# PROBLEM GAMBLING AND MENTAL HEALTH COMORBIDITY IN CANADIAN FEDERAL OFFENDERS

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This article examines the relationship between problem gambling, mental health, and criminal behavior in a sample of incarcerated Canadian male federal offenders ($N = 254$). In particular, the study compared correlates of problem gambling in the offender population with the correlates of problem gambling in a nonoffender population from a previous study. The offenders were assessed using self-report tests, interviews, and a file review. Of these offenders, 106 were interviewed in more depth. Results indicated that problem gambling was significantly correlated with social anxiety, depression, substance abuse, impulsiveness, and current and childhood attention-deficit/hyperactivity disorder (ADHD) symptoms. In addition, the results indicated that the correlates of problem gambling were similar in offender and nonoffender populations. The relationship of gambling problems to depression, anxiety, substance abuse, ADHD, and impulsiveness suggests that any intervention for this population needs to be comprehensive and take into consideration a broad range of clinical needs.

*Keywords:* mental health; comorbidities; problem gambling; adult offenders; types of crime

In the general population, evidence suggests that severe problem gamblers are a heterogeneous group of people (Blaszczynski & Nower, 2002; Stewart & Zack, 2008; Turner, Jain, Spence & Zangeneh, 2008; Turner, Zangeneh, & Littman-Sharp, 2006) who develop gambling problems for a variety of reasons and suffer from a number of comorbid mental health problems, including depression, anxiety, impulsivity, and substance abuse (Bland, Newman, Orn, & Steblesky, 1993; Blaszczynski & McConaghy, 1989; Turner et al., 2008).

Previous studies in the United States (Templer, Kaiser, & Siscoe, 1993; Walters, 1997), Australia (Lahn & Grabosky, 2003), New Zealand (Abbott & McKenna, 2000; Abbott, McKenna, & Giles, 2000, 2005), and other countries have found very high rates of problem gambling in correctional populations, with an average prevalence estimate of 33% (Williams, Royston, & Hagen, 2005).[1] In contrast, in the general population in Canada and in the United States, approximately 4% of the population are considered to be problem gamblers; 1% have severe gambling problems, and 2% to 3% have moderate gambling problems (Canadian Partnership for Responsible Gambling, 2009; Ferris & Wynne, 2001; Room, Turner, & Ialomiteanu, 1999; Shaffer, Hall, & Vander Bilt, 1999; Wiebe, Mun, & Kauffman, 2006). The high prevalence of problem gambling in the correctional population suggests that problem gambling is an important issue for correctional research. To determine programming needs for problem gamblers in the correctional population, we need more information on mental health problems in this population. In the current article, we examine correlates of problem gambling in the offender population to determine whether problem gamblers in this population are similar in terms of comorbidities and correlates to problem gamblers in a nonoffender population.

According to Blaszczynski and Nower (2002), people develop gambling problems for different reasons or via distinct pathways. Some people may develop a problem because of unusual experiences while gambling (e.g., big wins) or erroneous beliefs about winning. Others are emotionally vulnerable (e.g., depressed, anxious) and develop a gambling problem to help cope with these emotional problems. In a third group, people are impulsive by nature, which may lead them to seek out the stimulation of the gambling experience. In the current study, we examined the correlates of problem gambling in an offender population to determine whether the same relationships are found in the offender population as have been found in nonoffender populations. To examine correlates of problem gambling, we included variables related to each of the pathways. Most of the relevant variables in these pathways were also used in Turner et al. (2008). The similarity in methods and questionnaire between these two studies provided us with an opportunity to compare correlates of problem gambling in a general population sample to the correlates of problem gambling in an offender population sample.

Another issue is the interrelationship of problem gambling and other psychiatric problems. Numerous studies have found that problem gamblers demonstrate significantly higher rates of depression, anxiety, attention-deficit/hyperactivity disorder (ADHD), substance abuse problems, and other mental disorders than does the general population (Bland et al., 1993; Blaszczynski & McConaghy, 1989; Elia & Jacobs, 1993; Linden, Pope, & Jonas, 1986; National Opinion Research Center, 1999; A. Roy, Custer, Lorenz, & Linnoila, 1988; Smart & Ferris, 1996; Specker, Carlson, Christenson, & Marcotte, 1995; Turner et al., 2006, 2008). Similarly, offenders demonstrate higher rates of depression, anxiety, ADHD, and substance abuse problems than does the general population (Blocher et al., 2001; Boe & Vuong, 2002; Dalteg, Gustafsson, & Levander, 1998; Motiuk & Porporino, 1991; Rasmussen & Gillberg, 2000; M. Roy, 2001). This is an interesting parallel between the two populations. However, what is not clear for either the offender or the problem gambler population is whether a mental disorder precipitates, or is a consequence of, problem gambling.

