $= 1$ or 2), (4) Non-problem subjects ($n = 97$; PGSI $= 0$), (5) Non-gamblers ($n = 36$; PGSI $= 0$ & no reported gambling in past year).

To validate these group differences the groups were compared in terms of harmful consequences as measured by the HCG (Turner et al. 2006), log of total number of gambling session per year, and log of estimated total money risked per year (see Table 2). HCG differed significantly by PGSI groups, $F(4, 252) = 72.8$, $p < .001$, $\eta^2 = .54$. Non-gamblers, low risk, and non-problem participants did not differ in terms of HCG scores. All other pairwise contrasts were significant. The PGSI groups also differed significantly in terms of log of gambling episodes per year, $F(4, 253) = 63.8$, $p < .001$, $\eta^2 = .56$, and log

Table 1 Estimates and confidence intervals for severe problem gambling and other population segments based on DSM-IV-TR, SOGS, and PGSI ($N = 254$)

PGSI labels	DSM-IV-TR	SOGS past year	SOGS lifetime	PGSI
Non-gambler (level 0)	15.0 ± 4.4	14.2 ± 4.3	12.8 ± 4.1	14.2 ± 4.3
Non problem (level I)	48.4 ± 6.1	46.5 ± 6.1	35.4 ± 5.9	38.2 ± 6.0
Low risk (level I)	20.9 ± 5.0	21.7 ± 5.1	27.8 ± 5.5	22.4 ± 5.1
Moderate problem (level II)	9.4 ± 3.4	4.7 ± 2.6	7.9 ± 3.3	15.7 ± 4.5
Severe problem (level III)	6.3 ± 2.9	13.0 ± 4.1	15.0 ± 4.4	9.4 ± 3.4

Note: The classification labels (e.g., low risk, moderate problem, and severe problem) from the PGSI were used in the table, to simplify the presentation. For DSM-IV-TR, SOGS past year, SOGS lifetime, and PGSI scores of 1 or 2 were classed as low risk. Moderate problem was defined as a score of 3–7 on the PGSI and a score of 3 or 4 on the DSM-IV-TR, SOGS past year, SOGS lifetime. Severe problem gambling was defined as a score of 8 or more on the PGSI, or 5 or more on the DSM-IV-TR, SOGS past-year, and SOGS life time

Table 2 Harmful consequences, frequency of play and total spending by PGSI group

PGSI group		HCG (max = 72)	Log gambling sessions per year	Geometric mean	Log dollars risked	Geometric mean
Non-gamblers	*M*	2.03[a]	0.00[a]	0.00	0.00[a]	0.00
(*n* = 36)	*SD*	8.23	0.00		0.00	
Non-problem	*M*	2.29[a]	1.42[b]	25.6	2.37[b]	235.6
Gamblers (*n* = 97)	*SD*	8.29	0.74		1.10	
Low risk	*M*	3.75[a]	1.64[b]	42.8	2.80[b]	636.2
(*n* = 57)	*SD*	6.93	0.88		1.46	
Moderate	*M*	13.53[b]	2.17[c]	145.8	3.75[c]	5579.9
Problems (*n* = 40)	*SD*	10.13	0.68		1.12	
Severe problems	*M*	36.33[c]	2.55[d]	357.8	4.53[d]	33782.1
(*n* = 24)	*SD*	16.73	0.64		1.09	
Full sample	*M*	7.59	1.49	30.3	2.55	357.0
(*n* = 254)	*SD*	13.79	1.00		1.67	

Note: Different letter superscripts indicate groups that are significantly different according to post hoc Tukey B tests, $p < .05$. Frequency and total money risked were analyzed using log base 10 values and the mean given is the log value. A constant of 1 was added to all raw numbers before transformation because a log value cannot be computed for zero. The geometric means were computing by using the log value as an exponent and a constant of 1 was subtracted from the result ($x_g = (10^{(\text{mean}(\log x))}) - 1$)

of total money risked gambling, $F(4, 253) = 78.1$, $p < .001$, $\eta^2 = .55$. For log of gambling episodes per year post hoc comparisons indicated that all means were significantly different except for the contrast between moderate and severe problem gamblers. For total money risked, all means were significantly different (see Table 2 for details). The group differences found for HCG, gambling episodes and money risked suggests that, at least on average, the PGSI based categories represent real differences between the participants.

