Frequency and Correlates of Gambling Problems in Depressed and Bipolar Outpatients

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Abstract

BACKGROUND: Problem and pathological gambling are becoming a major public health issue in Canada. Higher rates of psychiatric comorbidities, most notably bipolar disorder and major depressive disorder have been reported in populations of problem and pathological gamblers. While it has also been shown that gamblers tend to exhibit negative mood symptoms, the temporal relationship between the two has not been clearly delineated.

OBJECTIVE: This investigation was undertaken to explore the prevalence and associated correlates of gambling problems amongst individuals with mood disorders, as well as to document whether gambling difficulties most often preceded or followed the onset of a mood disorder.

METHODS: Individuals (≥ 18 years of age) meeting criteria for lifetime DSM-IV-TR-defined major depressive disorder (MDD) or bipolar I/II disorder (BD) were recruited from five mood disorder clinics in Canada and one in the United States. Psychiatric diagnosis was confirmed with the Mini International Neuropsychiatric Interview, version 5.0. Past-year problem gambling was assessed with the Canadian Problem Gambling Index (CPGI) while lifetime pathological gambling was assessed with the South Oaks Gambling Screen (SOGS). A current diagnosis of pathological gambling was made if the individual met appropriate DSM-IV criteria. Problem gambling was defined by a score of ≥3 on the CPGI (i.e. moderate risk or higher). Lifetime pathological gambling was defined as ≥5 on the SOGS.

RESULTS: A total of 606 participants were enrolled (mean age=44.77, SD=12.14). Past-year prevalence of problem gambling did not differ significantly between MDD (12.7%) and BD (12.5%) groups. The prevalence of current and lifetime pathological gambling in the total mood disorder group was 5.3% and 9.0%, respectively. Most individuals (68.6%) reported onset of mood disorder prior to problems with gambling and the temporal relationship with illness onset did not differ between MDD and BD groups. A significantly higher proportion of males (61.5%) endorsed a problem with gambling before the onset of a mood disorder versus females (28.9%) ($p<0.001$). Individuals with comorbid current panic disorder (OR=1.96, 95% CI=1.02-3.75), obsessive compulsive disorder (OR=2.36, 95% CI=1.17-4.76), alcohol dependence (OR=5.73, 95% CI=3.08-10.65) and substance dependence (OR=2.051, 95% CI= 1.17-3.58), had a significantly increased odds of problem gambling. Results from a multiple-logistic regression indicate that lifetime alcohol dependence is the strongest predictor of problem gambling (OR=2.49, 95% CI=1.44-4.33) in mood disorders.

CONCLUSIONS: These preliminary results confirm the higher prevalence of gambling in both BP and MDD populations compared to community rates. They also address the pathways or risk factors for gambling in the BP and MDD groups.

Key Words: gambling, bipolar disorder, major depressive disorder

Preamble

The modern definition of gambling in terms of the maladaptive conditions of pathological and problem gambling is offering up money or a substance of value in a game of chance for a return that is less than certain (Ontario Problem Gambling Research Centre, 2007). This type of gambling comes in many forms. Some modern Western forms include casino gambling, scratch-and-win tickets, lotteries, slots, video lottery terminals (VLTs) and card games for money.

Problem and pathological gambling are becoming major public health issues in Canada (Poulin, 2006). According to a Statistics Canada report, 76% of Canadians reported having gambled in 2002 (Statistics Canada, 2003). Gambling is on the rise due to the expansion of legalized gambling outlets in Canada, and the need for the government to increase revenue. New technological advances in the gaming industry are leading to exciting forms of gambling that are highly addictive (ex. VLTs and Online Texas Hold'em Poker). Government directed gambling has increased four-fold during the last decade (Statistics Canada, 2003). In 2003 Canadians spent $11.8 billion in gambling, and approximately 35% of the money spent on gambling came from problem gamblers (Andresen, 2006). By 2006, this amount had increased to $15 billion, which is a significant increase in just three years (Canadian Gaming Association, 2007). There is a conflict of interest between the revenue and the welfare of the gamblers themselves. The money spent on gambling in Canada is a double-edged sword – the profit for the provincial and federal coffers is welcome, but the cost to the individuals who lose their money in gambling or become addicts is unwanted.

Definition of Problem and Pathological Gambling

For many, gambling is an entertaining leisure activity that provides some mental and emotional excitement. For some, however, repetitive and escalated gambling can have serious consequences. Problem gambling involves a pattern of repeated gambling behaviour that disrupts the gambler's life; including, but not limited to family life, occupational functioning, finances, and personal well-being.

Pathological gambling, on the other hand, is classified as an impulse control disorder described in the DSM-IV-TR (American Psychiatric Association, 2000) (see Table 1) along with kleptomania, pyromania, intermittent explosive disorder and trichotillomania. Pathological gambling is an escalated form of gambling and, in addition to being an impulse control disorder, also shares many features with addictions. The pathological gambler is preoccupied with gambling, may have delusions about the chances of winning and often lies to others to conceal gambling behaviour. Sometimes the individual will engage in illegal activity to finance gambling or relieve the desperate financial situation caused by gambling behaviour.

Prevalence of Problem and Pathological Gambling

The prevalence of gambling behaviour is influenced by many variables including culture, availability of casinos and other gambling outlets, as well as age group. In 1985, the Canadian government gave complete control of casino gambling and of legalized computer, video and slot machine gambling (Korn, 2000) to the provinces. With the rise in legalized gambling in Canada, there has been a noted increase in problem and pathological gamblers. Almost 5% or 1 in 20 Canadians are at risk for problem gambling (Anderson, 2006), and about 2% of Canadians meet the DSM-IV criteria for pathological gambling (Shaffer & Hall, 2001). These figures are higher

in Alberta, the "Gambling Mecca of Canada", where 5.2% of residents are classified as problem gamblers (Alberta Lottery Fund, 2006).

Course of Pathological Gambling

Typically, pathological gamblers have their first gambling experience in their adolescent years. It has been reported that among adult gamblers, women start later in life but develop problems more rapidly than men (Tavares et al., 2003; Martins et al., 2004). Young people have been shown to be twice as likely to develop serious gambling problems as older individuals (Andresen, 2006). College age students are at particularly high risk, with some estimates of pathological gambling in this population being as high as 3% (Ladouceur, Dubé & Bujold, 1994). It has also been suggested that early onset of gambling is associated with greater severity of gambling and concurrent substance use disorders compared to late onset of gambling (Derevensky & Gupta, 1999; Volberg, 1994). Retrospective studies of adult problem and pathological gamblers reveal that age at onset of gambling is typically before adulthood (Winters, 2002). Lynch, Maciejewski & Potenza (2004) reported that adolescent onset gambling is associated with more severe psychiatric problems.

Communities with greater accessibility and availability of gambling outlets such as casinos and VLTs tend to have more problem and pathological gamblers (Shaffer, LaBrie, & LaPlante, 2004; Volberg, 2004). The development of problem or pathological gambling is gradual; beginning with a "winning phase", followed by a "losing phase" and subsequently a "desperation phase", which may be repeated or end with a forced change in behavior (Custer, 1984).

Psychiatric Comorbidities and associated features of Pathological Gamblers

It has been shown that individuals with psychiatric diagnoses are more likely to be pathological gamblers. Zimmerman, Chelminski, and Young (2006) surveyed 1,709 outpatients in Rhode Island, and found that pathological gamblers are more likely to have other psychiatric diagnoses, particularly alcohol abuse, social phobias, bipolar disorder and of other impulse control disorders. This study found that pathological gamblers had a higher number of psychiatric comorbidities, averaging 4.7 disorders.

The largest population-based survey on psychiatric comorbidity and pathological gambling, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), surveyed 43,093 individuals in the United States. Results showed that past-year Pathological Gambling diagnoses were highest among individuals who experienced a manic episode (Petry, Stinson & Grant, 2005). This study also showed significant associations between pathological gambling and disorders of substance use, anxiety, personality and mood disorders.

Substance and Alcohol abuse

Pathological Gamblers are more likely to have a substance use disorder. Results from the NESARC survey (Petry, Stinson & Grant, 2005) showed that approximately 73% of pathological gamblers had an alcohol use disorder, 38% had a drug use disorder, and 60% had nicotine dependence. Using the Canadian Community Health Survey—Mental Health and Well Being Cycle 1.2 (CCHS-1.2), el-Guebaly and colleagues (2006) evaluated psychiatric comorbidities associated with problem gambling. They found that individuals with a substance use disorder were three times more likely to be problem gamblers.

Anxiety Disorders

Anxiety disorders are common in gambling populations. In the NESARC survey, approximately 41% of respondents with pathological gambling also had an anxiety disorder while Zimmerman, Chelminski, and Young (2006) found that, in a survey of psychiatric outpatients, 48% of pathological gamblers also had social phobia, 43% had panic disorder with agoraphobia, and also had high rates of posttraumatic stress disorder, specific phobia and generalized anxiety disorder. A high prevalence of anxiety disorders among pathological gamblers has also been reported elsewhere (el-Guebaly et al., 2006; Black & Moyer, 1998).

Personality disorders

Henderson (2004) compared psychiatric outpatients with and without gambling problems, and was able to identify specific personality and clinical features associated with the problem gambling group. Avoidant and compulsive personality features were significantly associated with gambling problem status. Also, the Self-Defeating and Dysthymic Disorder scales were positively associated with gambling involvement. In a study to examine the relationship between gambling and personality disorders among 82 pathological gamblers, Steel and Blaszczynski (1998) found that pathological gamblers met criteria for an average of 4.7 personality disorders, with a majority in the dramatic cluster B category from the DSM-III-R classification.

Mood Disorders

According to the DSM-IV TR, a diagnosis of pathological gambling is not made if the episode is better accounted for by a manic episode. Individuals in a manic state may use gambling to quell some desire to take excessive risks. Gambling behaviour and mood, high or low, are interrelated. Some people use gambling as a way of relieving a depressive mood, while others experience depression as a result of their gambling behaviour. For some, it is a vicious cycle between the two.

Data on gambling behaviour were collected in the Canadian Community Health Survey on Mental Health and Well-Being, conducted by Statistics Canada in 2002. The prevalence of problem gambling as defined by the CPGI (a Canadian measure of past-year problem gambling) was 3.8%. McIntyre and colleagues (2007) found that out of 36,984 respondents, 2.4% met criteria for bipolar I disorder (BDI). Of this subpopulation of individuals diagnosed with BDI, 11.6% also met criteria for problem gambling. The study showed no significant increase in problem gambling among people who met criteria for major depressive disorder (MDD).

According to Statistics Canada (Marshall & Wynne, 2003), one-quarter of problem gamblers report symptoms that are compatible with a diagnosis of MDD at some point in their lives, and one-fifth had contemplated suicide during the previous year. It has been noted that almost universally, pathological gamblers become depressed when their financial difficulties mount (Kim, Grant, Eckert, Faris & Hartman, 2006).

Despite this significant overlap of mood disorders and problem as well as pathological gambling, there have been few explorations of the etiological development and comorbid risk factors. McElroy et al. (1996) estimated pathological gambling comorbidity at approximately 30% in bipolar patients. Comorbidity of problem gambling in mood-disorder patients adversely affects the clinical course and treatment of both disorders. Furthermore, because each disorder is frequently treated in separate specialized clinics, there is a risk that the full-spectrum of the comorbid disorders may be neglected (Ibáñez et al., 2001).

Suicide

Gamblers are more likely to contemplate suicide and make suicide attempts (Pfuhlman & Schmidtke, 2002). It is difficult to estimate the prevalence of suicidal ideation in this population because both problem gambling and suicidal ideation are frequently concealed from health care professionals. The Canada Safety Council (2004) estimates the number of suicides per year due to gambling to exceed 200, and also that for every one of these successful suicides, there are five gamblers who attempt suicide or are hospitalized with self-inflicted injuries.

Newman and Thompson (2007) extracted data from the Canadian Community Health Survey, a Statistics Canada survey of over 38 492 participants, and determined that pathological gamblers were over three times more likely to attempt suicide than other Canadians. Among those who seek treatment for gambling problems, 50% report a history of suicidal thoughts and ideation (Beaudoin & Cox, 1999).

This triad of pathological gambling, depression and substance abuse confers a significantly higher risk for suicide than each disorder alone. Treatment of pathological gambling should include screening and, if indicated, treatment for comorbidities with special attention paid to suicidal ideation.

Introduction

Pathological gambling has largely been a hidden disorder that received little attention in the psychiatric community until recently. Yet, mood disorders and gambling disorders are complexly entangled. While it has been shown that gamblers frequently exhibit mood symptoms as well, the temporal relationship between the two has not been sufficiently studied. Pathological gambling behaviour has an impact on mood, and vice versa.

While studies have shown that problem or pathological gamblers also tend to have mood disorder diagnoses, the prevalence of gambling problems in mood disorder patients has been given considerably less attention. Of the studies that have been conducted, many are limited by their small sample size. Educating mental health professionals as well as patients and their families to address gambling behaviours is an important but neglected public health issue.