This study examined gambling behavior in a sample of incarcerated Canadian male federal offenders. In a previous article based on these data, Turner, Preston, Saunders,

McAvoy, and Jain (2009) reported that 9.4% (±3.4%) of the offenders scored in the severe problem range of the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). An additional 15.7% (±4.5%) of the offenders scored in the moderate problem range of the PGSI. That article focused mainly on estimating the prevalence of severe problem gambling and its relationship to criminal behavior. In the present article, we examine the data from Turner et al. (2009) in terms of mental health and other correlates of problem gambling. In addition, this article examines the temporal relationship between gambling and mental disorder.

On the basis of previous research, we hypothesized the following:

*Hypothesis 1:* Variables that have been identified as correlates of the severity of problem gambling in previous studies with nonoffenders (e.g., Blaszczynski & Nower, 2002; Turner et al., 2008) would also be related to problem gambling in the offender population. In particular, we expected to find significant correlations between severity of problem gambling and measures of mental health problems (Hypothesis 1a), impulsiveness (Hypothesis 1b), and cognitive and experiential variables (Hypothesis 1c).

*Hypothesis 2:* Substance use would be related to the severity of problem gambling.

*Hypothesis 3:* Some indicators of mental health problems would be related to larger numbers of crimes committed, whereas other indicators of mental health problems would not be. In particular, it was expected that impulse variables would be related to more criminal behavior, but mood problems would not be. In addition, it was hypothesized that the severity of problem gambling would be a significant predictor of the number of income-producing offenses but not a predictor of the number of violent offenses.

*Hypothesis 4:* The relationship between gambling and mental disorder would vary depending on the individual. For some, gambling may precipitate mental disorder; for others, mental disorder may precipitate gambling; whereas for others, gambling and mental disorder may appear to be unrelated. It was hypothesized that with more severe cases, mental health problems and gambling problems would be more strongly related to each other.

## METHOD

### PARTICIPANTS

Participants were 254 male offenders in an intake assessment unit of the Correctional Service of Canada (CSC). In Canada, offenders are placed under federal jurisdiction if they are sentenced to 2 years or more. The assessment unit is the reception center for recently convicted federal offenders in Ontario and therefore is an ideal location to assess a large, representative sample of recently sentenced federal offenders. Some repeat federal offenders, however, may have been fast-tracked through the assessment unit and may have been underrepresented in this study.

There were no specific exclusion criteria for the study. However, 7 participants were excluded for difficulties with language or for excessive missing values. We asked 651 offenders whether they would be interested in volunteering for the study. 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 their gambling history and mental health.

The mean age of the offender sample was 34.6 years (*SD* = 10.8), with both the median and mean being within 1 year of CSC figures for the same time period (Cormier, 2005). The sample was 68% Caucasian, which is very close to the national figure of 70%. The

current sample, however, had a smaller proportion of Aboriginal offenders than did the national sample (7% vs. 16%) and a higher proportion of "Other" offenders (10% vs. 3%; Cormier, 2005). These differences are likely attributable to the fact that the current sample was collected in southern Ontario. According to Statistics Canada (2006), the proportion of the population with an Aboriginal background in Ontario (3.4%) is smaller than in the rest of Canada (6.7%), and the proportion of the population from other ethnic backgrounds, such as South Asian, is larger (6.7% vs. 2.5%, respectively). Prior to incarceration, 52.5% of the sample were 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 had been employed full time.

## COMPARISON SAMPLE

In addition, the results from the current study were compared to the results from a study of the correlates of problem gambling in a general population sample (i.e., not incarcerated) collected by Turner et al. (2008). The questionnaire package used for these two studies was largely the same. Turner et al.'s (2008) sample consisted of 141 people, of whom 76 were male. For the comparison, we used only the data from the males. The average age of the males in that sample was 40.5 ($SD = 12.3$). Three quarters of the male sample (75.2%) had completed a secondary education, and 25% reported a postsecondary education. The majority of the male sample was Caucasian (74.2%). The pathways sample was similar to the current offender sample in terms of ethnic makeup but was significantly older and much more educated than the incarcerated sample. In the comparison sample, 27 were nonproblem gamblers, 19 were moderate problem gamblers, and 30 were severe problem gamblers (see Turner et al., 2008, for more details).

## PROCEDURE AND DESIGN

The project was reviewed by the research ethics board of the Centre for Addiction and Mental Health (CAMH) and the research branch of the CSC. 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 and asked to attend an information session. Two research assistants explained the study, answered questions, and solicited volunteers. Those who volunteered were invited to a meeting with the researchers on a subsequent day. They first read and signed a consent form indicating that their participation in the study was voluntary, that they could withdraw at any time without any negative repercussions or consequences, and that they would not receive any rewards or compensation for participating. For each individual, it was made clear that the study had nothing to do with the correctional institution and that the results would not be shared with institutional staff (unless required by law). They were also asked to consent to the file review.

