Running head: COMORBIDITY AND PATHOLOGICAL GAMBLING

The Association Between Comorbidity and Outcome in Pathological Gambling: A Prospective

Follow-up of Recent Quitters

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Abstract

A naturalistic sample of pathological gamblers (N=101) who recently quit gambling was followed prospectively for a year (follow-up rate 80%). Lifetime mood disorders were identified in 61% of participants and 73% and 48% had lifetime alcohol use and drug use disorders respectively. Current prevalence rates, however, were much lower. Current mood disorders were found for 20% and 7% had a current alcohol disorder and 7% a current drug use disorder. Age of onset for substance use disorders was earlier than gambling disorders but mood disorders were equally likely to predate or follow gambling disorders. Lifetime mood disorder was associated with a longer time to achieve three months of stable abstinence. Participants who were currently in treatment or attending Gamblers Anonymous and the small number of participants with current alcohol disorders were also more likely to achieve abstinence earlier. The results underscore the importance of increasing our understanding of the role of comorbid disorders in the recovery process from gambling problems.

The Association Between Comorbidity and Outcome in Pathological Gambling: A Prospective

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About 1-2% of the adult population meets diagnostic criteria for pathological gambling,

characterized by the impaired ability to control gambling involvement, resulting in significant

adverse social and emotional consequences (American Psychiatric Association, 1994; Shaffer &

Hall, 2001). Numerous general population surveys and studies of clinical samples indicate that

other mental health disorders are highly comorbid with pathological gambling. The evidence is

strongest for substance abuse and mood disorders (Crockford & el-Guebaly, 1998).

Rates of alcohol and other drug disorders are consistently elevated among pathological

gamblers. Specific estimates vary according to sampling and measurement differences but range

from 25% to 63% (Crockford & el-Guebaly, 1998). In the most recent national United States

general population survey, among current pathological gamblers, 28% were currently alcohol

dependent (Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001). In the National Opinion

Research Center national United States survey, pathological gamblers had seven times the rate of

alcohol or other drug dependence compared with social gamblers (NORC, 1999).

Rates of mood disorders are also consistently elevated among pathological gamblers,

although the estimates are highly variable from study to study.   In general population surveys,

one Canadian study found elevated rates of dysthymia but not major depressive or bipolar

disorders (Bland, Newman, Orn, Stebelsky, 1993). In a US study, rates of dysthymia and major

depression were elevated but not bipolar disorders (Cunningham-Williams, Cottler, Compton &

Spitznagel, 1998). Among clinical samples of pathological gamblers prevalence estimates of

mood disorders have ranged from 60% to 85% (Crockford & el-Guebaly, 1998; Petry, 2000)

although sample sizes are often small and the mood assessments based upon self-report depression scales versus structured clinical interviews (NRC, 1999).

The etiological implications of increased rates of comorbidity among pathological gamblers are unclear. The concept of "switching addictions" has been used to describe the etiology of former substance abusers who present for gambling treatment. This notion suggests a shared etiology between substance use and gambling disorders (e.g., Arsenault, Ladouceur, & Vitaro, 2001; Blum et al., 2000), with the gambling problem representing the current expression of the disorder. More elaborated models specifying the nature of the shared etiology, whether genetic, personality or environmentally based, have not been advanced.

Gambling has also been viewed as an attempt to self-medicate or escape negative mood states among a significant subgroup of pathological gamblers (Blaszczynski & Nower, 2002). An alternative possibility is that both major depressive disorders and abusive substance use can be precipitated by the financial and psychosocial stresses of a serious gambling disorder. One study of pathological gamblers in a residential treatment program found that 76% were currently depressed and that gambling preceded the depression in 86% of the cases (McCormick, Russo, Rameriz, & Taber, 1984). On the other hand, a general population survey found that depression was more likely to precede the gambling disorder in comorbid individuals (Cunningham-Williams et al., 1998).