Through a unique partnership of consumers/patients and families (Mood Disorders Society of Canada - MDSC) and academic researchers (Canadian Network for Mood and Anxiety Treatments - CANMAT), the mutually-defined objective of this study was to investigate the frequency of gambling in Canadians who are seeking treatment for major depressive disorder or bipolar disorder. This study provides an opportunity to define the prevalence of problem gambling within these psychiatric populations and to highlight currently neglected, but potentially important, compounding factors in the lives of many patients with mood disorders.

Primary Objective

The primary objective was to determine the prevalence of past-year problem gambling as well as current and lifetime pathological gambling in bipolar disorder (BD) and major depressive disorder (MDD) clinic populations.

Secondary Objectives

Secondary objectives were the evaluations of (i) sex differences in the rates of problem and pathological gambling, (ii) psychiatric comorbidities within problem and pathological gambling populations, (iii) putative risk factors for gambling pathology, (iv) how gambling problems impact quality of life, (v) the temporal relationship between the onset of mood disorders and problem or pathological gambling and the relationship between the two groups. The final objective sought to examine the influence of anxiety and depressive comorbidity on the prevalence of gambling behaviours in both MDD and BD populations.

Method

Sample

Individuals (N=606; ≥ 18 years of age) meeting criteria for lifetime disorder (MDD) or bipolar I/II disorder (BD) defined according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV-TR) were recruited.

Participants were recruited from outpatient mood disorder clinics and from those who responded to advertisements posted in local hospitals. The advertisement was in the form of a poster requesting individuals who have a known diagnosis with any mood disorder to take part in a study investigating "lifestyle issues". Subjects were excluded from the study if they met criteria for schizophrenia or other psychotic disorders. Other psychiatric comorbidities (e.g. substance dependence, anxiety) were not exclusionary. The study was approved by local Research Ethics Board for each of the recruiting sites. All enrolled subjects provided written informed consent.

Study Design

This was a single-visit multi-site study, involving five sites in Canada and one site in the United States. Over sixty percent of subjects were recruited from the three sites in Ontario (See Table 2). Prior to initiation of any site, an inter-rater reliability session was held for all study coordinators and standardised instructions for questionnaire administration were provided for use at each centre.

Measures

Depressive and hypo/manic symptom severities were assessed respectively using the clinician-rated Hamilton Depression Rating Scale 7-item (HAM-D-7) (McIntyre et al., 2005), and the Young Mania Rating Scale (YMRS) (Young, Biggs, Ziegler & Meyer, 1978). Psychiatric diagnoses were defined with the short-version of the Mini International Neuropsychiatric Interview, version 5.0.0 M.I.N.I.PLUS (Sheehan et al., 1998) for DSM-IV. The structured interview was administered by a trained research coordinator, and included modules for mood and anxiety disorders, alcohol and other substance abuse and dependence. The M.I.N.I.PLUS also has a module for suicide risk assessment that codes the individual as no risk, low risk, moderate risk, or high risk. The modules not included in the shortened version of the M.I.N.I.PLUS were eating disorders (anorexia nervosa, bulimia nervosa), antisocial personality disorder, somatization disorder, hypochondriasis, body dysmorphic disorder, pain disorder, conduct disorder, attention deficit/hyperactivity disorder, adjustment disorders, premenstrual dysphoric disorder and mixed anxiety depressive disorder. The M.I.N.I. has been validated against the Structured Clinical Interview for DSM diagnoses (SCID-P) as well as the Composite International Diagnostic Interview for ICD-10 (CIDI).

Gambling Measures

A separate clinician-rated module was implemented to diagnose DSM-IV-TR-defined current pathological gambling. A person was classified as a current pathological gambler if he/she scored a minimum of 5 on the DSM-IV checklist (see Table 1). Gambling behaviour was also assessed with two self-report questionnaires; the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001) and the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987).

The CPGI is a 9-item scale that assesses problem gambling severity in the past year. It is scored using a 4-point Likert scale and yields four categorical outcomes (O = Non-problem Gambler, 1-2 = Low risk gambler, 3-7 Moderate risk gambler, 8 -27 Problem Gambler). Research on the CPGI has shown a high degree of correlation between the DSM-IV and SOGS and a high degree of internal consistency and reliability (Ferris & Wynne, 2001). The study herein, classified problem gamblers as individuals scoring greater or equal to three on the CPGI. The decision to collapse the levels of moderate risk, and problem gambling was based on the need to increase sample size for statistical analysis, as well as to recognize that there is a spectrum of problem gambling behaviour, that can range from moderate to high levels of gambling pathology. This strategy of combining moderate risk and high risk for problem gambling has been applied elsewhere (McIntyre et al., 2007).

The SOGS is a 20-item questionnaire that assesses lifetime pathological gambling. Scores on the SOGS range from 0-20 with a score of 5 or greater suggesting a potential pathological gambling disorder. Scores on the SOGS have shown high correlations with the DSM-III-R classification of pathological gambling and also has a high degree of internal consistency and reliability (Lesieur & Blume, 1987). The SOGS and the CPGI have been shown to be highly correlated (Ferris & Wynne, 2001).

Temporal Assessment: Which Came First?

In order to capture the temporal relationship between mood disorder and gambling, two scales were devised: The Temporal Assessment of Mood (TAM) and the Temporal Assessment of Gambling (TAG) (see Appendix B). These two scales provide a chronological account of milestones for onset of mood disorder and gambling problems. Mean age scores were calculated for the TAM and the TAG and subsequently used in the analysis of temporal relationship between mood and gambling pathology.

Other Self-report Measures

The Trimodal Anxiety Questionnaire (Lehrer & Woolfolk, 1982) (TAQ) is a 36-item self-report questionnaire that was used to separately assess the cognitive, somatic, and behavioural domains of anxiety. The Quick Inventory of Depressive Symptomatology (QIDS-SR_{16}) (Rush, Carmody & Reimitz, 2000) is a 16-item self-report scale that has been used to assess severity of depression in many depression treatment trials, including the Sequenced Treatment Alternatives to Relieve Depression (STAR*D) (Wisniewski et al., 2007).

Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) is a self-report questionnaire that is used to evaluate current quality-of-life. Higher scores are indicative of greater enjoyment or satisfaction in each domain. The Q-LES-Q has been shown among depressed outpatients and in a community sample to have good test-retest reliability and to discriminate between those who were found to meet criteria for current mental disorder and those who did not (Endicott, Nee, Harrison & Blumenthal, 1993).

The NEO-FFI Personality inventory (Costa, & McCrae, 1992) is a 60-item self-report questionnaire that was developed to generate the five personality domains identified in the Five Factor Model of Personality. The NEO-FFI is a shortened version of the longer NEO PI-R. It is designed to give a quick, reliable and valid measure of Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness.

Statistical Analysis

The analysis herein focuses on past-year problem gambling, which is defined as moderate or high risk (i.e. CPGI a score of $\geq$3), current pathological gambling (i.e. DSM-IV-TR criteria met), and lifetime pathological gambling (i.e. a SOGS score of $\geq$5). Analyses were conducted for (i) any mood disorder (including all subjects), (ii) major depressive disorder (MDD), and (iii) bipolar I/II disorder (BD).

Chi-square analysis was employed when evaluating categorical variables and to obtain prevalence rates of gambling problems as well as psychiatric coomorbidities. Logistic regressions were used to obtain odds ratios (ORs) for identifying risk factors (e.g. socio-demographic, comorbidities) associated with gambling. T-tests were implemented to identify differences on continuous variables (e.g. HAMD-7, YMRS, TAQ) between gamblers and non-gamblers. Correlational analyses were performed between total scores on each of the gambling measures, and measures of personality (NEO-FFI), anxiety (TAQ), depression (HAM-D-7, QIDS), and mania (YMRS).

Stepwise multiple logistic regressions were performed to identify a set of significant and unique correlates of gambling behaviour. Variables included in the multiple logistic regression were first identified as significant individual covariates associated with gambling. A total of nine separate multiple logistic regressions were applied for each of the gambling measures (i.e. CPGI, SOGS, and DSM-IV) across three mood disorder groups (i) any mood disorder, (ii) MDD, and (iii) BD groups

The variables included in the 'any mood disorder' group for CPGI and SOGS were: education, ethnicity, lifetime alcohol dependence, lifetime substance dependence, current social phobia, current panic disorder, current oppressive compulsive disorder, personality measure of neuroticism, and quality of life. The variables included in the analysis with the DSM-IV criteria for pathological gambling were: ethnicity, specific phobia, current oppressive compulsive disorder, lifetime alcohol dependence, lifetime substance dependence, total Q-LES-Q score, total HAMD-7 score, total YMRS score, personality measures of Neuroticism, Agreeableness, Conscientiousness, TAQ. The QIDS was excluded from the regression because it was highly correlated ($r > 0.7$) with the HAMD-7.

The multiple logistic regressions for the MDD group with all three outcome measures of gambling included the following common variables; Neuroticism, Openness, Agreeableness, Conscientiousness, QLESQ, and lifetime alcohol dependence. Additional variables of education, TAQ, and HAMD-7 were included in the CPGI analysis. Ethnicity but not education were included in the SOGS analysis, as well as, lifetime substance dependence, and individuals who met criteria for any current anxiety disorder. The DSM-IV criteria included lifetime substance dependence as the additional variable.

The multiple logistic regression for the BD group included common variables of Agreeableness, lifetime alcohol dependence, and lifetime substance dependence on all three outcome measures. The CPGI group also included sex, ethnicity, conscientiousness, TAQ, QLESQ, and HAMD-7. The SOGS group also contained sex, Agreeableness, Conscientiousness, QLESQ, and HAMD-7. Finally, the DSM-IV group included TAQ as the only additional variable.

Data were captured using a standardized case report form and scanned with automated software (TELEFORM Version 8). Statistical analysis was conducted using SPSS for Windows, Version 13.0 (Chicago, IL). All tests were two-tailed with statistical significance set at $p<0.05$.

Missing Data

A small number of self-report and clinician rated scales were found to be incomplete in the analysis stage of the study. Subjects with a missing data point, such as one item on the self-reported CPGI or SOGS were still included in the analysis, although that data point was excluded. Thus the overall total score of the self-report scales with missing data may skew results to the lower end of the spectrum. Also, if one item on the M.I.N.I.PLUS was not completed, the other modules were still incorporated in the analysis.

Results

Prevalence of Problem Gambling among participants with Psychiatric Comorbidities

A total of 606 respondents were enrolled, of whom 27 withdrew consent, leaving a sample of 579 (female: n=380, male: n=198) for analysis (mean age=44.77, SD=12.14). A positive screen for lifetime bipolar disorder (BD) was identified in 52.3% (BDI=227, BDII=77) of the subjects while 47.50% (n=275) screened positive for major depressive disorder (MDD).

The prevalence of past-year problem gambling for the total mood disorder sample was 12.5% (n=69), while the prevalence of lifetime pathological gambling was 9.0 % (n=50), and current pathological gambling was 5.3% (n=31). There were no significant differences in the prevalence rates of gambling by the type of mood disorder diagnosis. (See Table 3)

There were no significant differences in the prevalence of lifetime and current pathological gambling between any of the six study sites. However, the prevalence of past-year problem gambling was significantly higher for Ottawa, Toronto, and Edmonton respectively (Ottawa=19.6%, Toronto=18.0%, Edmonton=16.0%, Kingston=10.0%, Halifax=4.3%, Rhode Island=4.1%) (χ^2 =19.262, df=5, p=0.002).

The prevalence of problem gambling and pathological gambling was not significantly different between males and females with a mood disorder. In the BD group, there was a significant difference in the prevalence of past-year problem gambling and lifetime pathological gambling between males (18.92% and 14.29%, respectively) and females (8.33% and 5.46%, respectively) (see Table 4). This was not the case with MDD. There were also no significant differences in the prevalence of current pathological gambling between males and females.

The prevalence of gambling problems was significantly associated with several socio-demographic characteristics in individuals with a mood disorder (see Tables 5,6,7). Rates of past-year problem gambling were significantly higher amongst individuals with less than high school education (10.94% vs. 8.37%) and high school diploma only (29.69% vs. 14.81%) in individuals with any mood disorder. Rates of lifetime pathological and current pathological gambling did not reach statistical significance with respect to the level of educational attainment.

A separate analysis controlling for diagnosis (i.e. MDD vs. BD) revealed that individuals with MDD who have a high school education only were significantly more likely to meet criteria for past-year problem gambling (37.5% vs. 15.63%); the results were not significant for individuals with BD. Neither did the prevalence of lifetime and current pathological gambling differ by level of educational attainment in MDD or BD. The rates of gambling problems were significantly higher in non-Caucasian ethnic groups on all three measures of gambling behaviour in individuals with any mood disorder ($p<0.05$). Due to insufficient sample size in the non-Caucasian group, separate analyses could not be performed by the type of mood disorder. The prevalence of gambling problems was not significantly associated with income, employment, or marital status for individuals with any mood disorder, MDD, and BD.