Participants then completed a series of questionnaires designed to screen for problem gambling, examine various aspects of gambling behavior, and assess several mental health indices. Participants completed the questionnaires in small groups of approximately 1 to 10 but were seated at separate desks spaced well apart. The researchers assisted anyone who needed help completing the questionnaires because of issues of language comprehension.

**MEASURES**

The questionnaire package for the current study was largely derived from a questionnaire package used by Turner et al. (2006, 2008) to study problem gamblers in the general population. Problem gambling was assessed using the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987, 1993) framed in terms of past year (alpha = .87) and lifetime (alpha = .89), a questionnaire based on the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV-TR*; American Psychiatric Association, 2000; alpha = .85), and the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001; alpha = .93). The PGSI comprises the nine key severity indicators from the Canadian Problem Gambling Index that was developed by Ferris and Wynne (2001). The items are scored on a scale (*never*, *sometimes*, *often*, and *always*). In contrast, the SOGS and *DSM-IV-TR* questionnaire mostly consist of binary yes-or-no-type questions. In addition, the PGSI recognizes a continuum of disordered gambling with categories of nonproblem, low-risk, moderate-risk/moderate problem, and severe problem gambler, which is roughly equivalent to "pathological gambler." The PGSI criteria were developed and tested both with a clinical sample and with a general population sample, and a strong empirical approach was used to identify the final set of items composing the scale.

In addition, a 12-item Harmful Consequences of Gambling Scale (HCG; Turner et al., 2006, 2008) was included that asked participants to rate on a 7-point scale the 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.

For each participant who consented, a file review was carried out to gather and verify demographic, mental health, and criminal history information.

To assess mental health indices, the questionnaire package included measures of coping style (Ways of Coping Questionnaire; Folkman & Lazarus, 1988; e.g., "I hoped for a miracle"), depression (Radloff, 1977; Robinson, Shaver, & Wrightsman, 1991; e.g., "I thought my life had been a failure"), impulsiveness (Barrat, 1987, e.g., "I buy things on impulse"), social anxiety (Leary, 1983; Robinson et al., 1991; e.g., "I often feel nervous even in casual get-togethers"), general anxiety (Zung, 1971; e.g., "I feel more nervous and anxious than usual"), and substance use as measured by the Drug Abuse Screening Test (DAST; Skinner, 1982; e.g., "Have you had 'blackouts' or 'flashbacks' as a result of drug use?") and the Problems Related to Drinking Scale (PRD; Porporino, Robinson, Millson, & Weekes, 2002; e.g., "Did your drinking result in marital or family separation?"). Each of these instruments has been shown through previous research to be reliable and valid for use with various populations. Turner et al. (2006, 2008) found that several of these variables (e.g., Ways of Coping Questionnaire, depression, impulsivity, social anxiety, general anxiety) were strongly related to the severity of problem gambling.

In addition, we included a measure of adult ADHD used by the Adult Attention Deficit Disorder Clinic at the CAMH that is based directly on the *DSM-IV-TR* diagnostic criteria for ADHD (e.g., often have difficulty maintaining attention while playing or during tasks). The scale provides measures of retrospective childhood and current adult attention-deficit and hyperactivity problems. In a previous study, this measure of adult ADHD was found to be very reliable (alpha = .91) and was correlated with impulsivity, $r = .43$; problem gambling, $r = .36$; and difficulties with work or school, $r = .22$ (Turner et al., 2008). An examination

of data collected for another study (Muglia, Kennedy, Jain, & Turner, 2004) revealed that this measure was significantly correlated with all the subscales of Brown's (1996) ADD Scale. To score the scale, we treated it as a continuous variable of symptom endorsement. These various measures were included in this questionnaire package to allow us to compare problem gamblers in the prison sample with nonincarcerated problem gamblers (Turner et al., 2008).

To assess erroneous beliefs, we used the 22-item Random Events Knowledge Test (REKT; Turner et al., 2006; e.g., "False or true: Looking for a machine that has not paid out in a while will help you win"). Turner et al. (2006) found the REKT had adequate internal reliably, alpha = .70. Previous studies indicate that the REKT is negatively related to pathological gambling with an effect size of approximately $r = -.30$ (Turner et al., 2006, 2008, 2009).