Aggregate Problem Gambling Scores

It is not known if problem gambling is best thought of as a discrete disorder (e.g., non-problem vs. severe problem) or a continuous construct that varies from non-problem to severe problem. As noted above, several scales were employed to measure problem gambling, and all were strongly correlated with each other. In order to examine problem gambling as a continuous construct an aggregate problem gambling index score (Turner et al. 2006, 2008) was derived by combining the DSM-IV-TR, SOGS, PGSI, and HCG scores together. The aggregate was computed by extracting one component score from the SPSS data reduction procedure (eigenvalue 1 = 82.4% of the variance). This aggregate problem gambling component score was used to examine correlates of problem gambling.

Criminal Activity and its Relationship to Gambling

On average the offenders were serving time for 5.1 ($SD = 5.8$) offences, had been convicted of an average of 23.1 ($SD = 20.5$) offences in their lifetime, and were currently sentenced to 168.8 weeks ($SD = 84.6$) of incarceration. Aggregate problem gambling scores were not correlated with the length of the current sentence $r = -.01$, *ns*. However,

aggregate problem gambling scores were positively correlated to number of federal convictions, $\rho = .19$, $p < .01$, and number of federal sentences, $\rho = .14$, $p < .05$, and negatively correlated with being a first time offender, $\rho = -.17$, $p < .01$.

As shown in Table 3, the mean number of violent offences committed in their lifetime was 3.7 ($SD = 4.1$), and the mean number of income producing offences was 9.4 ($SD = 11.7$). On average severe problem gamblers had been convicted of 15.0 ($SD = 10.3$) income producing offences whereas non-problem gamblers had been convicted of 8.1 ($SD = 11.7$) income producing offences. Note that some offences such as robbery count as both violent and income producing offences.

Significant PGSI group differences were found for income producing offences, $F(4, 253) = 7.3$, $p < .001$, $\eta^2 = .11$, and non-violent, non-income producing offences, $F(4, 253) = 3.7$, $p < .01$, $\eta^2 = .06$, but no significant group differences in the number of violent offences, $F(4, 253) = 1.4$, $p = .24$, $\eta^2 = .02$ (see Table 3 for details).

As shown in Table 4, the most common income producing offence was theft (55.5%), followed by possession of property obtained by crime (45.3%), break and enter (32.4%), and robbery (32.4%). Aggregate problem gambling scores were most strongly correlated with theft, $\rho = .25$, $p < .001$, break and enter, $\rho = .22$, $p < .01$, and robbery, $\rho = .21$, $p < .01$. The 24 severe problem gamblers made up 9.4% of the sample, but had committed 15.1% of the income producing offences, 20.3% of the break and enter offences, and 14.6% of the thief offences, and 13.4% of the robbery offences.

Games Played

On average offenders reported starting to gamble at the age of 16.7 ($SD = 6.4$). In addition, aggregate problem gambling scores were associated with gambling while under the influence of alcohol, $r = .27$, $p < .001$, or other substances, $r = .19$, $p < .01$.

As shown in Table 5, the most common games played by the offender sample were lotteries (55.8%), scratch tickets (43.1%), and private card games (24.9%). More than a

Table 3 Number of different types of crime committed in their lifetime by problem gambling status

PGSI group		Income producing	Violent	Other
Non-gamblers	*M*	8.3[a]	4.9	9.7[ab]
($n = 36$)	*SD*	12.6	4.4	11.1
Non-problem	*M*	8.1[a]	3.5	9.7[abc]
Gamblers ($n = 97$)	*SD*	11.7	4.1	10.6
Low risk	*M*	7.4[a]	3.1	8.0[a]
($n = 57$)	*SD*	10.8	3.1	9.9
Moderate problems	*M*	13.2[b]	3.9	10.5[bc]
($n = 40$)	*SD*	11.9	3.5	6.8
Severe problems	*M*	15.0[b]	4.3	14.9[c]
($n = 24$)	*SD*	10.3	5.7	12.2
Full sample	*M*	9.4	3.7	9.9
($n = 254$)	*SD*	11.7	4.1	10.3

Note: The significance was evaluated using the logarithmically transformed data. Groups with the same letter superscript are not significantly different according to post hoc Tukey B tests, $p < .05$. "Other" refers to offences that are neither income producing or violent such as vandalism, contempt of court, and drunk driving

Table 4 Income producing crimes and their correlation with aggregate problem gambling scores

Offence	At least one offence (%)	ρ
Income producing	77.4	.26***
Theft	55.6	.25***
Possession of property obtained by crime	45.5	.15*
Break and enter	32.3	.22**
Robbery	32.3	.21**
Other	25.7	.15*
Fraud	19.8	.03
Trafficking	18.7	.00
Forgery	6.6	−.04
Extortion	1.2	−.05
Counterfeiting	1.2	.17**

* $p < .05$; ** $p < .01$; *** $p < .001$

third of the current sample (38.8%) reported gambling in some form of non-regulated game (e.g., private card games, sports bets, games of skill).