Characterizing the age of onset of mood disorder symptoms and gambling problems

The age at onset of gambling problems and mood symptoms are presented in Table 8 and Table 9. Individuals with BD had a significantly lower mean age of illness onset as compared to MDD (M=27.53 SD=10.05 vs. M=29.53 SD=11.18; p=0.025). There was a trend towards an earlier age of onset of gambling problems for individuals with BD versus MDD (p=0.056).

Temporal Assessment of Mood

Sex differences were found in the age of onset of significant mood symptoms (see Table 10). The mean age at onset of mood symptoms as measured by the TAM was significantly younger for females (M=27.60 SD=10.08) compared to males (M=30.24 SD=11.49) ($p<0.05$). For individuals with any mood disorder, an analysis of itemized components of the TAM indicates that although there was no significant difference between males and females in the age at which they first noticed a disturbance in their mood, females reported mood symptoms first causing problems in their life at an earlier age. Females also sought help and received a diagnosis as well as treatment for their mood disorder at an earlier age; this remained significant when evaluating MDD and BD groups separately.

Temporal Assessment of Gambling

Sex differences were found in the mean age at onset of gambling problems in individuals with a mood disorder as measured by the TAG (see Table 11). For all individuals with a mood disorder, males had a significantly earlier age of onset of gambling problems than females (M=28.34, SD=8.79 vs. M=34.06, SD=11.35; p=0.002). Males with any mood disorder bet more than they could really afford, gambled with larger amounts of money to get the same feeling of excitement, felt that they might have a problem with gambling, and felt guilty about the way the gambled at an earlier age than females.

A separate analysis including individuals with MDD only, indicates that males had a significantly lower mean age at onset of gambling problems than females (M=28.48, SD=7.36 vs. M=36.20, SD=11.21; p=0.007). Similarly to any mood disorder, males with MDD reported an earlier mean age at which they bet more than they could really afford, felt guilty about the way that they gamble, and felt they might have a problem with gambling than females. Unlike any mood disorder, males with MDD reported having health problems including stress and anxiety due to their gambling at an earlier age than females (see Table 12).

Males with BD did not differ with respect to the onset of mean age of gambling problems from females (see Table 13). However, in an itemized analysis of the TAG, males reported gambling with larger amounts of money to get the same feeling of excitement at a significantly younger age than females (M=25.61, SD=9.543 vs. M=34.75, SD=9.313; p=0.008.) No significant differences were found on any other item on the TAG between males and females, though the trend was for earlier age of onset of gambling problems for males compared to females.

Temporal Relationship between Gambling and Mood Disorders: Which Came First?

Based on subjective reporting on the TAG, a total of 137 subjects reported a lifetime negative experience with gambling. Most individuals (68.6%) reported the onset of mood disorder prior to problems with gambling (see Table 14). A separate analysis restricting the sample to individuals meeting criteria for past-year, lifetime, and current gambling problems revealed that the onset of mood disorder preceded the onset of gambling pathology in more than 70% of the cases (i.e. 70.97%, 73.91%, and 73.33%, respectively).

Both non-parametric and parametric tests show that individuals who reported a problem with gambling prior to the onset of a mood disorder did not significantly differ in the severity of gambling pathology as measured by the CPGI, SOGS, and DMS-IV-TR rating scales when compared to individuals with the onset of mood disorder prior to gambling.

No significant differences between MDD and BD were found in the temporal relationship between gambling and mood disorder with 66.13% versus 70.67% of individuals reporting mood disorder onset prior to problems with gambling respectively (p=0.569) (see Table 14). After excluding individuals who did not meet criteria for past-year problem gambling, lifetime pathological gambling, or current pathological gambling, the temporal relationship continued to show non-significant findings between MDD and BD groups.

Socio-demographic characteristics

A significantly higher proportion of males (48.08% vs. 21.18%) reported problems with gambling before the onset of a mood disorder (X^2=10.841, p=0.001). A separate analysis by type of mood disorder demonstrates that this was largely accounted for by the MDD subgroup with a significantly higher proportion of males (n=13; 68.42% vs. n=8; 18.60%) reported gambling problems prior to the onset of MDD (X^2=14.600, p<0.001); this difference was not significant for individuals with BD (36.36% vs. 23.81%; X^2= 1.405, p= 0.236) (see Table 15).

There were no significant differences between individuals who reported gambling problems prior to a mood disorder and those who reported gambling problems following a mood disorder in terms of educational attainment, ethnic background, marital status, employment status, or annual income.

Clinician-rated psychiatric comorbidities

A series of analyses were performed to determine if individuals who reported gambling problems prior to mood symptoms (gambling first) differed in psychiatric comorbidities from individuals who reported mood symptoms prior to gambling problems (mood first). The "mood first" group were at greater risk for suicide (73.91% vs. 51.22%; p=0.010). This finding remained significant for individuals with MDD (p=0.029), but not for individuals with BD (p=0.156).

Individuals who reported "gambling first" and met criteria for past-year problem gambling had higher rates of current panic disorder (38.89%) versus "mood first" (16.28%) (p=0.055). The "mood first" group also had a trend towards higher rates of lifetime substance dependence (40.91%) as compared to those with reporting "gambling first" (16.67%) (p=0.067). A separate analysis of individuals with BD who met criteria for past-year problem gambling showed higher rates of lifetime panic disorder in those with "gambling first" (85.71%) compared to those with "mood first" (44.00%) (p=0.05). Also, the data available indicated that individuals with BD who reported "gambling first", had higher rates of lifetime alcohol dependence (100%) compared to those who reported "mood first" (60.00%) p=0.044). An analysis of individuals with MDD did not reveal any differences in psychiatric comorbidities between "mood first" and "gambling first".

Individuals meeting criteria for lifetime pathological gambling and who reported "gambling first" also had higher rates of current panic disorder (25.00%) versus "mood first" (3.03%) (p=0.022). Furthermore, individuals with "gambling first" had higher rates of current generalized anxiety disorder (GAD) (58.33% vs. 21.21%) (p=0.017). A separate analysis of individuals with MDD showed that, among those who met criteria for lifetime pathological gambling, those reporting "gambling first" had higher rates of current GAD (71.43%) compared to those reporting "mood first" (25.00%) p=0.036. Also, individuals with MDD who reported "gambling first" had higher rates of current panic disorder (28.57%) compared to those reporting "mood first" (0.00%) p=0.030. These results were not significant for individuals with BD.

Amongst individuals meeting criteria for current pathological gambling and reporting "mood first", higher rates of lifetime substance dependence (54.55% vs. 12.50%) (p=0.040) were found. Similarly to lifetime pathological gamblers, current pathological gamblers reporting "gambling first" also had higher rates of current panic disorder (37.50% vs. 4.76%) (p=0.022). Due to insufficient sample size, separate analyses for MDD and BD for individuals with current pathological gambling were not performed.

Self-report personality and anxiety

Individuals who reported "gambling first" scored higher on the personality measure of openness (M=27.53, SD=6.27 vs. M=31.32, SD=6.24) (p=0.002), whereas individuals who reported "mood first" scored higher on anxiety as measured with the TAQ (M=149.01, SD=57.71 vs. M=125.37, SD=55.028) (p=0.030). A sub-analysis of behavioural, cognitive, and somatic aspects of anxiety on the TAQ indicates that severity of somatic symptoms was significantly higher in individuals with "mood first" (M=60.09, SD=28.80479 vs. M=46.44, SD=28.25; p=0.013) compared to those with "gambling first". A separate analysis selecting individuals who met diagnostic criteria for problem or pathological gambling did not reveal any differences in measures of personality or anxiety with respect to the temporality of illness onset.

A separate analysis of individuals with MDD revealed that those reporting "mood first" scored higher on the self-reported anxiety scale (TAQ) (M= 152.44, SD= 58.436 vs. M= 121.55, SD= 53.967) (p=0.054) and the subscale of somatic aspects of anxiety (M=62.62, SD=28.930 vs. M=41.15, SD= 28.930) (p=0.007). Individuals with MDD and "mood first", scored higher on the self-reported depression scale (QIDS) (M=14.70, SD= 5.712) compared to those reporting the onset of "gambling first" (M=11.20, SD= 5.625) p= 0.028.

An analysis of the BD group revealed that those reporting "gambling first" scored higher on the personality measure of agreeableness (M= 31.33, SD= 6.923 vs. M= 27.74, SD= 6.812) (p=0.047) and openness (M=33.14, SD=5.082 vs. M=27.82, SD=6.278) (p= .001) compared to individuals reporting "mood first".

Comorbidities

Psychiatric Comorbidities

Psychiatric comorbidities are presented in chi-square and odds ratio form in Tables 16-21. Individuals with a mood disorder meeting the CPGI criteria for past-year problem gambling had significantly increased odds of current panic disorder (OR=1.96, 95% CI=1.02-3.75), current specific phobia (OR=2.36, 95% CI=1.17-4.76), current obsessive-compulsive disorder (OCD) (OR=1.86, 95% CI=1.01-3.65), current (OR=5.73, 95% CI=3.08-10.65) as well as lifetime alcohol dependence (OR=3.02, 95% CI=1.80-5.07), and lifetime substance dependence (OR=2.05, 95% CI=1.17-3.58) (see Table 19). An increased odds of current OCD (OR=2.67, 95% CI=1.13-6.31) as well as current (OR=2.92, 95% CI=1.05-8.09) and lifetime alcohol dependence (OR=2.12, 95% CI=0.99-4.51) remained significant for individuals with MDD, while those with BD had a significantly increased odds of current specific phobia (OR=2.96, 95% CI=1.08-8.15) as well as current (OR=9.33, 95% CI=4.12-21.13) and lifetime alcohol dependence (OR=4.34, 95% CI=2.04-9.23) along with current (OR=4.00, 95% CI=1.40-11.44) and lifetime substance dependence (OR=2.89, 95% CI=1.39-6.00).

Lifetime pathological gambling as measured by the SOGS questionnaire was not associated with increased odds of any of the anxiety disorders measured, but was associated with increased odds of current (OR=4.84, 95% CI=2.44-9.59) and lifetime alcohol dependence

(OR=3.37, 95% CI=1.84-6.17), as well as lifetime substance dependence (OR=2.95, 95% CI=1.60-5.41). These results remained significant for individuals with MDD and BD (see Table 20).

Individuals with current pathological gambling as measured by the DSM-IV criteria had increased odds of OCD (OR=2.52, 95% CI=1.12-5.68), specific phobia (OR=3.23, 95% CI=1.32-7.92), current (OR=4.92, 95% CI=2.19-11.06) and lifetime alcohol dependence (OR=5.20, 95% CI=2.35-11.52) as well as lifetime substance dependence (OR=3.09, 95% CI=1.47-6.51) (see Table 21). Individuals with MDD who met criteria for current pathological gambling also had higher odds of current (OR=3.95, 95% CI=1.17-13.38) and lifetime alcohol dependence (OR=4.54, 95% CI=1.59-12.96), and lifetime substance dependence (OR=3.18, 95% CI=1.09-9.22). Individuals with BD had increased odds of current (OR=6.17, 95% CI=2.04-18.60) and lifetime alcohol dependence (OR=6.93, 95% CI=1.91-25.13), lifetime substance dependence (OR=3.16, 95% CI=1.10-9.06), as well as current specific phobia (OR=5.43, 95% CI=1.57-18.78).

Overall, the total number of current psychiatric comorbidites was significantly correlated with the total scores on the past-year problem gambling, lifetime pathological gambling, and current pathological gambling scales for individuals with a mood disorder (r=0.179, 0.127, 0.171 respectively; $p<0.005$). The significant correlations with the number of comorbidities and total scores on the past-year problem gambling, lifetime pathological gambling, and current pathological gambling scales persisted for individuals with MDD (r=0.191, 0.151, 0.204, $p<0.05$). For individuals with BD, the total score on the past-year problem gambling and the current pathological gambling scales were significantly correlated with the total number of comorbidities (r=0.168, 0.142; $p<0.05$) while lifetime pathological gambling was not significant ($p=0.066$).

Past-year problem gamblers had significantly more current psychiatric comorbidities than non-problem gamblers (M=2.203, SD=2.040 vs. M=1.432, SD=1.633, $p<0.005$). A separate analysis of individuals with MDD showed that past-year problem gamblers had more current psychiatric comorbidites than non-problem gamblers (M=2.121, SD=2.073 vs. M=1.480, SD=1.567; $p=0.096$), but this result did not reach significance. An analysis of individuals with BD showed that past-year problem gamblers had significantly more current psychiatric comorbidities than non-problem gamblers (M=2.278, SD=2.040 vs. M=1.390, SD=1.692; $p<0.005$).

Lifetime pathological gamblers had an average of 1.9 current psychiatric comorbidities, however this was not significantly higher than non-pathological gamblers in individuals with any mood disorder, MDD or BD.