In addition, the study included the Winning-Experiences Questionnaire (WEQ), which was developed through interviews conducted by Turner, Littman-Sharp, Zangeneh, and Spence (2002). The WEQ is a collection of questions about the timing and size of wins and the feelings evoked by wins. Key variables from the WEQ used in the current study are whether the respondent has ever had a big win, whether he had a big win the first time he gambled, whether he had won in the early days after he had first won, and the size of his first win. Turner et al. (2006) found that compared to nonproblem social gamblers, pathological gamblers were more likely to report having a big win, to report winning the first time they gambled, and to report larger first wins.

### INTERVIEWS

All those classified as moderate or severe problem gamblers were asked to participate in an interview in a second session. In addition, nonproblem 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, one sixth of the remaining participants were randomly selected for an interview ($n = 23$). The interviews were conducted by two research analysts. One would interview the offender while the other recorded the information on a notepad. The interview consisted of 14 questions on the respondent's gambling history, his criminal history, and the interrelationship between the two. For the present article, the focus is on the following question:

Which of the following best describes your experience?

(a) Gambling led to problems with my mental health.
(b) My mental health led to problems with gambling.
(c) My gambling and mental health are unrelated.

The respondent's answer was written down and then grouped in terms of whether the person described that (a) gambling led to mental health problems, (b) mental health problems led to gambling, (c) there was an unclear or two-way relationships between the two, or (d) they were unrelated. The interview data were organized by the two research associates (SM and LG) on the basis of their literal content. In the event of a disagreement, the

full team would discuss the description and reach a consensus. More information about the interviews can be obtained by contacting Turner.

It was not possible to interview all participants selected because some offenders were transferred to their parent institutions prior to being interviewed. Interview completion rate was 81% for the nonproblem gamblers, 75% for the moderate problem gamblers, and 96% for the severe problem gamblers. Participants were interviewed jointly by two researchers (CS and SM) to ensure consistent, accurate, and complete data collection as well as the safety of the interviewers. The sample sizes of low-risk and nonproblem participants within the random and nonrandom groups were too small for separate analysis; thus for the interview analysis, the low-risk and nonproblem 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 nonrandom).

In the interview, offenders were asked additional questions about their gambling behavior, their criminal histories, and their mental health. A semistructured interview format was used and the interview results were coded and analyzed statistically.

## RESULTS

Of the offenders, 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 offense, and 77.4% had committed at least one income-producing offense. On average, participants reported 36.0 weeks ($SD = 36.8$) since last being on the street (time since arrest or incarceration) and, according to file information, had been sentenced to a median of 2.8 years in prison ($M = 3.2$, $SD = 1.6$). This average excluded 14 offenders (5.5%) sentenced for murder who were listed as having indeterminate sentences.

As reported in Turner et al. (2009), according to the PGSI, 9.4% of the sample were severe problem gamblers. The SOGS suggested that 13.0% of the sample were probable pathological gamblers. The *DSM-IV-TR* questionnaire yielded an estimate of 6.3%. Although these figures differ, they are all substantially higher than the rate of pathological gambling in the general public, which is approximately 1% (Shaffer et al., 1999; Wiebe et al., 2006).

After estimating the prevalence of problem gambling and various mental health indices, we examined the relationship between severity of gambling problem and these indices. In general, the PGSI was used in the analysis of the present study as a measure of the severity of problem gambling because it falls midway between the conservative *DSM-IV-TR* and the liberal SOGS past-year measures. However, the PGSI was not used in the pathways study. To compare the two studies and to test Hypotheses 1a, 1b, and 1c, we computed a problem gambling severity measure by aggregating *DSM-IV-TR* scores, SOGS lifetime and past-year scores, and HCG scores. The two files were first merged, and then an aggregate variable was computed using the data reduction program from SPSS (principle components analysis). This analysis revealed that 83% of the variance of these variables could be accounted for by a single factor. The same method was used to examine the correlates of problem gambling in the pathways study (Turner et al., 2008). In the offender sample, the

**TABLE 1:  Correlations of Severity of Problem Gambling With Mental Health, Impulse Control, and Other Variables for Offender and General Population Samples**