Although well-established etiological models do not exist, there is mounting evidence that comorbid individuals have more severe disability than non-comorbid individuals. Most of this research has been conducted with substance abuse and gambling comorbidity. In a heterogeneous sample of substance abusers drawn from eight substance abuse treatment programs, pathological gamblers showed more disturbance on substance use, social

consequences, psychiatric comorbidity, childhood conduct disorder and attention deficit disorder symptoms (Langenbucher, Bavly, Labouvie, Sanjuan, & Martin, 2001). In a sample of 2,171 treatment-seeking substance abusers, Carlton and Manowitz (1992) also found high rates of attention deficit disorder behaviors among pathological gamblers. A sample of 103 media recruited substance abusers revealed that the problem gamblers showed greater psychiatric distress as measured by the SCL-90 (Petry, 2000). Similar results have been shown in a sample of homeless substance abusing veterans (Castellani, Wootton, Rugle, & Wedgeworth, 1996). Pathological gamblers in treatment (N = 765) who have had substance abuse treatment in the past have been shown to have more gambling-related negative life events than those without past substance abuse treatment (Stinchfield, Kushner, & Winters, this issue).

Association of Comorbidity and Outcome

A few studies have examined the association between pathological gambling and outcome from substance abuse treatment. In one study there was no difference in the one-year outcome from inpatient or outpatient cocaine treatment. Of 298 patients, 15% were diagnosed with pathological gambling (Steinberg, Kosten & Rounsaville, 1992). In another study of 313 cocaine dependent individuals, 8% with a lifetime and 4% with a current diagnosis of pathological gambling (Hall et al., 2000), the pathological gamblers had more disability and greater legal involvement but were as likely to remain in treatment and to have cocaine-free urines while in treatment. In a sample of mixed substance abusers in an inpatient program, lifetime gambling disorder was not associated with housing or employment status after six months post treatment (Castellani et al., 1996).

To date two studies have examined the association between substance use patterns and outcome from gambling treatment. Toneatto, Skinner and Dragonetti (2002) had 169

pathological gamblers in treatment provide brief self-assessments of lifetime illicit drug use and problems. Over 70% of the sample reported lifetime use of drugs and these individuals were younger, had more severe gambling problems and were more likely to have had a previous psychiatric hospitalization. Drug problems were acknowledged by 24%, with cannabis the most frequently abused drug. In terms of outcome, lifetime drug use was not associated with gambling frequency or severity either during treatment or at a 12-month follow-up. Unfortunately only 47% of the sample was successfully followed.

The second study to examine substance abuse impact on outcome (Stinchfield et al., this issue) examined past substance abuse treatment and current alcohol use as potential predictors of six-month outcome from a large sample of pathological gamblers in treatment. Neither variable was associated with a variety of gambling related outcomes in the 69% of the sample who were successfully followed.

In terms of the association of depression with outcome, Taber, McCormick, Russo, Adkins and Ramirez, (1987) conducted a six-month follow up after residential gambling treatment and found that, of the 32% who were depressed at admission and successfully followed, over half continued to be depressed after becoming abstinent from gambling and showing improvements in other life areas. They conclude that gambling and depression are independent in at least a subgroup of gamblers. Similar conclusions are drawn in a study of citalopram, an antidepressant medication, as a gambling treatment (Zimmerman, Breen, & Posternak, 2002). In a small sample of 15 pathological gamblers, clinically depressed patients had the same gambling outcome as non-depressed patients and improvement in gambling was unrelated to improvement in depression.

We have examined the role of mood state in a microanalysis of the factors associated with gambling relapses. In comparison to substance abuse relapses in which negative affect is cited as the primary precipitant, gambling relapses are most frequently precipitated by cognitive processes regarding the likelihood of winning money. Positive mood states were reported as frequently as negative mood states prior to a relapse (Hodgins & el-Guebaly, in press).

In summary, pathological gambling is highly comorbid with substance use and mood disorders although the role of comorbid substance abuse and mood disorders in the etiology and on the course of gambling disorders is unclear. Previous research has been limited in quantity and plagued by poor follow-up rates.

Present Investigation

The purpose of this exploratory investigation was to (a) describe the prevalence and age of onset of lifetime and current alcohol, other drug and mood disorders in a naturalistic sample of pathological gamblers who have recently quit gambling and (b) to examine the association between these disorders and achievement of stable abstinence during a one-year follow-up period. A better understanding of this association may lead to more informed prevention and treatment strategies.