Current pathological gamblers had significantly more current psychiatric comorbidities than non-problem gamblers (M=2.452, SD=2.063 vs. M=1.472, SD=1.661; $p<0.005$). A separate analysis of individuals with MDD showed that current pathological gamblers had more current psychiatric comorbidites than non-problem gamblers (M=2.500, SD=2.251 vs. M=1.475, SD=1.571; $p=0.092$) but this result did not reach significance. An analysis of individuals with BD showed that current pathological gamblers had significantly more current psychiatric comorbidities than non-problem gamblers (M=2.400, SD=1.920 vs. M=1.469, SD=1.741; $p<0.05$).

Suicide risk comorbidity

The total scores on the suicide risk assessment indicate significant correlations with past-year problem gambling, lifetime pathological gambling, and current pathological gambling ($r=0.175, 0.151, 0.200$, respectively; $p<0.0005$). A separate analysis of individuals with MDD, indicates significant correlations between suicide risk and past-year problem gambling, lifetime pathological gambling and current pathological gambling ($r=0.230, 0.157, 0.234$, respectively; $p<0.05$). An analysis of individuals with BD indicates significant correlations between suicide risk and past-year problem gambling, lifetime pathological gambling and current pathological gambling ($r=0.122, 0.146, 0.169$, respectively; $p<0.05$).

Individuals with a mood disorder and meeting criteria for past-year problem gambling had increased risk for suicide (OR= 2.05, 95% CI=1.18-3.57). A separate analysis of individuals with MDD and BD showed a significantly increased risk for suicide in MDD only (OR=2.49, 95% CI=1.10-5.67). Similarly, individuals meeting criteria for lifetime pathological gambling with any mood disorder (OR=2.32, 95% CI=1.20-4.49) and MDD (OR=3.43, 95% CI=1.22-9.63) had increased risk for suicide. Individuals with a mood disorder meeting the DSM-IV-TR criteria for current pathological gambling also had increased risk for suicide (OR=3.00, 95%CI=1.20-7.43).

Anxiety comorbidity

The total scores on the past-year problem gambling measure (CPGI) were significantly positively correlated with the total score and behavioural, cognitive and somatic subscales of the self-reported anxiety measure (TAQ) ($p<0.005$). Individuals meeting criteria for past year problem gambling scored significantly higher on the overall total of the TAQ self-report scale of anxiety ($M=147.26$, $SD=54.983$ vs. $M=121.27$, $SD=58.731$; $p<0.005$) and all of its subscales (behavioural ($M=49.57$, $SD=19.792$ vs. $M=41.62$, $SD=21.629$; $p<0.005$), cognitive ($M=39.47$, $SD=13.348$ vs. $M=32.04$, $SD=15.445$; $p<0.005$), and somatic ($M=58.22$, $SD=27.691$ vs. $M=47.61$, $SD=28.608$; $p<0.005$) as compared to non-problem gamblers. These results remained significant when selecting for individuals with MDD ($p<0.05$). Individuals with BD scored significantly higher on only the somatic subscale ($M=57.49$, $SD=26.797$ vs. $M=46.46$, $SD=30.320$; $p<0.05$), while the overall anxiety score and cognitive and behavioural subscales trended towards significance.

Similarly to past-year problem gambling, the total scores on the lifetime pathological gambling measure (SOGS) were significantly positively correlated with the total score and behavioural, cognitive and somatic subscales of the self-reported anxiety measure (TAQ) ($p<0.005$). Individuals meeting criteria for lifetime pathological gambling scored higher on the mean TAQ anxiety scale as well as all subscales (behavioural, cognitive, and somatic), ($p<0.05$). When selecting solely individuals with MDD, differences on neither the mean TAQ score nor any of its subscales reached significance. When selecting for individuals with BD, higher scores for lifetime pathological gamblers were found on the measure of cognitive ($M=39.16$, $SD=12.409$ vs. $M=31.56$, $SD=16.131$; $p<0.01$) anxiety compared to non-gamblers.

The total scores on the DSM-IV-TR criteria for pathological gambling were significantly positively correlated with the total score and behavioural, cognitive and somatic subscales of the self-reported anxiety measure (TAQ) ($p<0.005$). Individuals meeting the DSM-IV-TR criteria for pathological gambling scored higher on the overall TAQ score, as well as the subscales of behavioural, cognitive and somatic symptoms of anxiety ($p\leq0.05$). These results remained significant in individuals with MDD. Individuals with BD and current pathological gambling

scored significantly higher on the TAQ total score, the subscale of cognitive and behavioural anxiety.

Quality of Life

The total scores on the past-year problem gambling (CPGI), the lifetime pathological gambling (SOGS) and the DSM-IV-TR criteria for pathological gambling were significantly negatively correlated with the total score on the self-reported quality of life scale (Q-LES-Q) ($p<0.05$). Individuals meeting criteria for past-year problem gambling had lower reported quality of life than those without past-year problem gambling (M=26.46, SD=11.819 vs. M=33.43, SD=12.788; $p<0.0005$). This finding remained significant for individuals with MDD and BD. Those meeting criteria for lifetime pathological gambling also had lower reported quality of life compared to those not meeting criteria (M=26.66, SD=13.320 vs. M=33.25, SD=12.629; $p=0.0005$). This finding remained significant for individuals with MDD and BD ($p<0.05$). Those meeting the DSM-IV criteria for current pathological gambling also had lower mean scores on the quality of life measure (M=26.10, SD=12.070 vs. M=32.98, SD=12.776; $p<0.005$). These results remained significant for individuals with MDD ($p=0.01$) but not BD ($p=0.111$).

Self-reported Depression

The total scores on the past-year problem gambling (CPGI) measure, the lifetime pathological gambling measure (SOGS) and the DSM-IV-TR criteria for pathological gambling were significantly positively correlated with the total score on the self-reported depression scale (QIDS) ($p<0.05$). Individuals meeting criteria for past-year problem gambling had a higher mean score on the QIDS than those without past-year problem gambling (M=13.75, SD=5.184 vs. M=10.90, SD=6.080; $p<0.005$). This finding remained significant for individuals with MDD ($p<0.0005$) but not BD ($p=0.055$). Those meeting criteria for lifetime pathological gambling also had higher reported levels of self-reported depression compared to those not meeting criteria (M=13.38, SD=5.735 vs. M=11.02, SD=6.065; $p=0.009$). This finding trended toward significance for individuals with MDD ($p=0.058$) and BD ($p=0.064$). Those meeting the DSM-IV criteria for current pathological gambling also had higher mean scores on the self-report depression measure (M=14.10, SD=5.294 vs. M=11.09, SD=6.072; $p=0.009$). These results remained significant for individuals with BD ($p<0.05$) but not MDD ($p=0.113$).

Clinician-rated Depression

The total scores on the past-year problem gambling measure (CPGI), the lifetime pathological gambling measure (SOGS) and the DSM-IV-TR criteria for pathological gambling were significantly positively correlated with the total score on the clinician-reported depression scale (HAM-D-7) ($p<0.005$). Individuals meeting criteria for past-year problem gambling had a higher mean score on the HAM-D-7 than those without past-year problem gambling (M=9.00, SD=5.573 vs. M=6.51, SD=5.616; $p<0.005$). This finding remained significant for individuals with MDD ($p<0.05$) and those with BD ($p<0.05$). Those meeting criteria for lifetime pathological gambling also had higher clinician rated levels of depression compared to those not meeting criteria (M=8.52, SD=6.089 vs. M=6.62, SD=5.592; $p<0.05$.). This finding did not reach significance for individuals with MDD ($p=0.292$), but individuals with BD and lifetime pathological gambling did score significant higher on the clinician-rated depression scale ($p=0.028$). Those meeting the DSM-IV criteria for current pathological gambling also had higher mean scores on the self-report depression measure (M=9.39, SD=5.637 vs. M=6.77, SD=5.678;

p<0.05.). These results trended toward significance for individuals with MDD (p=0.065), but not for BD (p=0.111).

Clinician-rated Mania

The total scores on the DSM-IV-TR criteria for pathological gambling were significantly positively correlated with the total score on the clinician-reported mania scale (YMRS) (p<0.05). Significant correlations between past-year problem gambling and lifetime pathological gambling were not found.

Self-reported Personality

The total scores on the past-year problem gambling measure (CPGI) were significantly positively correlated with the subscale of Neuroticism, and significantly negatively correlated the measures of Openness, Agreeableness, and Conscientiousness subscales of the self-reported personality measure (NEO-FFI) (p<0.05). Individuals meeting criteria for past year problem gambling had significantly higher scores on the subscale of Neuroticism (M=31.52, SD=6.781 vs. M=29.03, SD=8.704; p<0.01), and significant lower scores on the subscales of Agreeableness (M=27.04, SD=6.614 vs. M=31.67, SD=6.277; p<0.0005) and Conscientiousness (M=24.57, SD=7.068 vs. M=28.35, SD=7.795; p<0.0005), compared to non-problem gamblers. These results remained significant when selecting for individuals with MDD (p<0.05), with the addition of Openness (M=25.242, SD=5.540 vs. M=27.94, SD=6.299; p<0.05), which was significantly lower in past-year problem gamblers. Individuals with BD had significantly lower scores on only the Agreeableness (M=26.306, SD=6.663 vs. M=31.65, SD=6.605; p<0.0005) and Conscientiousness subscales (M=25.167, SD=7.443 vs. M=28.609, SD=7.861; p<0.0005).

The total scores on the lifetime pathological gambling measure (SOGS) were significantly positively correlated with the personality subscale of Neuroticism, and significantly negatively correlated with the measures of Agreeableness, and Conscientiousness subscales of the self-reported personality measure (NEO-FFI) (p<0.01). Individuals meeting criteria for lifetime pathological gambling scored significantly higher the subscale of Neuroticism (M=32.06, SD=7.671 vs. M=29.07, SD=8.567; p<0.05), and significant lower on the subscales of Agreeableness (M=27.84, SD=6.316 vs. M=31.41, SD=6.450; p<0.0005), and Conscientiousness (M=23.69, SD=6.899 vs. M=28.32, SD=7.737; p<0.0005), as compared to non-pathological gamblers. Lifetime pathological gamblers with MDD scored significantly lower on the subscales of Openness (M=24.52, SD=5.696 vs. M=28.00, SD=6.266; p=0.01), Agreeableness (M=28.39, SD=5.998 vs. M=31.50, SD=6.048; p<0.05) and Conscientiousness (M=24.04, SD=7.571 vs. M=27.93, SD=7.642; p<0.05) compared to non-pathological gamblers. Individuals with BD scored significantly lower on only the Agreeableness (M=27.35, SD=6.663 vs. M=31.33, SD=6.795; p<0.005), and Conscientiousness subscales (M=23.38, SD=6.382 vs. M=28.66, SD=7.819; p<0.005), only.

The total scores on the current pathological gambling (DSM-IV-TR) were significantly positively correlated with the subscale of Neuroticism, and significantly negatively correlated the measures of Openness, Agreeableness, and Conscientiousness subscales of the self-reported personality measure (NEO-FFI) (p<0.05). Individuals meeting criteria for current pathological gambling scored significantly higher the subscale of Neuroticism (M=32.70, SD=7.140 vs. M=29.16, SD=8.556; p<0.05), and significant lower on the subscales of Openness (M=25.23, SD=5.782 vs. M=28.79, SD=6.550; p<0.005), Agreeableness (M=26.90, SD=6.520 vs. M=31.32, SD=6.431; p<0.0005), and Conscientiousness (M=25.00, SD=6.888 vs. M=28.04,

SD=7.797; $p<0.05$), as compared to non-pathological gamblers. These results remained significant when selecting for individuals with MDD ($p<0.05$). Individuals with BD scored significantly lower on only the Agreeableness (M=26.40, SD=7.149 vs. M=31.22, SD=6.777; $p<0.01$) subscale.

Predictors of Gambling Problems in Mood Disorders

Predictors of Past-year Problem Gambling

Results from a multiple-logistic regression indicate past-year problem gambling was significantly associated with that lifetime alcohol dependence (OR=2.751, 95% CI=1.606-4.713), self-reported depressive symptoms (OR=1.073 95%CI=1.024-1.125), not having a greater than high school education (OR=2.133 95%CI=1.49-3.957), and of being of non-Caucasian ethnicity (OR=2.296 95%CI=1.210-4.357) in individuals with any mood disorder.

When individual with MDD were analyzed separately in a multiple-logistic regression, the results indicate that quality of life (OR=0.934 95% CI=0.897-0.972) and a personality measure of agreeableness (OR=0.910 95% CI-0.851-0.973) persisted as significant predictors of past-year problem gambling, indicating a potential protective factor of gambling pathology. In BD past-year problem gambling was also significantly associated with personality measures of agreeableness (OR=0.876 95% CI=0.823-9.32) and lifetime alcohol dependence (OR=3.691 95% CI=1.60-8.497)

Predictors of Lifetime Pathological Gambling

Results from a multiple-logistic regression indicate lifetime pathological gambling was significantly associated with that lifetime alcohol dependence (OR=2.668, 95% CI=1.289-5.125), being of non-Caucasian ethnicity (OR=2.289 95%CI=1.191-4.796), and was trending towards significance for lifetime substance dependence (OR=1.952 95%CI=0.998-3.816) in individuals with any mood disorder.