| | Correlation | | Regression Analysis | | |
|---|---|---|---|---|---|
| Dependent Variable | Offender Sample (n = 254) | Pathways Sample (n = 76) | Pathway vs. Offender Samples | Problem Severity | Interaction of Sample and Severity |
| Mental health | | | | | |
| Social anxiety | .19** | .43*** | .19*** | .30*** | −.02 |
| Zung anxiety | .19** | .50*** | .08 | .32*** | −.08 |
| Depression | .22** | .43*** | .04 | .32*** | −.02 |
| Total stress | .49*** | .42*** | .13* | .46*** | .12 |
| Total support | −.06 | −.21 | −.06 | −.15* | .02 |
| Escape coping | .26*** | .52*** | .15** | .38*** | −.06 |
| Support coping | −.10 | .10 | .14* | .02 | −.06 |
| Impulse control | | | | | |
| Current ADHD score | .27*** | .28 | .17** | .29*** | −.01 |
| Childhood ADHD score | .20** | .00 | .13* | .16* | .11 |
| Impulsiveness | .18** | .35** | −.05 | .26*** | .04 |
| Cognitive and experiential | | | | | |
| Random events knowledge | −.22** | −.28* | −.01 | −.17** | .03 |
| Log size of first win | .28*** | .30* | .12 | .31*** | .09 |
| Big win ever | .57*** | .28 | −.25 | .79*** | .31* |
| Big win first time gambling | .42** | .66** | .33 | .69*** | −.19 |
| Big win in early days | .42** | .17 | −.15 | .54*** | .25* |

*Note.* The variables listed in column 1 were the dependent variables. The independent variables were sample (1 = pathways study, 2 = prison study) and problem gambling severity. Problem gambling severity was an aggregate of *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text revision; American Psychiatric Association, 2000) scores, South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987, 1993) lifetime scores, SOGS past-year scores, and Harmful Consequences of Gambling Scale (Turner et al., 2006, 2008) scores that was computed using the data reduction routine from SPSS using principle components analysis. The correlations in columns 2 and 3 are mostly Spearman rho coefficients, except for the last three dichotomous big-win variables, which are gamma correlations. Linear regression was used to test the main effects (Step 1) and the interaction (Step 2) for all variables except the three big-win variables, which were tested using logistic regression. The effects listed in column 3, 4, and 5 are beta coefficients except for the three dichotomous big-win variables, which are unstandardized slope estimates, *b*. ADHD = attention-deficit/hyperactivity disorder.
*$p < .05$. **$p < .01$. ***$p < .001$.

correlation between the aggregate of problem severity and the PGSI was $r = .90$, $p < .001$. The aggregate was used as a continuous measure.

*Hypothesis 1a: Mental health correlates of problem gambling.* Table 1 gives the correlations of the aggregate problem gambling measure and the 15 correlates used in the two studies and the findings of 15 regression analyses comparing the two samples. The problem gambling measure was somewhat skewed (skew = 1.6). Analyses were conducted with Pearson and Spearman correlations on the raw data as well as with log-transformed data. No differences were found between these analyses, indicating that the skew was not affecting the results. Consistent with previous research, social anxiety, rho = .19, $p < .01$; depression, rho = .22, $p < .01$; Zung anxiety scores, rho = .19, $p < .01$; and stressful life experiences, rho = .49, $p < .001$, were significantly correlated with the problem gambling aggregate score. In addition, problem gambling was correlated with reliance on escape to cope with stress, rho = .26, $p < .001$. There was no significant correlation between supportive and positive aspects of life and problem gambling. Although the effects were

significant, the sizes of the correlations for the offender sample were in general smaller than we have found in general population samples. For example, the correlation of depression and problem gambling in the current study was rho = .22, $p < .01$, whereas in our pathways study, the correlation was rho = .43, $p < .001$ (Turner et al., 2008). We used multiple regression analyses to test each mental health correlate to determine (a) whether the offender sample was different from the general population samples, (b) whether the correlation was significant across the combined data set, and (c) whether the relationship differed between the two samples (e.g., an interaction of sample and problem gambling severity). In each analysis, the mental health variable was treated as the dependent variable, and problem gambling severity and sample were treated as independent variables. As shown in Table 1, controlling for problem gambling severity, we found that the offender sample scored significantly higher on social anxiety, stressful life experiences, and reliance on escape to cope with stress. The interaction did not reach significance for any of the mental health correlates.

*Hypothesis 1b: Impulsiveness correlates of problem gambling.* Impulsiveness, rho = .18, $p < .01$; current ADHD, rho = .27, $p < .001$; and childhood ADHD symptoms, rho = .20, $p < .01$, were significantly related to problem gambling in the offender sample. Multiple regression analysis indicated that the offender sample scored significantly higher than the nonoffender sample on both current and childhood ADHD scores, but no difference was found for impulsiveness. None of the impulsiveness variables showed an interaction between sample and problem gambling severity.

*Hypothesis 1c: Cognitive and experiential correlates of problem gambling.* Scores on the random-events knowledge test were negatively correlated with the severity of problem gambling, rho = –.22, $p < .01$. There was also a significant positive correlation between the log size of the participant's first win and severity of problem gambling. In addition, participants who reported having a big win ever, a big win the first time they ever gambled, or a big win in the early days after they started to gamble scored higher on problem gambling severity. Regression analyses did not find any overall difference between the offender sample and the pathways sample on the cognitive or experiential variables, but logistic regression analysis found significant interactions for the effect of a big win ever and the effect of a big win in the early days. The slope for these interactions was positive, indicating that these effects were stronger for the offender sample than for the pathways sample.