<div align="center">Method</div>

Procedure

Media announcements in Calgary, Alberta were used to recruit individuals who had recently stopped gambling. Inclusion criteria were: South Oaks Gambling Screen (SOGS, Lesieur & Blume, 1987) score of five or greater; no gambling in the past two weeks but some gambling in the past four weeks, age 18 or greater, willingness to be followed for 12 months and to nominate three individuals to corroborate their gambling reports. Informed consent was

obtained from both participants and collaterals. All participants were paid $20 Canadian in gift

certificates for the three month and six month interviews and $30 for the final interview.

Interviews were conducted in person at the University of Calgary. More details are provided in

previous reports (Hodgins & el-Guebaly, in press; Hodgins, Makarchuk, el-Guebaly, & Peden,

2002).

Participants

The sample (N = 101) included 36 women and 65 men with a mean age of 39 (SD = 10,

range 19 to 77). Full-time employment was reported by 55% and 66% had some post-secondary

education. Cultural group was reported as English Canadian by the majority (76%), with 8%

French Canadian, 5% European ancestry, 2% Native, and 9% other groups.

The mean score on the lifetime SOGS was 12.2 (SD = 3.4), which indicates a substantial

level of gambling problems, and 89% met the DSM-IV criteria for Pathological Gambling (APA,

1994)[1]. Participants reported experiencing a mean of five years of problem gambling (SD = 7)

with 49% reporting problematic involvement with video lottery terminals (the most accessible

type of gambling locally) and 12% casino games. An additional 34% reported problems with

both VLTs and casino games, 3% bingo, and 3% other. Past gambling treatment or Gamblers

Anonymous involvement was reported by 50% of participants and 25% were currently involved.

Previous quit attempts were reported by 75%.

Follow-up Rates

Of the 101 participants, 72 were followed at three months, 71 at six months, and 80 at 12

months. Since participants could provide some information for earlier missed assessments,

follow-up data were available for 83% at three months and 80% at six and twelve months. No

significant differences ($p < .05$) in initial assessment variables (demographics, comorbidity,

gambling involvement) were found between participants who were followed at 12 months (n = 80) and those not followed (n = 21). In the Cox Regression analyses, all available data for participants are used in the analyses.

Initial Interview

The content domains of the initial face-to-face interview included: demographics, gambling history and related problems, DSM-IV pathological gambling criteria, mood and substance abuse diagnoses, smoking history, gambling goal and confidence, and reasons for changing. These variables were assessed using a structured interview adapted from our previous research (Hodgins & el-Guebaly, 2000) and the Structured Clinical Interview for DSM-IV (Spitzer, Williams, Gibbon, & First, 1990). A number of other interview and self-report scales were also administered, not relevant to this study (Hodgins & el-Guebaly, in press; Hodgins, et al., 2002).

Follow-up Interviews

At each of the follow-up face-to-face interviews, a timeline follow-back interview captured the number of days gambled during the follow-up period, the amount of money won or lost on each occasion and any treatment sought over the follow-up. The retest reliability and validity of these data were generally good (Hodgins & Makarchuk, in press). The occurrence of life events and their relationship to gambling were also recorded and the mood and substance disorders modules of the SCID-R were readministered.

Measures

South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987). The SOGS was used as a descriptive measure of gambling severity. It is a widely used 20-item self-report questionnaire that assesses lifetime gambling-related difficulties. A score of 5 or greater indicates probable

pathological gambling as validated against clinician ratings (Lesieur & Blume, 1987; Stinchfield, 2002) although in this investigation the lifetime total score was used as an indicator of gambling severity.

Structured Clinical Interview for the DSM-IV (SCID; Spitzer et al., 1990). The SCID is a structured interview that examines the frequency and intensity of DSM-IV symptoms and provides Axis I diagnoses. The Mood and Substance Use modules were administered to determine DSM-IV diagnosis. Inter-rater diagnostic agreement for the two interviewers and first author across 12 audiotapes was 100%.