The predictors of lifetime pathological gambling that persist in a multiple logistic regression in individual with MDD lifetime alcohol dependence (OR=4.956 95% CI=1.885-13.028) followed by personality variables (i.e. openness and conscientiousness) as measured with the NEO (OR=0.882, 95% CI=0.814-0.956 and OR=0.920 95% CI=0.860-0.983). On the other hand, lifetime pathological gambling in individuals with BD was significantly associated with lifetime substance dependence (OR=2.976 95% CI=1.276-6.943) and conscientiousness (OR=0.921 95% CI=0.872-0.973) were significant predictors of in a multiple logistic regression.

Predictors of Current Pathological Gambling

Results from a multiple-logistic regression indicate current pathological gambling was significantly associated with that lifetime alcohol dependence (OR=5.084, 95% CI=2.276-11.357), being of non-Caucasian ethnicity (OR=2.268 95%CI=1.019-5.503), and meeting criteria for current specific phobia (OR=2.903 95%CI=1.143-7.374) in individuals with any mood disorder.

When individual with MDD analyzed separately in a multiple-logistic regression, the results indicate that comorbid lifetime alcohol dependence was the strongest predictor of current pathological gambling (OR=4.280 95% CI=1.343-13.646), followed by anxiety as measured with the TAQ (OR=1.013 95% CI=1.002-1.025) and a personality measure of openness (OR=0.853 95% CI=0.770-0.946). In individuals with BD, lifetime alcohol dependence

(OR=10.019 95%CI=2.199-45.662) was the only significant predictor of current pathological gambling behaviour after controlling for multiple confounders. Current Alcohol dependence was also a highly associated with current pathological gambling (OR=6.377 96%CI=2.031-20.018).

Discussion

This study confirmed a high prevalence of problem and pathological gambling in clinic-based mood disorder patients. The prevalence of past-year problem gambling was equally high in both bipolar (12.5%) and major depressive disorder (12.7%) populations. The rate of gambling was more than twice as high in men with BD (18.9%) compared to women with BD (8.3%), although men and women did not differ in rates of gambling in the MDD population. Patterns were similar for lifetime and current pathological gambling, although rates were considerably lower. Community rates for problem gambling in Canada are estimated at less than 5% (Andresen, 2006), while pathological gambling rates are less than 2% (Shaffer & Hall, 2001). The results of this study document more than twice the prevalence of problem gambling in the mood disorder population. This study found more than two and a half times the prevalence of pathological gambling in the mood disorder population compared to the Canadian community as a whole.

Problem gamblers distinguished themselves from non-problem gamblers by having a lower level of educational attainment. Findings from other studies have also shown that problem gamblers are more likely to have lower level of educational attainment (McIntyre et al., 2007) while individuals with post-graduate degrees have the lowest participation rates for gambling. There were no differences in income, employment status or marital status between gamblers and non-gamblers in either mood disorder population in this study.

Two of the three Ontario sites and the Alberta site had the highest prevalence of problem gambling in the past year (Ottawa=19.6%, Toronto=18.0%, Edmonton=16.0%), while Halifax (4.3%) and Providence (4.1%) had the lowest rates with Kingston (10%) in between. This may be in part due to the availability of gambling outlets such as VLTs and permanent casinos in these areas. For instance, Alberta is estimated to have the highest prevalence of pathological gamblers in Canada, and also the highest numbers of VLTs (Alberta Lottery Fund, 2006). This study did not examine the prevalence of gambling behaviour in Manitoba or Saskatchewan, which both have large populations of problem gamblers (Cox, Yu, Afifi & Ladouceur, 2005).

There were also significant differences between gamblers and non-gamblers in several areas of comorbidity. The most consistent distinguishing feature across all three gambling measures was alcohol dependence and this was true in both BD and MDD groups. The gambling populations were also more than twice as likely to display suicidal ideation and had higher rates of OCD and specific phobias compared to non-gamblers.

Using the Five-Factor Model of Personality, the study also showed a consistent profile of high Neuroticism, low Openness, low Agreeableness and low Conscientiousness in the gambling populations compared to non-gambling population, although the high level of Neuroticism was largely accounted for by the BD population. There is a paucity of data available in the gambling literature quantifying the five-factor model of personality and gambling behaviour. These findings have implications for identifying individuals at high risk for gambling pathology, as well as generating hypotheses regarding the etiology of gambling behaviour.

In this study the temporal relationship between onset of gambling behaviour and onset of mood disorder was also examined, with 70% of individuals reporting onset of mood disorder before gambling problems. The onset of gambling behaviour occurred earlier in men with MDD compared to women but this sex difference was not present in the BD population. Individuals in the "mood first" group had higher rates of substance dependence while individuals with "gambling first" had higher rates of anxiety disorders like panic disorder and GAD. Individuals

with MDD in the "mood first" group were also more likely to report suicidal ideation. Individuals with BD who reported "gambling first" also had higher scores on the personality measure of Openness in the five-factor personality inventory.

People meeting criteria for problem or pathological gambling also had lower self-reported quality of life. The three gambling scales were significantly negatively correlated with scores on the Q-LES-Q. These results corroborate a lower quality of life in gambling sufferers reported by Grant and Kim (2005). The Banff Consensus (Walker, Toneatto, Potenza, Petry, Ladouceur, et al, 2006), an expert panel invited by the Alberta Gambling Research Institute, confirmed quality of life as an important element to measure problems caused by gambling. Ultimately, it is quality of life that determines whether gambling behaviour is pathological for the individual partaking in gambling activities. This study confirms that quality of life is indeed an issue that needs to be addressed by clinicians for individuals with problem and pathological gambling.

Individuals with problem or pathological gambling had higher self-reported anxiety (behavioural, cognitive, and somatic) than non-problem or non-pathological gamblers. The scores on the three gambling measures were significantly negatively correlated with scores on the self-reported anxiety measure, the TAQ. These results substantiate the evidence from a previous report (Zimmerman, Chelminski & Young, 2006) that anxiety is often an important component of problem and pathological gambling behaviour.

Individuals meeting criteria for problem or pathological gambling also had higher levels of clinician-rated depression, as quantified with the HAM-D-7 and self-reported levels of depression as measured by the QIDS. Particularly relevant is the inference that as gambling difficulties mount, so do symptoms of depression. This indicates the importance of exploring potential gambling behaviour in individuals with depression and, in addition, to address the level of depression in individuals with problem or pathological gambling.

The total score on the clinician-rated DSM-IV-TR checklist of current pathological gambling behaviour was significantly correlated with the clinician-rated manic symptoms in individuals with BD. This may be indicative of higher mood and greater impulsivity in this group, as shown elsewhere in the gambling literature (Steel & Blaszczynski, 1998).

There were a number of strengths to this study including the large sample size, administration of in-person interviews and the use of reliable diagnostic instruments and symptom scales. The results of this study lend support to the argument that problem and pathological gambling share features with addictions, as well as personality traits of impulsivity. The question remains, why does the mood disorder population have higher incidences of problem and pathological gambling? It is possible that individuals with depression use gambling to quell symptoms of low mood. Some individuals with problem or pathological gambling become depressed due to decreased quality of life and financial ruin Results from this study indicate that in most cases (ie. approximately 70%), participants had experienced a mood episode prior to a problematic gambling episode. However, men with major depressive disorder had significantly lower age of onset of gambling pathology than women. This corroborates results found elsewhere that document an earlier age of onset of gambling in males (Martins, Tavares, da Silva Lobo, Galetti & Gentil, 2004).

There are many features of gambling behavior that are commonly encountered in individuals with bipolar disorder. For example, impulsivity is a frequent symptom in states of hypo/mania and often represents an enduring feature in remitted bipolar populations. Gambling may represent a feature of impulsivity and may reflect a more fundamental abnormality in

aberrant reward behaviours (e.g. substance use disorders and compulsive overeating) (McIntyre et al., 2007b).

This study has public policy implications. Lessons in healthy public policy development can be learned from successful tobacco control strategies. Given the high comorbidity of gambling and alcohol and substance dependence, consideration should be given to limiting the availability of alcohol in gambling outlets such as casinos. Also, the number of video lottery terminals (VLTs) should be decreased, and they should be removed from premises licensed to serve alcohol. Just as the tobacco industry is prevented from advertising their products, so too should the gambling industry. Educating the public about the effects of gambling on individual gamblers, their families, and communities will help promote the idea of gambling as an important health issue facing Canadians today. Therefore, an increase in funding to research groups concerned with examining the effects of problem gambling should be allocated. There needs to be strong advocacy by health care professionals on behalf of gambling sufferers to address this significant issue and push the government to make the recommended changes.

Study Limitations

Several methodological issues should be noted. Firstly, not all study sites achieved their target recruitment; however there was an even distribution of participants with major depressive disorder and bipolar disorder.

Secondly, not all modules of the M.I.N.I.-PLUS were used. The M.I.N.I.-PLUS was shortened to include specific modules that contained lifetime expressions of mood and substances disorders (alcohol dependence, alcohol abuse, substance dependence, substance abuse) as well as current expression of anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, obsessive-compulsive disorder, post-traumatic stress disorder (PTSD) and generalized anxiety disorder (GAD). Lifetime incidence of anxiety disorders is not included in the M.I.N.I-PLUS, save for panic disorder and agoraphobia. Individuals who met criteria for a diagnosis of schizophrenia or another psychotic disorder were excluded, though mood disorder with psychotic features was not exclusionary.

Thirdly, the M.I.N.I.-PLUS does not contain a module for assessing pathological gambling. The diagnosis of pathological gambling was not based on a validated scale, but was a DSM-IV-TR criteria checklist of pathological gambling and was administered by a clinician. However, the SOGS has been shown to be highly correlated with the DSM-III-R classification of pathological gambling, and was used in this study to confirm pathological gambling diagnoses. Also, the CPGI is a self-report scale used for screening of gambling problems, but is not a diagnostic tool.

Fourth, the Temporal Assessment of Mood (TAM) and the Temporal Assessment of Gambling (TAG) scales were developed to determine age of onset of mood disorder and gambling pathology. These scales are not validated questionnaires but include a series of subjective questions that mirrored each other to ensure that a temporal onset could be extracted when comparing one to the other. Another limitation is that causality cannot be inferred from the results of this study. To infer causality, one would need a component of randomization, which is not possible in a cross-sectional study.

Fifth, there were missing data in the sample in some self-report scales. As noted in the methods section of this report, the missing data will tend to skew the results to the lower end of the spectrum. As such, the prevalence of problem and pathological gambling in mood disorder populations may be higher than reported in this study. There were also some missing data for the clinician-rated scales such as the M.I.N.I.PLUS, and those data points were excluded from the analysis. This may skew the data, though it is not possible to infer whether the modules that are missing on individual clinician-rated scales would have represented positive findings or negative.

Sixth, 27 individuals withdrew consent from the study, and it is not possible to infer whether these individuals were problem or pathological gamblers, or those that had high psychiatric comorbidity.

Lastly, the sample was predominantly Caucasian, which did now allow for exploration of increased gambling pathology in non-Caucasian ethnic groups.

Dissemination

Results from this study will be communicated to the community via formal and informal presentations. Submission has been made to the 2008 Canadian Psychiatric Association conference.

The authors will seek to publish the results in the *Journal of Affective Disorders*, the *Canadian Journal of Psychiatry*, and the Centre for Addiction and Mental Health's *Journal of Gambling Issues.*

The research team at the Mood Disorders Psychopharmacology Unit at the University Health Network in Toronto, Ontario will also submit articles to Moods Magazine, and other lay-person audience outlets.

The Mood Disorders Society of Canada (MDSC) has well-developed high quality relationships with influential government policy makers at both the federal and provincial levels, ensuring that the research findings will be communicated in such a way as to heighten the awareness among key decision-makers regarding the human and fiscal costs of gambling problems. The MDSC will disseminate the research findings through its existing network of provincial and territorial self-help groups, as well as community mental health organizations. The MDSC will post study material on the MDSC website which receives an average of 300,000 hits per month. The MDSC-led role of translating findings into accessible language for a variety of audiences is a critical component in the dissemination.