*Hypothesis 2: Substance use and problem gambling.* PGSI scores were significantly correlated with the DAST, $r = .21$, $p < .001$, and the PRD, $r = .18$, $p < .01$. Problem gamblers were also more likely to report gambling while under the influence of alcohol, $r = .27$, $p < .001$, and drugs, $r = .19$, $p < .001$. The CSC files also included results of the DAST and PRD administered at admission to the assessment unit. Although we found significant correlations between scores obtained by CSC on the DAST and PRD and our tests (.80 and .77, respectively), we found that our scores on these tests were significantly higher than the CSC scores for both the DAST (CAMH, $M = 6.1$, $SD = 6.5$; CSC, $M = 4.4$, $SD = 5.7$; $t = 7.3$, $p < .001$) and the PRD (CAMH, $M = 2.8$, $SD = 4.0$; CSC, $M = 1.6$, $SD = 2.9$; $t = 6.8$, $p < .001$).

**TABLE 2:    Correlations of Mental Health Indicators and Number of Violent, Income-Producing, and Other Crimes**

| Variable | Violent | Income | Other | First Offense |
|---|---|---|---|---|
| Addiction variables | | | | |
| PGSI total | −.01 | .26*** | .13* | −.16*** |
| Total score on DAST | .13* | .42*** | .37*** | −.27*** |
| Total score on PRD | .17*** | .16** | .30*** | −.24** |
| Impulse control variables | | | | |
| Impulsiveness | .04 | .16** | .17** | −.10 |
| Current ADHD score | .00 | .21*** | .18** | −.18** |
| ADHD score before age 12 | .04 | .20** | .17** | −.15* |
| Mood and coping variables | | | | |
| Depression | .09 | −.04 | −.05 | −.03 |
| Social anxiety | .01 | .01 | .00 | .01 |
| Zung anxiety | .02 | −.02 | −.02 | −.01 |
| Escape coping | .06 | .07 | .04 | −.03 |
| Support coping | −.09 | −.11 | −.15** | .10 |
| Total stressful life events | .12 | .11 | .14* | −.11 |
| Total support | −.12 | −.14* | −.18** | .15* |

*Note.* PGSI = Problem Gambling Severity Index (Ferris & Wynne, 2001); DAST = Drug Abuse Screening Test (Skinner, 1982); PRD = Problems Related to Drinking Scale (Porporino, Robinson, Millson, & Weekes, 2002); ADHD = attention-deficit/hyperactivity disorder.
*$p < .05.$ **$p < .01.$ ***$p < .001.$

*Hypothesis 3: Relationship of type of crime committed and mental health indices.* To address Hypothesis 3, we computed correlations between the mental health, impulsivity, and addiction indices used in this study and types of offenses committed. The results of this analysis are presented in Table 2. There were very few significant correlations between the mental health variables and the types of crime. For example, depression and anxiety were neither negatively nor positively correlated with any particular type of crime. There were weak negative associations of total support with income-producing crimes, $r = -14, p < .05,$ and other crimes, $r = -.18, p < .01.$ Total support was also associated with being a first-time offender.

As shown in Table 2, PGSI scores (top row) were significantly associated with income-producing crimes, $r = .26, p < .001.$ In addition, alcohol abuse as measured by the PRD and drug problems as measured by the DAST were significantly correlated with violent, income-producing, and other crimes. In fact, of all the measures examined, only the PRD and DAST were significantly correlated with the number of violent crimes. Income-producing and other crimes were associated with all three of the impulse control indices, including current ADHD symptoms, childhood ADHD symptoms, and impulsiveness.

In addition, we tested which of these variables was most strongly associated with being a first-time offender. The DAST, PRD, PGSI, current ADHD symptoms, and childhood ADHD symptoms were all significantly negatively associated with being a first-time offender. In addition, positive life experiences (total support) were positively associated with being a first-time offender.