For each type of gambling, offenders were asked if it was a problem for them. The majority of severe problem gamblers (79%) endorsed at least one game as being a problem to them. On average the severe problem gamblers reported having problems with 2.4 games ($SD = 2.6$) and the moderate problem gamblers reported having problems with 0.9 games ($SD = 1.6$). As shown in Table 5, amongst severe problem gamblers, 41.7% reported having a problem with casino card games and 31.8% reported have a problem with scratch tickets. In addition, 37.5% of the severe problem gamblers reported having a problem with at least one of the non-regulated forms of gambling (e.g., games of skill, private card games, internet gambling, and sports bets). The participants were also asked which form of gambling was the biggest problem for them. Severe problem gamblers were most likely to report that casino card games (20.8%) and scratch tickets (20.8%) as their most problematic games. Moderate problem gamblers were most likely to report that private card games (30.8%) were their biggest problem. None of the severe problem gamblers and only 7.7% of the moderate problem gamblers indicated that slot machines or video poker was their biggest problem.

A little more than a third of the offenders (38.5%) reported gambling while in prison. Aggregate problem gambling scores were significantly correlated with gambling in prison, $\rho = .35$, $p < .001$. As shown in Table 6, the most common games played in prison were card games (33.2%), sports bets (13.9%) and other games such as dice (7.4%). Severe problem gamblers were most likely to report having problems with card games and sports betting while in prison.

Relationship Between Gambling and Crime

Nearly half of the severe problem gamblers (43.5%) and 15% of the moderate problem gamblers endorsed item 8 of the DSM-IV-TR indicating that they had committed crimes in order to gamble. To explore the link between gambling and crime in more detail, 106 participants were interviewed about the links between gambling and their criminal history. During the interview the participants were asked if gambling problems led to their criminal activity or if their criminal activity led to gambling. Responses were recorded on a note pad

Table 5 Game participation, weekly participation, and problematic play in year prior to incarceration

	Participation		Is game a problem for you	
	In past year (%)	Weekly (%)	Moderate (%) ($n = 40$)	Severe (%) ($N = 24$)
Lottery tickets	55.8	26.5	10.0	12.5
Scratch tickets	43.1	25.4	17.9	31.8
Pull tabs	15.8	6.7	5.0	8.3
Private card games	24.7	8.8	20.0	16.7
Casino card games	20.2	4.8	5.0	41.7
Other casino table games	6.7	1.2	2.5	17.4
Slot machines	20.2	2.4	7.5	20.8
Video poker	2.8	0.0	0.0	8.3
Stock market speculation	1.6	0.8	0.0	4.3
Race track betting	7.5	2.7	0.0	16.7
Sports lotteries	19.7	13.4	10.0	25.0
Bingo	14.2	1.2	5.0	4.2
Real-estate speculation	0.4	0.0	0.0	0.0
Sports betting	11.6	3.2	2.5	16.7
Internet gambling	3.9	2.8	0.0	0.0
Games of skill	17.9	6.9	7.5	20.8
Other games	2.8	1.2	0.0	0.0

Table 6 Game participation, weekly participation, and problematic play while in prison

	Participation		Is game a Problem for you?	
	In past year (%)	Weekly (%)	Moderate (%) ($n = 40$)	Severe (%) ($N = 24$)
Lottery tickets	2.0	0.0	0.0	4.2
Pull tabs	0.4	0.4	0.0	4.2
Private card games	33.2	22.7	18.9	16.7
Sports lotteries	4.7	2.4	5.0	12.5
Bingo	0.8	0.0	0.0	4.2
Sports betting	13.9	5.2	0.0	16.7
Games of Skill	5.9	2.4	2.5	4.3
Other games (e.g., dice)	7.4	4.7	2.5	12.5

Note: responses to other games were mostly for playing dice games for money. Games of skill in prison often involved competitive activities such as weight lifting or basketball

and coded into one of four categories: (1) gambling led to crime, (2) gambling was part of their criminal lifestyle, (3) unclear or two-way relationship, (4) gambling and crime were unrelated. Examples of each category are given in Table 7 and the frequency of each type of response is shown in Table 8.