APPENDIX A

Table 1

DSM-IV-TR "Diagnostic Criteria For 312.31 Pathological Gambling

A. Persistent and recurrent maladaptive behaviour as indicated by five (or more) of the following.

1. Is preoccupied with gambling (e.g. preoccupied with reliving past gambling experiences, handicapping the next venture, or thinking of ways to get money with which to gamble).
2. Needs to gamble with increasing amounts of money in order to achieve the desired excitement.
3. Has repeated unsuccessful efforts to control, cut back or stop gambling.
4. Is restless or irritable when attempting to cut down or stop gambling.
5. Gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g. feeling of helplessness, guilt, anxiety, depression)
6. After losing money gambling, often returns another day to get even ("chasing" one's losses)
7. Lies to family members, therapists, or others to conceal the extent of involvement with gambling.
8. Has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling.
9. Has jeopardized or lost significant relationship, job, or educational or career opportunity because of gambling.
10. Relies on others to provide money to relieve a desperate financial situation caused by gambling.

B. The gambling behaviour is not better accounted for by a Manic Episode

Table 2

Study recruitment by site

Site	Number of participants
University Health Network,Toronto, Ontario	197
Royal Ottawa Hospital, Ottawa, Ontario	52
Dalhousie University, Halifax, Nova Scotia	94
University of Alberta, Edmonton, Alberta	50
Queens University, Kingston, Ontario	100
Brown University, Rhode Island, USA	86
Total	579

Table 3

Prevalence of Problem and Pathological Gambling in Major Depressive Disorder and Bipolar Disorder

	Mood Disorder		MDD		BD		X^2	p-value
	N	%	N	%	N	%		
Pathological Gambling								
DSM-IV (current) ≥5	31	5.30	16	5.80	15	5.00	0.22	0.636
SOGS (lifetime) ≥5	50	9.00	24	9.20	26	8.80	0.02	0.896
Problem Gambling								
CPGI (past- year)							0.81	0.848
1 - 2 – low risk	61	11.10	31	11.90	30	10.30		
3 -7 – moderate risk	39	7.10	20	7.70	19	6.60		
≥8 – problem gambler	30	5.40	13	5.00	17	5.90		

Table 4

Gambling prevalence rates by sex

	female		male			
	N	%	N	%	X2	p-value
CPGI- Prevalence rates of past year problem gambling by sex and diagnosis						
MDD	24	13.64	9	10.84	0.40	0.529
BD	15	8.33	21	18.92	7.10	0.008
SOGS- Prevalence rates of lifetime pathological gambling by sex and diagnosis						
MDD	16	8.99	8	9.64	0.03	0.866
BD	10	5.46	16	14.29	6.73	0.009
DSM-IV-TR- Prevalence rates of current pathological gambling by sex and diagnosis						
MDD	11	5.82	5	5.88	0.00	0.984
BD	7	3.66	8	7.08	1.76	0.184

Table 5

Demographic and Socioeconomic characteristics for past-year problem gambling as measured with the Canadian Problem Gambling Index (CPGI)

	PG Absent (N=482)†		PG present (n=69)		X2	p-value
	N	%	N	%		
Sex					2.32677	0.12717
Males (n = 192)	164	34.10	30	43.48		
Females (n =336)	317	65.90	39	56.52		
Educational Level					10.2253	0.00602
less than high school	39	8.37	7	10.94		
high school diploma	69	14.81	19	29.69		
some college or more	358	76.82	38	59.38		
Income					6.85997	0.23126
Less than 19,999	151	33.11	31	47.69		
20,000 – 39,999	97	21.27	11	16.92		
40,000 – 59,999	75	16.41	7	10.77		
60,000 – 79,999	54	11.84	9	13.85		
80,000 – 99,999	30	6.58	3	4.62		
>100,000	49	10.75	4	6.15		
Employment status					7.82994	0.45026
Full-time employed	130	26.97	16	23.19		
Part-time employed	55	9.13	11	15.94		
Unemployed	50	10.37	7	10.14		
Full-time student	21	4.36	0	0.00		
Part-time student	5	1.04	1	1.45		

Homemaker	14	2.90	1	1.45		
Retired	42	8.71	3	4.35		
Disability	150	31.12	27	39.13		
Marital status					8.38439	0.13628
Single	165	35.79	33	50.00		
Married	159	34.49	15	22.73		
Cohabitating	28	6.07	5	7.58		
Separated	29	6.29	6	9.09		
Divorced	74	16.05	7	10.61		
Widowed	6	1.30	0	0.00		
Ethnicity					10.0659	0.00652
African Can/Am	11	2.42	6	9.68		
Caucasian	419	92.29	51	82.26		
Other	24	5.29	5	8.06		

	Mean	S.D.	Mean	S.D.	t	p
Age	44.94	12.118	42.94	11.537	1.24827	0.21249

†Missing data points excluded from analysis - denominator varies according to available data

Table 6

Demographic and Socioeconomic characteristics for lifetime pathological gambling as measured with the South Oaks Gambling Screen (SOGS)

	PG Absent (n=507)†		PG present (n=50)		X2	p-value
	N	%	N	%		
Sex					4.03	0.045
Males	171	33.79	24	48.00		
Females	335	66.21	26	52.00		
Educational Level					3.79	0.150
less than high school	42	8.55	3	6.67		
high school diploma	76	15.48	12	26.67		
some college or more	373	75.97	30	66.67		
Income					6.80	0.236
Less than 19,999	164	34.10	23	50.00		
20,000 – 39,999	98	20.37	10	21.74		
40,000 – 59,999	77	16.01	5	10.87		
60,000 – 79,999	59	12.27	5	10.87		
80,000 – 99,999	33	6.86	1	2.17		
>100,000	50	10.40	2	4.35		
Employment status					6.60	0.581
Full-time employed	136	26.82	10	20.00		
Part-time employed	60	11.83	9	18.00		
Unemployed	52	10.26	6	12.00		
Full-time student	21	4.14	0	0.00		
Part-time student	5	0.99	1	2.00		

Homemaker	14	2.76	1	2.00		
Retired	42	8.28	3	6.00		
Disability	162	31.95	17	34.00		
Marital status					7.26	0.202
Single	182	37.45	21	44.68		
Married	166	34.16	9	19.15		
Cohabitating	27	5.56	5	10.64		
Separated	30	6.17	5	10.64		
Divorced	75	15.43	7	14.89		
Widowed	6	1.23	0	0.00		
Ethnicity					7.76	0.021
African Can/Am	14	2.94	3	6.67		
Caucasian	439	92.23	26	57.78		
Other	23	4.83	6	13.33		

	Mean	S.D.	Mean	S.D.	t	p
Age	44.69	12.157	43.83	10.737	0.47	0.642

†Missing data points excluded from analysis - denominator varies according to available data

Table 7

Demographic and Socioeconomic characteristics for current DSM-IV-defined pathological gambling

	PG Absent (n=547)†		PG present (n=31)		X2	p-value
	N	%	N	%		
Sex					0.86	0.354
Males	185	33.82	13	41.94		
Females	362	66.18	18	58.06		
Educational Level					1.79	0.408
less than high school	45	8.51	3	10.71		
high school diploma	86	16.26	7	25.00		
some college or more	398	75.24	18	64.29		
Income					4.00	0.549
Less than 19,999	180	34.68	12	42.86		
20,000 – 39,999	109	21.00	7	25.00		
40,000 – 59,999	80	15.41	4	14.29		
60,000 – 79,999	61	11.75	4	14.29		
80,000 – 99,999	36	6.94	0	0.00		
>100,000	53	10.21	1	3.57		
Employment status					7.76	0.457
Full-time employed	149	27.19	5	16.13		
Part-time employed	69	12.59	3	9.68		
Unemployed	54	9.85	5	16.13		
Full-time student	21	3.83	0	0.00		

Part-time student	6	1.09	0	0.00		
Homemaker	14	2.55	1	3.23		
Retired	44	8.03	1	3.23		
Disability	174	31.75	14	45.16		
Marital status					3.81	0.577
Single	191	36.38	14	48.28		
Married	175	33.33	8	27.59		
Cohabitating	30	5.71	3	10.34		
Separated	37	7.05	1	3.45		
Divorced	85	16.19	3	10.34		
Widowed	7	1.33	0	0.00		
Ethnicity					8.81	0.012
African Can/Am	15	2.92	3	10.34		
Caucasian	471	91.81	22	75.86		
Other	27	5.26	4	13.79		

	Mean	S.D.	Mean	S.D.	t	p
Age	44.8	12.262	44.17	9.802	0.27	0.786

†Missing data points excluded from analysis - denominator varies according to available data

Table 8

Mean Self-reported Ages on Temporal for Mood (TAM) questionnaire

	Any Mood Disorder		MDD		BD		
	n=572		n=272		n=300		
Age at which...	Mean years	SD	Mean Years	SD	Mean Years	SD	
… you first noticed something wrong with your mood	21.63	12.32	22.59	13.32	20.76	11.29	
… these symptoms caused you significant problems in your life	24.87	12.6	26.11	13.4	23.74	11.73	*
… when you saw someone for emotional or psychiatric problems	27.86	12.07	29.01	12.5	26.81	11.58	*
… when were you diagnosed with a mood disorder	31.26	11.79	32.14	12.11	30.46	11.45	
… you first received treatment for a mood disorder	30.9	11.81	31.53	12.07	30.33	11.56	
… your mood felt the worst	34.93	12.29	36.36	12.41	33.62	12.06	*
Mean age of mood onset on TAM	28.48	10.64	29.53	11.18	27.53	10.05	*

* significant difference between MDD and BD on mean age (years), $p<0.05$.

Table 9

Mean Self-reported Ages on Temporal for Gambling (TAG) questionnaire

	Any mood disorder		MDD		BD		
	n=139		n=63		n=76		
Age at which you first...	Mean	SD	Mean	SD	Mean	SD	
.. bet more than could really afford	31.1	11.88	32.26	11.89	29.96	11.86	
… gambled with larger amounts of money to get same feeling or excitement	30.85	9.99	32.12	9.49	29.91	10.38	
…borrowed or sold anything to get money to gamble	32.13	11.21	34.22	12.91	30.25	9.37	
… felt that you might have a problem with gambling	33.45	11.78	35.8	12.09	31.25	11.23	
… had any health problems, including stress or anxiety due to gambling	33.76	12.68	37.67	12.34	29.86	12.06	*
…been criticized for you betting or told you that you had a gambling problem, regardless of whether or not you thought it was true	35.17	11.29	37.65	11.55	32.91	10.81	
… had any financial problems due to gambling	35.35	12.11	38.24	12.99	33.22	11.23	
… felt guilty about the way you gamble or what happens when you gamble	32.99	11.51	34.32	13.23	31.84	9.8	
Mean age of gambling onset on TAG	31.84	10.77	33.75	10.72	30.25	10.62	

* significant difference between MDD and BD on mean age (years), $p<0.05$.

Table 10

Mean Self-reported Ages on Temporal for Mood (TAM) questionnaire for males vs. females with any mood disorder

	Males n=195		Females n=376		
Age at which...	Mean	SD	Mean	SD	
… you first noticed something wrong with your mood	22.73	12.99	21.07	11.95	
… these symptoms caused you significant problems in your life	26.32	13.54	24.13	12.05	*
… when you saw someone for emotional or psychiatric problems	29.75	13.13	26.91	11.39	*
… when were you diagnosed with a mood disorder	33.76	12.82	30.01	11.02	*
… you first received treatment for a mood disorder	33.26	12.81	29.73	11.09	*
… your mood felt the worst	36.26	13.17	34.28	11.76	
Mean age of mood onset on TAM	30.24	11.49	27.60	10.08	*

* significant difference between MDD and BD on mean age (years), $p<0.05$.

Table 11

Mean Self-reported Ages on Temporal for Gambling (TAG) questionnaire for males vs. females with any mood disorder

	Males		Females		
	n=42		n=65		
Age at which you first...	Mean	SD	Mean	SD	
.. bet more than could really afford	26.67	9.15	33.97	12.60	*
… gambled with larger amounts of money to get same feeling or excitement	26.64	9.33	33.94	9.43	*
…borrowed or sold anything to get money to gamble	30.06	9.66	33.64	12.21	
… felt that you might have a problem with gambling	28.88	9.49	36.54	12.28	*
… had any health problems, including stress or anxiety due to gambling	31.22	10.07	35.67	14.25	
…been criticized for you betting or told you that you had a gambling problem, regardless of whether or not you thought it was true	31.80	10.54	38.23	11.31	
… had any financial problems due to gambling	32.45	11.26	38.25	12.51	
… felt guilty about the way you gamble or what happens when you gamble	29.67	9.55	35.22	12.25	*
Mean age of gambling onset on TAG	28.34	8.79	34.06	11.35	*

* significant difference between MDD and BD on mean age (years), $p<0.05$.

Table 12

Mean Self-reported Ages on Temporal for Gambling (TAG) questionnaire for males vs. females with MDD

	Males		Females		
Age at which you first...	Mean	SD	Mean	SD	
.. bet more than could really afford	25.94	5.93	35.25	12.86	*
… gambled with larger amounts of money to get same feeling or excitement	29.29	8.86	33.22	9.74	
…borrowed or sold anything to get money to gamble	28.00	10.37	36.62	13.35	
… felt that you might have a problem with gambling	28.50	9.94	38.45	11.88	*
… had any health problems, including stress or anxiety due to gambling	30.75	5.78	41.92	13.52	*
…been criticized for you betting or told you that you had a gambling problem, regardless of whether or not you thought it was true	34.00	9.17	39.62	12.55	
… had any financial problems due to gambling	31.50	9.42	41.91	13.55	
… felt guilty about the way you gamble or what happens when you gamble	26.71	8.17	38.75	13.72	*
Mean age of gambling onset on TAG	28.48	7.36	36.20	11.21	*

* significant difference between MDD and BD on mean age (years), $p<0.05$.