Outcome

Stable outcome was defined as a period of three months of continuous abstinence from the types of gambling that had caused the individual problems as identified at the initial interview. In no case was an individual abstinent from the problematic types of gambling but gambling frequently or problematically with another type.

Results

Prevalence of Substance Abuse and Mood Disorders

Table 1 displays the lifetime and current prevalence rates of the comorbid disorders assessed using the SCID. More than half the sample met the criteria for a lifetime mood disorder, primarily major depressive disorder. Similarly, about half were diagnosed with lifetime alcohol dependence and an additional 25% with lifetime alcohol abuse. Lifetime substance dependence and abuse diagnoses were made for 48%. A variety of types of drugs were involved including cannabis, cocaine, benzodiazepines, hallucinogens and amphetamines. The majority reported abuse of or dependence on more than one drug class.

In terms of current (i.e., last month) diagnoses, prevalence rates were considerably lower. Major depressive disorders were found in 15% and 5% were currently dysthymic. Alcohol abuse/dependence was found in 7% of participants and drug abuse/dependence in 7%. Of these latter participants, cannabis was the drug involved in all cases and only one of the seven also had a current alcohol use disorder.

The age of onset for the comorbid disorders relative to the gambling disorders is displayed in Table 2. Major depressive disorder was equally likely to precede or follow the age of onset of the gambling disorder. The mean age of onset for major depressive disorder was 32 years (SD = 12), with a range of age 12 to 58 years, compared with age 34 (SD = 10, range 6 to 74 years) for gambling disorder onset. These two ages were not significantly different, $t(54) = 1.4$.

Both alcohol and other drug disorders were more likely to precede the onset of the gambling disorder. In comorbid individuals, the mean age of onset for alcohol use disorders was 23 (SD = 9, range 13-50) versus a mean age of 33 for the gambling disorder (SD = 11, $t(72) = 6.7, p < .0001$). For other drug use disorders the mean age of onset was 19 (SD = 5; range 12-35) compared with a mean of age 30 for the gambling disorder (SD = 8, $t(48) = 8.3, p < .0001$).

Predicting Stable Outcome

Of the 101 participants, 41% achieved a three-month period of abstinence sometime during the follow-up year. Cox regression analysis was conducted examining the time (measured in weeks) to the onset of stable abstinence. A series of steps was conducted with blocks of covariates inputted in a temporal sequence, starting with lifetime variables, followed with variables assessed at the initial assessment, and finally time dependent variables assessed during the follow up period. Each step was run as a separate analysis. Covariates significant in one step

were entered into the next step. Preliminary analyses were conducted including variables

representing the interaction of current treatment involvement and each lifetime and current

covariate. None of these centered interaction terms was significant which suggests that the

predictors of time to stable abstinence did not differ according to treatment status and that it is

appropriate to include both groups within one sample. Therefore, these variables were excluded

from the subsequent analysis. In the first step, a block of lifetime variables was entered into the

Cox regression including the lifetime SOGS total score, lifetime alcohol abuse/dependence,

lifetime other drug abuse/dependence, lifetime mood disorder, and previous involvement in

treatment (including Gamblers Anonymous). Time to stable abstinence was significantly

predicted by this set of covariates, $\chi^2(5) = 11.9$, $p < .05$, $R^2 = .07$, but only lifetime mood

disorder made an independent contribution, ($\beta = .80$, Wald = 6.6, Odds ratio = 2.2, $p < .01$).

In the second step, lifetime mood disorder was entered in the first block, and a block of

current variables was entered as a second block. These covariates included current alcohol

disorder, current drug use disorder, current mood disorder, and current treatment involvement.

Time to stable abstinence was reliably predicted by this set of covariates, $\chi^2(5) = 22.8$, $p < .0001$,

$R^2 = .20$. As shown in Table 3, three significant covariates were found, after accounting for the

remaining variables. Participants receiving current treatment were 3.1 times more likely to

achieve abstinence earlier than others ($p < .001$); those without past mood disorders were 2.3

times more likely to achieve abstinence earlier ($p < .04$); participants with current alcohol

disorders were 3.2 times more likely to achieve abstinence earlier ($p < .03$). This latter variable

is based upon a small number of individuals with current alcohol use disorders. Five of seven

achieved stable abstinence during the follow-up period. The survival functions are plotted in

Figure 1.