As shown in Table 8, of the 23 severe problem gamblers interviewed, 65.2% reported that gambling lead to criminal activity. In contrast, only, 20.0% of the moderate problem gamblers reported that gambling led to their criminal activity. Severe problem gamblers

Table 7 The relationship between crime and gambling

Gambling led to crime	The participant reported committing crimes as a direct consequence of gambling. In most cases the crime was committed to finance gambling or to pay gambling debts. • Robbery was committed to pay off a loan that was taken out to pay off an earlier gambling debt. • Gambling led to debt, my debt led to crime… and around it goes. • Need for money to gamble with led to fraud. Proceeds of fraud going directly to gambling. • Took up muscling for bookie in order to pay off gambling debts. Involvement in criminal lifestyle led to more gambling, specifically when collecting would offer debtor opportunity to bet double or nothing.
Gambling part of criminal lifestyle.	The participant reported that gambling was part of his criminal life style. In some cases they were involved in illegal gambling operations as bookies, enforcers, or players. In other cases they said that their criminal activity produced ready money that they could gamble with. • Criminal activity put me in jail, which is where I learned bookmaking • I was bringing in $5,000/wk and had to spend it somewhere • Card games held privately therefore illegal. Criminal peers enjoyed gambling therefore I gambled as well. • Crime provided more time and disposable income to gamble with and paid bills. Had more money to gamble with. • Criminal lifestyle allowed lots of cash and lots of free time.
Unclear or two way relationship	Responses where there was a relationship between gambling and crime, but the relationship was unclear. In some cases the participant description of the relationship suggested a two-way relationship between crime and gambling. • Won at gambling and then used proceeds to buy a big bag of weed. Also Gambling privately in unlicensed establishments is illegal. • Extra money from criminal activity did lead to additional pull-tab activities. Also used stolen car to get around town where pull-tabs were available. • Used proceeds to gamble with and committed property crimes to pay off gambling debts.
Unrelated	Crime and gambling were unrelated. In most cases the person simply stated that they were unrelated. • Unrelated. • Reported no gambling during 8-month crime spree due to disinterest in anything but getting high on crack.

Table 8 Relationship of gambling and crime across the categories of gambler interview type

Relationship	Random Non-problem (n = 23)	Non-random Non-problem (n = 30)	Moderate problem (n = 30)	Severe problem (n = 23)
Gambling led directly to criminal activity.	0.0%	20.0%	20.0%	65.2%
Gambling was part of criminal life style.	21.7%	23.3%	36.7%	8.7%
Unclear or two-way relationship.	0.0%	10.0%	13.3%	4.3%
Unrelated.	78.3%	46.7%	30.0%	21.7%

Note: Non-problem in this case is a combination of non-problem and low risk gamblers

were significantly more likely than moderate problem gamblers to claim that their gambling lead to their crime, *chi-square* $(1, n = 53) = 11.1, p < .001$. More than a third of the moderate problem gamblers (36.7%) and more than a fifth of the non-problem gamblers reported that gambling was part of their criminal life style.

Discussion

Consistent with the first hypothesis, the rate of moderate and severe problem gamblers in the offender sample was much higher than is found in the general population. According to PGSI 9.4% of the offender sample are severe problem gamblers and 15.7% are moderate problem gamblers for a combined total of 25.1%. Regardless of the measurement tool used, the prevalence for the offender population was significantly greater than the general population ($p_b < .01$), which tends to be around 1.14% (Shaffer et al. 1999). The four measures used provided a wide range of estimates and these variations should be taken into account when selecting a particular measure or in comparing studies.

This paper focused on the prevalence of severe problem gambling (level III) because more than 90% of people who seek treatment in Ontario score above the threshold for level III gambling (Urbanoski and Rush 2006). However in their summary of the literature, Williams et al. (2005) combined level II and level III and estimated an average rate of 33% in the offender population. In our study, the estimate for the combination of level II and III gambling ranged from 16.1% (±4.5) for the DSM-IV-TR to 25.1% (±5.3) with the PGSI. According to a binomial test our estimates are significantly lower than the average of 33% ($p_b < .05$) reported in the review by Williams et al. (2005). This might be because some of the studies reviewed by Williams et al. (2005) used a low cut off score to assess problems (e.g., a SOGS score of 1 or more). Alternatively it might be because the present study was conducted within a population of federal offenders who were serving time for more serious (often violent) offences. Replication in a provincial setting might yield a larger estimate for the prevalence of severe problem gambling in the offender population.