*Hypothesis 4: Temporal order of mental health and gambling problems.* During the interviews, we asked participants about the relationship between any mental health

**TABLE 3:  Temporal Relationship Between Gambling and Mental Health Problems Across Gambler Categories (in percentages)**

| Relationship | Random Nonproblem (n = 23) | Nonrandom Nonproblem (n = 30) | Moderate Problem (n = 30) | Severe Problem (n = 23) |
|---|---|---|---|---|
| Gambling led directly to mental health problems | 0.0 | 16.7 | 10.0 | 43.5 |
| Mental health problems led to gambling | 4.3 | 10.0 | 16.7 | 30.4 |
| Unclear or two-way relationship | 0.0 | 10.0 | 13.3 | 17.4 |
| Unrelated/not applicable | 95.7 | 63.3 | 60.0 | 8.7 |

*Note.* Nonproblem in this case is a combination of nonproblem and low-risk gamblers.

problems they have experienced and their gambling problems. As shown in Table 3, just more than 40% of severe problem gamblers reported that gambling led to stress; 30.4% reported that a mental health concern led to gambling, and 17.4% reported an unclear or two-way relationship between gambling and mental health problems. In total, 91.3% of severe problem gamblers reported a relationship between gambling and mental health. Most of the nonproblem gamblers (both the randomly selected 95.7% and nonrandomly selected 63.3%) and more than half of subclinical problem gamblers (60.0%) reported that there was no relationship between mental health problems and gambling. A small number (16.7%) of the nonrandomly selected nonproblem gamblers reported that gambling led to a mental health problem. In two cases, this was the result of someone else's gambling (e.g., wife or other family member).

It was found that offenders who reported that mental health problems led to gambling scored higher on the use of escape as a coping strategy ($n = 15$; $M = 2.4$, $SD = 0.6$) than did those who reported that gambling led to mental health problems ($n = 15$; $M = 2.0$, $SD = 0.5$; $t = 2.3$, $p < .05$, $d = .72$). This contrast did not reach significance for depression, anxiety, stressful life experiences, REKT scores, ADHD, or impulsiveness.

### INSTITUTIONAL RECORDS OF MENTAL HEALTH

Mental health was evaluated using CSC file information and psychometrics. For our psychometric measures, we examined the data only in terms of correlations. According to correctional file reviews, 25% of the sample demonstrated some mental health concern (e.g., situational adjustment problems), and 18% had a specific mental health diagnosis. These diagnoses were as follows: 15% of the sample had a diagnosis of depression, 5.8% had anxiety, 3.9% had ADHD, and 7.0% had other conditions. In many cases, these diagnoses were self-reported by offenders. A total of 3.5% of the files listed gambling as a problem, and 1.6% indicated institutional charges for gambling. Not surprisingly, offenders who were diagnosed with depression were more likely to score higher on our measure of depression (Center for Epidemiologic Studies Depression Scale; Radloff, 1977), gamma = .28, $p < .05$. Those diagnosed as anxious scored higher on the Zung anxiety measure, gamma = .47, $p < .001$, and those diagnosed as currently having ADHD scored higher on childhood ADHD, gamma = .60, $p < .01$, lending some support for their self-reported mental health information. Offenders who had gambling problems or had institutional charges

for gambling listed on their files also scored higher on the PGSI, gamma = .62, $p < .05$, and gamma = .68, $p < .05$, respectively.

## DISCUSSION

As reported previously, we found a much higher rate of moderate and severe problem gambling among the offender sample as compared to the general population (Turner et al., 2009). In the present article, we examined mental health correlates of problem gambling to determine the extent to which the offenders show the same pattern of problem gambling correlates as nonoffenders. Consistent with Hypothesis 1, problem gamblers in correctional samples show similar patterns of correlations to problem gamblers in noncorrectional samples for measures of emotional problems (Hypothesis 1a), impulsivity (Hypothesis 1b), and cognitive and experiential variables (Hypothesis 1c). Variables that are associated with problem gambling in the general population (Turner et al., 2008) are also significantly associated with problem gambling in the offender population. Depression, substance abuse, stressful life events, social anxiety, Zung anxiety scores, impulsiveness, reliance on escape to cope with stress, and erroneous beliefs about random chance were all significantly associated with the severity of problem gambling. Compared to the pathways sample, the correctional sample scored higher on stressful life experiences, use of escape to cope with stress, social anxiety, childhood ADHD symptoms, and current ADHD symptoms. As noted above, some of the correlates examined were somewhat smaller in the correctional sample than in the general population. However, a test for an interaction between the problem gambling severity and the sample reached significance for only two variables related to the timing of early big wins. The lack of an interaction suggests that problem severity and sample differences were independently related to variables such as social anxiety, escape coping, childhood ADHD symptoms, and adult ADHD symptoms. Overall, these results indicate that the correlates of problem gambling among offenders are similar to the correlates of problem gambling among nonoffender populations. The results of these analyses are descriptive in nature, not explanatory. Regression was used merely to test the similarity of the relationship between each of these variables and problem gambling severity between the offender sample and a nonoffender sample. The upshot of these analyses is that a clinician can expect to find similar comorbid issues in the correctional and noncorrectional populations but can expect to find more problems associated with ADHD and social anxiety in the correctional population in general. It was noted earlier that the nonincarcerated population used as a comparison was older than those in the correctional system and had also achieved a higher degree of education. The younger age, the higher ADHD scores, and the lower levels of education may in part explain why these particular problem gamblers resorted to crime to deal with financial problems, whereas many of those in the comparison sample were seeking counseling services.