In step three, block one included lifetime mood disorder, block two included current treatment, and current alcohol use disorder, and block three included a lagged time dependent covariate. This covariate indicated whether the individual met alcohol abuse/dependence criteria for the week prior to any given week and assesses the relationship between alcohol abuse/dependence in one week and gambling the next week. This block did not account for a significant amount of variance over the variables entered in blocks 1 and 2, $\chi^2(1) = 0.07$.

Discussion

High rates of lifetime comorbid substance use and mood disorders were confirmed in this sample of pathological gamblers who had recently quit gambling. A strength of this sample is that it included both gamblers in treatment and gamblers not in treatment. Because less than 10% of pathological gamblers seek treatment (NRC, 1999) and because many gamblers recover without treatment (Hodgins & el-Guebaly, 2000) it is important to include both treatment-seeking and non-seeking participants in our samples to maximize generalizability to pathological gamblers looking to quit gambling. On the other hand, media recruitment is likely to attract only a subgroup of the population of interest. Pathological gamblers with more disordered lives or those experiencing greater shame or less social support may be less likely to volunteer.

Despite high lifetime rates, current prevalence rates were much lower. Whereas 61% of the sample had a lifetime mood disorder, only 20% met criteria for the past month. Similarly for alcohol and other drug use disorders lifetime rates were 72% and 48% respectively but only 7% currently. This suggests the possibility that only a minority of pathological gamblers seeking to quit will need attention for the comorbid disorder. Further prevalence research on treatment-seeking and non treatment-seeking samples is required.

The age of onset for substance use disorders was earlier than the age of onset for gambling disorders. This finding is consistent with a "switching addiction model", with former substance abusers developing problems with gambling. The relatively recent increase in availability of gambling opportunities, however, complicates the interpretation of this finding. If gambling has been widely available earlier, the age of onset of gambling problems may have been lower. The finding that substance use disorders occurred earlier is also consistent with a model whereby substance use disorders cause pathological gambling. For example, impaired processing and judgment related to substance use may play a role in the development of a gambling problem that subsequently takes on an independent course. The substance use disorder resolves but the gambling problem persists.

In contrast to substance use disorders, mood disorders were not more likely to either precede or follow the gambling disorders. The mean age of onset was in the early 30s for both disorders, which is consistent with there being a shared etiology for the two disorders. This finding is consistent with the suggestion that there are two subtypes of gamblers, those who gamble to modulate moods (i.e., mood disorder exists prior to gambling disorder) and those who become depressed in response to the negative consequences of a gambling disorder (Blaszczynski & Nower, 2002).

The analyses examining predictors of outcome yielded interesting additional results about the role of mood disorders. Of the lifetime predictors, only lifetime mood disorder was reliably associated with outcome – a lifetime mood disorder predicted a longer time until stable abstinence was achieved. Individuals without a lifetime mood disorder were 2.3 times more likely to achieve stable abstinence earlier.   It is interesting, however, that information about current mood disorder did not improve the prediction. This suggests that the current mood state

was not interfering with the individuals' efforts towards becoming abstinent. It is also consistent with our previous finding in this sample, that negative affect was not the most frequent precipitant to relapse (Hodgins & el-Guebaly, in press). It is inconsistent, in contrast, with the notion that some people gamble to modulate mood. However, it is possible that gamblers with a history of depression, although not meeting the criteria currently, have greater mood variability than those without a depression history and that a measure of negative affect may have incremental predictive validity. More information on the functional relationship between mood and gambling is required to examine this further.

Lifetime gambling severity, past alcohol and other drug disorders, and past treatment involvement did not predict outcome. Gambling severity was measured by the SOGS total score, which is an imperfect measure of severity because it relies on symptom counts and over emphasizes borrowing money from various sources as a problem indicator. However, there is no consensus on more valid measures of severity (Stinchfield, 2002). We also did not include a measure of current gambling severity.