Table 13

Mean Self-reported Ages on Temporal for Gambling (TAG) questionnaire for males vs. females with BD

	Males		Females		
Age at which you first...	Mean	SD	Mean	SD	
.. bet more than could really afford	27.16	10.90	32.38	12.31	
… gambled with larger amounts of money to get same feeling or excitement	25.61	9.54	34.75	9.31	*
…borrowed or sold anything to get money to gamble	31.00	9.70	29.33	9.45	
… felt that you might have a problem with gambling	29.06	9.58	33.73	12.73	
… had any health problems, including stress or anxiety due to gambling	31.60	12.86	28.27	11.68	
…been criticized for you betting or told you that you had a gambling problem, regardless of whether or not you thought it was true	30.62	11.38	36.22	9.58	
… had any financial problems due to gambling	32.86	12.28	33.78	10.06	
… felt guilty about the way you gamble or what happens when you gamble	31.84	10.11	31.84	9.76	
Mean age of gambling onset on TAG	28.25	9.64	31.87	11.21	

* significant difference between MDD and BD on mean age (years), $p<0.05$.

Table 14

"Which came first" - mood symptoms or gambling problems - based on overall average of TAM and TAG

	Any mood disorder N=137		MDD N=62		BD N=75	
	N	%	N	%	N	%
Mood First	94	68.61	41	66.13	53	70.67
Gambling First	43	31.39	21	33.87	22	29.33

Table 15

Sex differences in "Which came first" - mood symptoms or gambling problems

	Female		Male			
	N	%	N	%	X2	p-value
Any mood disorder	N=85		N=52		10.8409	0.00099
Mood First	67	78.82	27	51.92		
Gambling First	18	21.18	25	48.08		
MDD	N=43		N=19		14.6001	0.00013
Mood First	35	81.3953	6	31.5789		
Gambling First	8	18.6047	13	68.4211		
BD	N=42		N=33		1.40507	0.23588
Mood First	32	76.1905	21	63.6364		
Gambling First	10	23.8095	12	36.3636		

Table 16

Psychiatric Commorbidities in Past-year Moderate or Problem Gambling as defined by the CPGI criteria (score >=3)

	Any Mood Disorder						**Major Depressive Disorder**						**Bipolar Disorder**					
	PG Absent (482)†		**PG present (n=69)**		**X2**	**p-value**	**PG Absent (n=227)†**		**PG present (n=33)**		**X2**	**p-value**	**PG Absent (n=255)†**		**PG present (n=36)**		**X2**	**p-value**
	N	%	N	%			N	%	N	%			N	%	N	%		
Suicide risk	245	53.38	47	70.15	6.66	0.0099	103	49.52	22	70.97	4.975	0.0257	142	56.57	25	69.44	2.144	0.1432
Anxiety Disorders																		
Panic Disorder Lifetime	167	34.94	28	40.58	0.84	0.360	80	35.56	10	30.30	0.35	0.554	87	34.39	18	50.00	3.32	0.068
Panic Disorder Current	56	11.69	14	20.59	4.22	0.040	27	11.95	6	18.75	1.16	0.281	29	11.46	8	22.22	3.27	0.071
Agoraphobia Lifetime	180	37.50	27	39.13	0.07	0.794	81	35.68	9	27.27	0.90	0.343	99	39.13	18	50.00	1.55	0.214
Agoraphobia Current	114	23.75	21	30.43	1.45	0.228	48	21.15	8	24.24	0.16	0.686	66	26.09	13	36.11	1.59	0.207
Social Phobia Current	126	26.30	22	31.88	0.95	0.329	63	27.88	11	33.33	0.42	0.517	63	24.90	11	30.56	0.53	0.467
Specific Phobia Current	40	8.33	12	17.65	6.02	0.014	24	10.57	6	18.75	1.83	0.176	16	6.32	6	16.67	4.79	0.029
OCD Current	67	13.96	16	23.19	4.01	0.045	28	12.33	9	27.27	5.27	0.022	39	15.42	7	19.44	0.38	0.536
PTSD Current	66	13.72	11	15.94	0.25	0.619	36	15.86	7	21.21	0.60	0.439	30	11.81	4	11.11	0.01	0.903
GAD Current	146	30.42	24	35.29	0.66	0.416	79	34.80	15	45.45	1.42	0.234	67	26.48	9	25.71	0.01	0.923
Any Anxiety Disorder Current	276	57.26	43	62.32	0.63	0.426	146	64.32	22	66.67	0.07	0.792	130	50.98	21	58.33	0.68	0.408
Substance Use Disorders																		
Alcohol Dependence Current	34	7.10	21	30.43	36.38	0.000	16	7.08	6	18.18	4.57	0.033	18	7.11	15	41.67	37.20	0.000
Alcohol Abuse Current	10	2.09	3	4.35	1.33	0.249	2	0.88	1	3.03	1.17	0.280	8	3.17	2	5.56	0.53	0.465
Alcohol Dependence Lifetime	148	30.83	39	57.35	18.63	0.000	61	26.87	14	43.75	3.88	0.049	87	34.39	25	69.44	16.32	0.000
Alcohol Abuse Lifetime	49	10.23	5	7.46	0.50	0.477	22	9.69	2	6.45	0.34	0.560	27	10.71	3	8.33	0.19	0.662
Substance Dependence Lifetime	89	18.58	22	31.88	6.61	0.010	39	17.18	7	21.21	0.32	0.571	50	19.84	15	41.67	8.59	0.003
Substance Dependence Current	22	4.60	7	10.14	3.69	0.055	10	4.42	1	3.03	0.14	0.711	12	4.76	6	16.67	7.62	0.006
Substance Abuse Current	8	1.67	1	1.45	0.02	0.893	3	1.32	0	0.00	0.44	0.507	5	1.98	1	2.78	0.10	0.755
Any Substance Use Current	59	12.24	26	37.68	29.94	0.000	28	12.33	7	21.21	1.95	0.163	31	12.16	19	52.78	36.58	0.000
Any Substance Use Lifetime	220	45.64	45	65.22	9.26	0.002	95	41.85	16	48.48	0.52	0.472	125	49.02	29	80.56	12.59	0.000

†Missing data points excluded from analysis - denominator varies according to available data

Table 17

Psychiatric Commorbidities in Lifetime Pathological Gambling as defined by the SOGS (score >=5)

	Any Mood Disorder						**Major Depressive Disorder**						**Bipolar Disorder**					
	PG Absent (n=507)†		**PG present (n=50)**		**X2**	**p-value**	**PG Absent (n=238)†**		**PG present (n=24)**		**X2**	**p-value**	**PG Absent (n=269)†**		**PG present (n=26)**		**X2**	**p-value**
	N	%	N	%			N	%	N	%			N	%	N	%		
Suicide risk	260	56.03	35	72.92	6.515	0.0107	109	49.77	17	77.27	6.061	0.0138	151	56.98	18	69.23	1.459	0.2271
Anxiety Disorders																		
Panic Disorder Lifetime	180	35.79	17	34.00	0.06	0.801	85	36.02	6	25.00	1.16	0.281	95	35.58	11	42.31	0.46	0.496
Panic Disorder Current	66	13.10	4	8.16	0.98	0.322	31	13.08	2	8.70	0.36	0.546	35	13.11	2	7.69	0.63	0.427
Agoraphobia Lifetime	190	37.62	19	38.00	0.00	0.958	84	35.29	6	25.00	1.02	0.311	106	39.70	13	50.00	1.04	0.307
Agoraphobia Current	123	24.36	14	28.00	0.32	0.569	50	21.01	6	25.00	0.21	0.649	73	27.34	8	30.77	0.14	0.709
Social Phobia Current	136	25.00	12	24.00	0.21	0.649	67	28.27	6	25.00	0.12	0.734	69	25.84	6	23.08	0.10	0.758
Specific Phobia Current	44	8.71	8	16.33	3.04	0.081	26	10.92	4	17.39	0.86	0.353	18	6.74	4	15.38	2.55	0.110
OCD Current	73	14.48	10	20.00	1.09	0.297	33	13.87	4	16.67	0.14	0.707	40	15.04	6	23.08	1.15	0.283
PTSD Current	68	13.44	9	18.00	0.79	0.373	38	15.97	5	20.83	0.38	0.540	30	11.19	4	15.38	0.41	0.524
GAD Current	158	31.29	14	28.57	0.15	0.695	85	35.71	9	37.50	0.03	0.862	73	27.34	5	20.00	0.63	0.428
Any Anxiety Disorder Current	292	57.59	31	62.00	0.36	0.547	153	64.29	15	62.50	0.03	0.862	139	51.67	16	61.54	0.93	0.336
Substance Use Disorders																		
Alcohol Dependence Current	41	8.13	15	30.00	23.93	0.000	16	6.75	6	25.00	9.40	0.002	25	9.36	9	34.62	14.73	0.000
Alcohol Abuse Current	11	2.18	2	4.00	0.66	0.418	3	1.26	0	0.00	0.31	0.580	8	3.01	2	7.69	1.57	0.210
Alcohol Dependence Lifetime	161	31.88	30	61.22	17.02	0.000	63	26.47	13	56.52	9.18	0.002	98	36.70	17	65.38	8.17	0.004
Alcohol Abuse Lifetime	49	9.72	5	10.42	0.02	0.877	24	10.08	0	0.00	2.44	0.118	25	9.40	5	19.23	2.48	0.115
Substance Dependence Lifetime	93	18.45	20	40.00	13.01	0.000	38	15.97	8	33.33	4.54	0.033	55	20.68	12	46.15	8.70	0.003
Substance Dependence Current	25	4.97	5	10.00	2.24	0.134	10	4.22	1	4.17	0.00	0.990	15	5.64	4	15.38	3.70	0.054
Substance Abuse Current	10	1.98	1	2.00	0.00	0.994	3	1.26	0	0.00	0.31	0.580	7	2.63	1	3.85	0.13	0.717
Any Substance Use Current	69	13.61	18	36.00	17.31	0.000	29	12.18	6	25.00	3.09	0.079	40	14.87	12	46.15	15.98	0.000
Any Substance Use Lifetime	233	45.96	36	72.00	12.36	0.000	99	41.60	13	54.17	1.41	0.235	134	49.81	23	88.46	14.22	0.000

†Missing data points excluded from analysis - denominator varies according to available data

Table 18

Psychiatric Comorbidities in DSM-IV-defined Current Pathological Gambling

	Any Mood Disorder						**Major Depressive Disorder**						**Bipolar Disorder**					
	PG Absent (n=544)†		**PG present (n=31)**		**X2**	**p-value**	**PG Absent (n=259)†**		**PG present (n=16)**		**X2**	**p-value**	**PG Absent (n=289)†**		**PG present (n=15)**		**X2**	**p-value**
	N	%	N	%			N	%	N	%			N	%	N	%		
Suicide risk	287	54.98	22	78.57	6.007	0.0142	123	51.68	10	76.92	3.153	0.0758	164	57.75	12	80	2.914	0.0878
Anxiety Disorders																		
Panic Disorder Lifetime	196	36.03	13	41.94	0.43	0.511	94	36.72	5	31.25	0.19	0.659	102	35.54	8	53.33	1.95	0.163
Panic Disorder Current	72	13.24	4	13.33	0.00	0.988	35	13.62	2	13.33	0.00	0.975	37	12.89	2	13.33	0.00	0.960
Agoraphobia Lifetime	202	37.06	15	48.39	1.60	0.206	89	34.50	7	43.75	0.57	0.452	113	39.37	8	53.33	1.16	0.282
Agoraphobia Current	132	24.22	11	35.48	1.99	0.158	54	20.93	6	37.50	2.42	0.120	78	27.18	5	33.33	0.27	0.603
Social Phobia Current	141	25.92	12	38.71	2.46	0.117	68	26.46	7	43.75	2.26	0.133	73	25.44	5	33.33	0.46	0.496
Specific Phobia Current	45	8.27	7	22.58	7.30	0.007	27	10.51	3	18.75	1.05	0.306	18	6.27	4	26.67	8.78	0.003
OCD Current	76	13.97	9	29.03	5.28	0.022	34	13.18	4	25.00	1.76	0.184	42	14.69	5	33.33	3.76	0.052
PTSD Current	75	13.71	8	25.81	3.49	0.062	41	15.83	5	31.25	2.57	0.109	34	11.81	3	20.00	0.89	0.345
GAD Current	165	30.33	11	35.48	0.37	0.545	87	33.72	8	50.00	1.76	0.184	78	27.27	3	20.00	0.38	0.536
Any Anxiety Disorder Current	313	57.12	23	74.19	3.51	0.061	163	62.93	13	81.25	2.19	0.139	150	51.90	10	66.67	1.25	0.264
Substance Use Disorders																		
Alcohol Dependence Current	48	8.82	10	32.26	17.76	0.000	20	7.78	4	25.00	5.57	0.018	28	9.76	6	40.00	13.05	0.000
Alcohol Abuse Current	13	2.39	1	3.23	0.09	0.769	3	1.16	0	0.00	0.19	0.664	10	3.50	1	6.67	0.41	0.524
Alcohol Dependence Lifetime	174	31.99	22	70.97	19.84	0.000	69	26.85	10	62.50	9.31	0.002	105	36.59	12	80.00	11.32	0.001
Alcohol Abuse Lifetime	56	10.33	2	6.45	0.49	0.486	26	10.16	0	0.00	1.80	0.180	30	10.49	2	13.33	0.12	0.728
Substance Dependence Lifetime	103	18.93	13	41.94	9.64	0.002	41	15.89	6	37.50	4.95	0.026	62	21.68	7	46.67	5.04	0.025
Substance Dependence Current	27	4.97	3	9.68	1.31	0.252	10	3.89	1	6.25	0.22	0.642	17	5.94	2	13.33	1.32	0.251
Substance Abuse Current	11	2.02	0	0.00	0.64	0.424	3	1.16	0	0.00	0.19	0.664	8	2.80	0	0.00	0.43	0.511
Any Substance Use Current	79	14.42	11	35.48	9.92	0.002	33	12.74	4	25.00	1.94	0.163	46	15.92	7	46.67	9.37	0.002
Any Substance Use Lifetime	256	46.72	24	77.42	11.08	0.001	108	41.70	10	62.50	2.66	0.103	148	51.21	14	93.33	10.16	0.001