The data collected in the present study were drawn from the federal correctional system. It is not known to what extent these data can be generalized to the correctional system as a whole. However, given that higher prevalence rates have been found in some other studies (Williams et al. 2005), it is reasonable to use the rates from this study as a somewhat conservative estimate of the scope of severe problem gambling in the Canadian correctional system. According to Statistics Canada (2007) in 2004/2005 there were 33,123 people incarcerated across Canada of which 12,582 were federal sentences. In addition they report that there were 119,209 people sentenced in the community (probation and conditional) sentences. Using the PGSI estimate of 9.4% (±3.4%) translates into an estimate of 3,114 (±1,126) severe problem gamblers incarcerated in Canada of which 1,183 (±427) are in federal institutions. In addition, there may be 11,205 (±4,053) severe problem gamblers serving community sentences across Canada. These figures suggest that there may be a significant need for services for the offender population.

As hypothesized, the severity of problem gambling was significantly correlated with income producing crimes, and not with the number of violent crimes. These findings suggest that severe problem gamblers commit some of their crimes because of their gambling. This was supported by the interview data where nearly two-thirds of the severe problem gamblers reported that their gambling led to their crimes. Williams et al. (2005) describe the crimes of problem gamblers as being for the most part as non-violent property crimes, but according to this study, moderate and severe problem gamblers were neither

more or less likely to have committed violent offences compared to the rest of the offenders. The fact that the present sample only included federal offenders may have resulted in range restriction in terms of violent crimes. In the current sample 81.6% of the offenders had committed at least one violent offence. As noted in the introduction, Lahn and Grabosky (2003) found higher rates of violence amongst offenders who scored between 1 and 9 on the SOGS compared to those who scored higher than 10 on the SOGS. We found no evidence of a negative correlation between any of our measures of problem gambling, and the number of violent offences (e.g., SOGS and # of violence offences, $r = -.01$), including or excluding people who scored 0 on the measures of problem gambling. The number of violent crimes reported by Lahn and Grabosky (2003) and by Abbott et al. (2005) was much lower than was found in the current study. Although the combined rate of moderate and severe problem gambling found in the current study was somewhat lower than has been found in other studies, it was still high enough to suggest that severe problem gamblers are as capable of violence as other offenders. Further study of provincial and non-custodial populations is needed to examine this link more completely.

Consistent with the 3rd hypothesis, there were some interesting differences between the offender sample and other samples of severe problem gamblers. Compared to males in the general population ($N = 1{,}251$; Turner et al. 2005) the offenders in the present study were more likely to report participating in private card games (24.7% ± 5.3 vs. 10.7% ± 1.7) and casino card games (20.2% ± 4.9% vs. 10.4% ± 1.7). In addition, more than a third of the offenders in the current study (38.8% ± 6.0%) reported gambling in some form of non-regulated game (e.g., private card games, sports bets, games of skill). In contrast a re-analysis of data from Turner et al. (2005) found that only 26.6% (±2.5%) of the males reported engaging in some form of non-regulated gambling ($p_b < .01$). Furthermore, most severe problem gamblers in treatment identify electronic gambling machines as their major area of concern (Dorion and Nicki 2001; Counter and Davey 2006; Urbanoski and Rush 2006). In the current offender sample 20.8% of the severe problem gamblers reported having a problem with slot machines and 8.3% reported having a problem with video poker. What is particularly surprising is that none of the severe problem gamblers indicated that slot machines or video poker was their biggest problem. It might be argued that the participants might no longer consider slot machines their biggest problem because they are now incarcerated and have no access to the machines. However, the participants were asked to complete the questionnaire in terms of the 12 months prior to incarceration. In addition participants did list casino card games (20.8%), other casino table games (12.5%), and horse race betting (12.5%) as their biggest problem and these games are also unavailable to the offenders while in prison. The differences between the offender and the general populations must be taken into account in developing treatment programs for this population.