Not surprisingly, current treatment (including Gamblers Anonymous) involvement was reliably associated with earlier abstinence. Treatment attendees were 68% more likely to achieve abstinence earlier. This may reflect the impact of the treatments specifically but also may reflect higher motivation or self-efficacy in this group. Participants were not randomly assigned to treatment or no treatment but instead self-selected their involvement. More surprisingly, individuals with current alcohol use disorder also reliably achieved abstinence earlier. When this variable was entered as a lagged time dependent covariate, however, it did not predict outcome. Alcohol abuse or dependence in one week did not predict gambling (or the onset of stable abstinence) the next week. We examined the small group of six individuals with current abuse

and dependence post hoc to confirm that recovery from one disorder was not related in time to recovery from the other disorder. This finding is based upon a very small sample of gamblers and needs to be viewed cautiously. Future research with larger samples is necessary to examine further this relationship.

There are a number of strengths associated with this investigation including the use of standardized structured assessments of substance use and mood disorders, use of the time-line follow back methodology to track gambling outcomes prospectively, and the use of collaterals to confirm self-reports. The follow-up rates, albeit imperfect, are good in comparison to previous research. The use of a broad-based naturalistic sample avoids the bias associated with recruitment from one treatment program. However, the use of media recruitment may introduce other types of unrecognized bias.

It is important to underscore that these data are descriptive. For example, as noted above, participants were not randomly assigned to receive treatment or not. Instead, they self-selected their involvement. Many other unmeasured factors, possibly including other comorbid disorders, also influenced outcome. As well, a twelve-month window is a short period of time in which to achieve three months of abstinence. Further follow up is underway with these participants to provide a more complete picture of the process of outcome over time.

In summary, there results point to a significant role for lifetime mood disorders in outcome from gambling disorders regardless of whether a current mood disorder is present. In contrast, lifetime substance abuse was not associated with outcome. However, the role of current substance abuse is less clear, given the unexpected and possibly unreliable finding of a more positive outcome for current substance abusers. Nonetheless, these results underscore the

importance of continuing to increase our understanding of the role of comorbid disorders in the

recovery process from gambling problems.

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Footnotes

1. The DSM-IV exclusion of gambling better accounted for by a manic episode was not used.

Table 1

Lifetime and Current Prevalence of Comorbid Disorders

	Lifetime		Current	
	N	%	N	%
Mood Disorder				
Major depressive disorder	50	50	13	13
Bipolar I	4	4	0	0
Bipolar II	2	2	2	2
Dysthymia	2	2	5	5
Double Depression[1]	3	3	0	0
None	40	40	81	81
Alcohol Use Disorder				
Alcohol dependence	48	48	5	5
Alcohol abuse	25	25	2	2
None	28	28	94[2]	94
Other Drug Use Disorder				
Drug Dependence	32	32	3	3
Drug Abuse	17	17	4	4
None	52	52	94	94

Note. [1] Double depression refers to individuals diagnosed with a major depressive disorder in addition to dysthymia. [2] Includes 10 early fully remission, 3 early partial, and 1 sustained partial.

Table 2

Age of Onset of Comorbid and Gambling Disorders

| Disorder | Age of Onset | | | | | |
| | Before Gambling | | After Gambling | | Concurrent | |
	N	%	N	%	N	%
Major depressive disorder	23	42	24	44	8	14
Alcohol abuse/dependence	54	74	16	22	3	4
Drug abuse/dependence	41	84	5	10	3	6

Table 3

Cox Regression Analysis on Time to Stable Abstinence

Variable	β	Wald	df	*p*	Odds Ratio
Lifetime Mood Disorder	0.82	4.30	1	.038	2.30
Current Treatment	-1.13	11.4	1	.001	0.32
Current Mood Disorder	-0.20	0.20	1	.610	0.82
Current Drug Disorder	-0.56	0.70	1	.404	0.57
Current Alcohol Disorder	-1.16	5.10	1	.025	0.31

Figure Caption

Figure 1: Plot of Survival Function for Significant Covariates – Proportion Achieving Stable

Abstinence by Number of Weeks