†Missing data points excluded from analysis - denominator varies according to available data

Table 19

Psychiatric Commorbidities in Past-year Moderate or Problem Gambling as defined by the CPGI criteria (score >=3)

	Any Mood Disorder				**Major Depressive Disorder**				**Bipolar Disorder**			
	OR	***95% CR***		**p-value**	**OR**	***95% CR***		**p-value**	**OR**	***95% CR***		**p-value**
Suicide risk	2.05	1.179	3.574	0.011021	2.492	1.096	5.668	0.029	1.74	0.823	3.70	0.147
Anxiety Disorders												
Panic Disorder Lifetime	1.27	0.76	2.13	0.361	0.79	0.36	1.74	0.555	1.91	0.94	3.85	0.072
Panic Disorder Current	1.96	1.02	3.75	0.043	1.70	0.64	4.51	0.285	2.21	0.92	5.30	0.076
Agoraphobia Lifetime	1.07	0.38	1.80	0.794	0.68	0.30	1.52	0.345	1.56	0.77	3.13	0.216
Agoraphobia Current	1.40	0.81	2.44	0.230	1.19	0.51	2.81	0.686	1.60	0.77	3.34	0.210
Social Phobia Current	1.31	0.76	2.26	0.330	1.29	0.59	2.82	0.518	1.33	0.62	2.85	0.468
Specific Phobia Current	2.36	1.17	4.76	0.017	1.95	0.73	5.22	0.183	2.96	1.08	8.15	0.035
Oppsessive Compulsive Disorder Current	1.86	1.01	3.45	0.048	2.67	1.13	6.31	0.026	1.32	0.54	3.24	0.537
Post Traumatic Stress Disorder Current	1.19	0.60	2.39	0.619	1.43	0.58	3.54	0.441	0.93	0.31	2.82	0.903
Generalized Anxiety Disorder Current	1.25	0.73	2.13	0.416	1.56	0.75	3.26	0.237	0.96	0.43	2.16	0.923
Any Anxiety Disorder Current	1.23	0.73	2.075	0.427	1.11	0.51	2.40	0.792	1.35	0.66	2.73	0.410
Substance Use Disorders												
Alcohol Dependence Current	5.73	3.08	10.65	<0.001	2.92	1.05	8.09	0.040	9.33	4.12	21.13	<0.001
Alcohol Abuse Current	2.13	0.57	7.95	0.259	3.52	0.31	39.89	0.310	1.79	0.37	8.80	0.471
Alcohol Dependence Lifetime	3.02	1.80	5.07	<0.001	2.12	0.99	4.51	0.052	4.34	2.04	9.23	<0.001
Alcohol Abuse Lifetime	0.71	0.27	1.84	0.479	0.64	0.14	2.88	0.563	0.76	0.22	2.64	0.663
Substance Dependence Lifetime	2.05	1.17	3.58	0.011	1.30	0.53	3.20	0.572	2.89	1.39	6.00	0.005
Substance Dependence Current	2.34	0.96	5.70	0.061	0.68	0.08	5.45	0.712	4.00	1.40	11.44	0.010
Substance Abuse Current	0.87	0.11	7.03	0.893	0.00	0.00	0.00	0.999	1.41	0.16	12.44	0.756
Any Substance Use Current	4.34	2.48	7.57	<0.001	1.91	0.76	4.82	0.168	8.08	3.80	17.17	<0.001
Any Substance Use Lifetime	2.23	1.32	3.78	0.003	1.31	0.63	2.72	0.472	4.31	1.82	10.19	0.001

Table 20

Psychiatric Commorbidities in Lifetime Pathological Gambling as defined by the SOGS (score >=5)

	Any Mood Disorder				**Major Depressive Disorder**				**Bipolar Disorder**			
		95% CR		**p-**		***95% CR***		**p-**		***95% CR***		**p-value**
	OR			**value**	**OR**			**value**	**OR**			
Suicide risk	2.3195	1.20	4.493	0.013	3.43	1.22	9.63	0.019	1.70	0.71	4.04	0.231
Anxiety Disorders												
Panic Disorder Lifetime	0.92	0.50	1.71	0.802	0.59	0.23	1.55	0.285	1.33	0.59	3.01	0.497
Panic Disorder Current	0.59	0.21	1.69	0.327	0.63	0.14	2.83	0.550	0.55	0.13	2.44	0.434
Agoraphobia Lifetime	1.02	0.56	1.85	0.958	0.61	0.23	1.60	0.315	1.52	0.68	3.40	0.310
Agoraphobia Current	1.21	0.63	2.31	0.569	1.25	0.47	3.32	0.650	1.18	0.49	2.83	0.709
Social Phobia Current	0.85	0.43	1.68	0.649	0.85	0.32	2.22	0.734	0.86	0.33	2.23	0.758
Specific Phobia Current	2.04	0.90	4.63	0.087	1.72	0.54	5.44	0.358	2.52	0.78	8.09	0.122
Oppsessive Compulsive Disorder Current	1.48	0.71	3.08	0.300	1.24	0.40	3.86	0.708	1.69	0.64	4.48	0.287
Post Traumatic Stress Disorder Current	1.41	0.66	3.04	0.375	1.39	0.49	3.94	0.541	1.69	0.64	4.48	0.287
Generalized Anxiety Disorder Current	0.88	0.46	1.68	0.695	1.08	0.45	2.57	0.862	0.66	0.24	1.84	0.430
Any Anxiety Disorder Current	1.20	0.66	2.184	0.547	0.93	0.39	2.21	0.862	1.50	0.66	3.42	0.339
Substance Use Disorders												
Alcohol Dependence Current	4.84	2.44	9.59	<0.001	4.60	1.60	13.21	0.005	5.12	2.07	12.69	<0.001
Alcohol Abuse Current	1.87	0.40	8.67	0.425	0.00	0.00	.	0.999	2.69	0.54	13.38	0.227
Alcohol Dependence Lifetime	3.37	1.84	6.17	<0.001	3.61	1.51	8.65	0.004	3.26	1.40	7.59	0.006
Alcohol Abuse Lifetime	1.08	0.41	2.85	0.877	0.00	0.00	.	0.998	2.30	0.80	6.62	0.124
Substance Dependence Lifetime	2.95	1.60	5.41	0.001	2.63	1.05	6.58	0.039	3.29	1.44	7.51	0.005
Substance Dependence Current	2.12	0.78	5.82	0.143	0.99	0.12	8.06	0.990	3.04	0.93	9.96	0.066
Substance Abuse Current	1.01	0.13	8.04	0.994	0.00	0.00	.	0.999	1.48	0.17	12.52	0.719
Any Substance Use Current	3.57	1.90	6.71	<0.001	2.40	0.88	6.54	0.087	4.91	2.12	11.38	<0.001
Any Substance Use Lifetime	3.02	1.59	5.74	0.001	1.66	0.71	3.86	0.239	7.72	2.27	26.34	0.001

Table 21

Psychiatric Comorbidities in DSM-IV-defined Current Pathological Gambling

	Any Mood Disorder				**Major Depressive Disorder**				**Bipolar Disorder**			
	OR	***95% CR***		**p-value**	**OR**	***95% CR***		**p-value**	**OR**	***95% CR***		**p-value**
Suicide risk	3.00	1.20	7.526	0.019045	3.117	0.837	11.61	0.090	2.93	0.81	10.60	0.102
Anxiety Disorders												
Panic Disorder Lifetime	1.28	0.61	2.67	0.512	0.78	0.26	2.32	0.660	2.07	0.73	5.88	0.171
Panic Disorder Current	1.01	0.34	2.97	0.988	0.98	0.21	4.51	0.975	1.04	0.23	4.79	0.960
Agoraphobia Lifetime	1.43	0.69	2.97	0.343	1.48	0.53	4.10	0.454	1.76	0.62	4.99	0.288
Agoraphobia Current	1.72	0.80	3.68	0.162	2.27	0.79	6.51	0.129	1.34	0.44	4.04	0.604
Social Phobia Current	1.81	0.85	3.81	0.122	2.16	0.77	6.03	0.141	1.47	0.49	4.43	0.498
Specific Phobia Current	3.23	1.32	7.92	0.010	1.97	0.53	7.34	0.315	5.43	1.57	18.78	0.007
Oppsessive Compulsive Disorder Current	2.52	1.12	5.68	0.026	2.20	0.67	7.20	0.194	2.90	0.95	8.92	0.063
Post Traumatic Stress Disorder Current	2.19	0.94	5.07	0.068	2.42	0.80	7.32	0.119	1.87	0.50	6.96	0.352
Generalized Anxiety Disorder Current	1.26	0.59	2.70	0.546	1.97	0.71	5.41	0.191	0.67	0.18	2.43	0.538
Any Anxiety Disorder Current	2.16	0.95	4.91	0.067	2.55	0.71	9.18	0.152	1.85	0.62	5.56	0.271
Substance Use Disorders												
Alcohol Dependence Current	4.92	2.19	11.06	<0.001	3.95	1.17	13.38	0.027	6.17	2.04	18.60	0.001
Alcohol Abuse Current	1.36	0.17	10.76	0.770	0.00	0.00	0.00	0.999	1.97	0.24	16.50	0.531
Alcohol Dependence Lifetime	5.20	2.35	11.52	0.000	4.54	1.59	12.96	0.005	6.93	1.91	25.13	0.003
Alcohol Abuse Lifetime	0.60	0.14	2.58	0.491	0.00	0.00	0.00	0.998	1.31	0.28	6.10	0.728
Substance Dependence Lifetime	3.09	1.47	6.51	0.003	3.18	1.09	9.22	0.034	3.16	1.10	9.06	0.032
Substance Dependence Current	2.05	0.59	7.16	0.262	1.65	0.20	13.73	0.645	2.43	0.51	11.67	0.266
Substance Abuse Current	0.00	0.00	0.00	0.999	0.00	0.00	0.00	0.999	0.00	0.00	0.00	0.999
Any Substance Use Current	3.27	1.51	7.08	0.003	2.28	0.70	7.50	0.174	4.62	1.60	13.37	0.005
Any Substance Use Lifetime	3.91	1.66	9.23	0.002	2.33	0.82	6.60	0.111	13.34	1.73	102.76	0.013

APPENDIX B

Table 1

Temporal of Mood (TAM) questionnaire

Age at which...	Years
… you first noticed something wrong with your mood	
… these symptoms caused you significant problems in your life	
… when you saw someone for emotional or psychiatric problems	
… when were you diagnosed with a mood disorder	
… you first received treatment for a mood disorder	
… your mood felt the worst	

Table 2

Temporal for Gambling (TAG) questionnaire

Age at which you first...	Years
.. bet more than could really afford	
… gambled with larger amounts of money to get same feeling or excitement	
…borrowed or sold anything to get money to gamble	
… felt that you might have a problem with gambling	
… had any health problems, including stress or anxiety due to gambling	
…been criticized for you betting or told you that you had a gambling problem, regardless of whether or not you thought it was true	
… had any financial problems due to gambling	
… felt guilty about the way you gamble or what happens when you gamble	

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