Consistent with the 4th hypothesis, most of the severe problem gamblers (65.2%), but only 20% of the moderate problem gamblers reported engaging in criminal activity because of their gambling problems. Based on these findings, it would seem that amongst the most severe cases some of their crime may be a result of a pre-existing gambling problem, but this is often not the case amongst moderate problem gamblers. The interview results suggest that moderate and severe problem gamblers maybe quite different populations in terms of the relationship between gambling and criminal conduct.

The link between problem gambling and crime does not mean that gambling is necessarily the cause of crime for severe problem gamblers. In fact Abbott et al. (2005) have argued that offenders often have a long history of criminal behavior that precedes their gambling problems. In addition, it has been estimated that at least half of the crimes

committed by problem gamblers are not related to gambling (Williams et al. 2005). Other authors have noted that both gambling and criminal behavior may be linked to personality disorders (Blaszczynski and McConaghy 1994; Blaszczynski et al. 1989; Meyer and Stadler 1999). Nonetheless it is reasonable to argue that the treatment of severe problem gamblers has the potential to reduce recidivism. In addition, early intervention for youth who are just beginning their criminal and gambling careers has the potential for reducing both gambling and criminal problems.

The data in the current study suggest that a number of male severe problem gamblers, get trapped in a cycle of gambling debt and crime and end up in prison. The higher rate of prior offences amongst severe problem gamblers and the number of people who report gambling in prison, also suggests that prison does not end the cycle of gambling debt and crime. The results suggest a significant need to provide treatment services for this population. During the course of this study a large number of the participants asked for information on problem gambling so we handed out many information booklets to the participants. These requests suggest that there is a demand for services for this population. Some agencies in Ontario have piloted treatment services to offenders, but currently no systematic effort has been made to help problem gamblers in the correctional system. Treatment services are available in Ontario for free through counseling agencies which are accessible to the offenders after release (e.g., probation), but the absence of any assessment for problem gambling means that such services are not offered (or required) on a regular basis.

This study had a number of limitations: First, it was conducted in an assessment unit for recently convicted federal offenders. Some repeat federal offenders who had been previously assessed would proceed more quickly through the assessment unit to their parent institutions to serve their sentences and therefore may have been under sampled in this study. Second, it is not known the extent to which the results can be generalized to provincial or community offender populations because people are typically given federal sentences for more serious offences or for having longer criminal histories. Third, although only a small number of participants (7) were excluded from the study due to language difficulties or missing values, it is unknown how many refused to participate because of language related problems or difficulty reading. Fourth, because the majority of these offenders were new to the federal prison system the study could not adequately examine gambling problems that exist in prison or that developed after entering prison. We are currently conducting a study that is looking at all levels of the correctional system to more thoroughly examine gambling problems in the offender population. Fifth, the study relied on self reports of offenders' and this brings up issues with reliability of the offenders self reports. The offenders may have reported a direct link with gambling in response to demand characteristics of the researchers or to justify their offences. This is possible, but does not explain why the severe problem gamblers were more likely than the sub-clinical or non-problem gamblers to report that gambling lead to their criminal behavior. In addition the manner in which some offenders casually talked about the difficulties associated with having $5,000 or more dollars per week to spend, suggests that some were quite open about their offences.

In summary, this study found evidence that severe gambling problems are quite common amongst federal offenders in Ontario. Compared to non-problem gamblers, severe problem gamblers were significantly more likely to have committed income producing offences, but were neither more nor less likely to have committed violent offences. If severe problem gamblers commit crimes to support their addiction they are likely to reoffend if their addiction is not addressed. Treatment services could be made available to,

or required by, offenders while incarcerated or upon release. Williams et al. (2005) have argued that mandating treatment as opposed to jail for first-time nonviolent offenders is less costly and more effective in reducing recidivism for drug-abusing offenders. They recommend that similar "gambling courts" should be used to divert non-violent severe problem gamblers away from prison and into treatment. Given the high rate of violent offences in the current sample, such a system would not apply to most federal offenders. However, it might prevent first time non-violent offenders from progressing to the federal system. In addition, although gambling within institutions is officially not permitted, the results indicate that it is nevertheless quite common. Williams (2008) has argued that gambling in the offender population is mostly harmless leisure activity, but others have argued that gambling within institutions may result in institutional violence and disciplinary problems (Walters 2005; Zinger and Wichmann 1999). The presence of gambling in prison must be taken into account in any assessment protocol or intervention strategy for this population. Further study in parent institutions (e.g., after the assessment and placement of offenders) is needed in order to estimate severe gambling problems that exist in prison or that could develop after entering prison.

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