Consistent with Hypothesis 2, we found significant correlations between substance abuse and problem gambling. Although the substance abuse measures were not used in the pathways study, numerous studies have shown that problem gambling is comorbid with substance abuse (Arsenault, Ladouceur, & Vitaro, 2001; Gupta & Derevensky, 1998a, 1998b; Ramirez, McCormick, Russo, & Taber, 1984). Interestingly, the scores on the substance abuse measures collected in the present study were higher than those collected by

the correctional staff. This perhaps indicates that the participants were more willing to admit having substance abuse problems to our research staff than to the correctional staff.

With respect to Hypothesis 3, we found a number of small correlations between the type of crime committed and the mental health variables. The impulse control variables, drug abuse, alcohol problems, and PGSI scores were correlated with the number of income-producing and other crimes. Although problem gamblers are somewhat more likely to engage in financial crimes, the relationship between drug problems as measured by the DAST and financial crimes was in fact much stronger than the link between problem gambling and financial crimes. Contrary to expectations, the impulse control variables were not related to the number of violent offences. Of the mental health variables examined, only drug abuse and alcohol problems were correlated with violent crimes. Depressed, anxious, or impulsive offenders committed neither more nor less violent offenses than did other offenders. The relationship of violent crimes to substance abuse may be related to the disinhibition caused by substance abuse. Childhood ADHD, current ADHD, substance abuse, alcohol problems, and problem gambling were all negatively correlated with being a first-time offender. Conversely, those who reported having more social support in their youth were somewhat more likely to be a first-time offender.

Related to Hypothesis 4, 91.3% of severe problem gamblers reported a relationship between gambling and mental health, with 43.5% reporting that gambling contributed to mental health problems and 30.4% reporting that mental health problems led to gambling. In contrast, 60.0% of subclinical problem gamblers, 63.3% of nonrandomly selected nonproblem gamblers, and 95.7% of randomly selected nonproblem gamblers said there was no relationship between gambling and mental health. This suggests that mental health indices are more relevant for severe problem gamblers as both precipitants and consequences of gambling, and the typological schemes for gamblers need to account for variations between gamblers of differing severity. We also found that offenders who claimed that a mental health problem led to gambling scored significantly higher on the use of escape as a means of coping with stress compared to those who reported that gambling led to mental health problems. This finding validates the self-reported temporal order of mental health problem and gambling problem. In particular, offenders who report having a mental health problem prior to gambling appear to be using gambling as a means of coping with negative affect or distress (cf. Gupta & Derevensky, 1998b; Jacobs, 1986).

## LIMITATIONS

This study had a number of limitations. First, although the assessment unit was an ideal place to survey recently convicted offenders, some repeat federal offenders may have been undersampled. Repeat federal offenders would have been assessed previously and therefore may have proceeded too quickly through the assessment unit to participate in this study. Second, the extent to which the results of this study can be generalized to provincial or community offender populations is unknown because people are typically given federal sentences for repeat offenses or for more serious offenses. Third, although only a small number of participants (7) was excluded from the study because of language difficulties or missing values, it is unknown how many refused to participate because of language-related problems or difficulties with 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 those that developed after entering prison. We are currently conducting a study in all security levels of the correctional system to more thoroughly examine gambling problems in the offender population. Fifth, the sample included only male offenders; the extent to which the results generalize to female offenders is unknown. Sixth, the study relied on self-reports of offenders, which may have had an impact on reliability and validity. However, the correlations between the offenders' self-report on mental health indices and the diagnoses found in file information suggest some validity to self-reported mental health information.

## CONCLUSIONS

Despite these limitations, there are a number of important implications of the current study. First, variables that correlate with problem gambling in a nonoffender context were, in general, replicated in the federal offender population. This suggests that theoretical models of the relationship between problem gambling and other mental health problems can be applied to both offender and nonoffender populations. In addition, treatment approaches to problem gambling developed for nonoffender populations may also apply to the correctional population. Second, the large number of offenders with gambling problems suggests a significant need to provide services for this population to assist them to overcome a potentially serious addictive behavior. Third, because problem gambling is often comorbid with common mental health disorders, such as depression, anxiety, substance abuse, and ADHD, any intervention needs to be comprehensive and take into consideration a broad range of clinical needs. Successful intervention can potentially ameliorate a host of mental health symptoms and possibly reduce recidivism.

## NOTE

1. Note that the 33% is a combination of moderate and severe problem gamblers.

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