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ORIGINAL PAPER

Correlates of Depressive Symptom Severity in Problem and Pathological Gamblers in Couple Relationships

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Abstract Problem and pathological gamblers (PPG) often suffer from depressive symptoms. Gambling problems have negative consequences on multiple aspects of gamblers' lives, including family and marital relationships. The objectives of the current study were to (1) replicate the results of studies that have suggested a stronger and more significant relationship between gambling and depression in PPG than in non-problem gamblers (NPG) and (2) explore specific correlates of depressive symptom severity in PPG in couple relationships. Variables demonstrated to be significantly correlated with depressive symptoms in the general population were selected. It was hypothesized that gender, age, gambler's mean annual income, perceived poverty, employment status, clinical status (i.e., problem or pathological gambler versus non-problem gambler), trait anxiety, alcoholism, problem-solving skills, and dyadic adjustment would be significant predictors of depressive symptoms. Sixty-seven PPG were recruited, primarily from an addiction treatment center; 40 NPG were recruited, primarily through the media. Results revealed that PPG reported significantly greater depressive symptoms than did NPG. Further, elevated trait anxiety and poor dyadic adjustment were demonstrated to be significant and specific correlates of depressive symptom severity in PPG. These findings contribute to the literature on depressive symptomatology in PPG in relationships, and highlight the importance of the influence of the couple relationship on PPG.

Keywords Problem gamblers · Pathological gambling · Depressive symptoms · Couple relationships · Trait anxiety

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Introduction

Pathological gamblers are often diagnosed with comorbid disorders; in particular, substance use, personality, anxiety, and mood disorders are common (Petry 2005; Petry et al. 2005; Kessler et al. 2008). Depressive symptoms in problem and pathological gamblers (PPG) are often reported in the scientific literature (el-Guebaly et al. 2006; Kerber et al. 2008); in fact, two epidemiological studies found that 38.6–50.2 % of pathological gamblers suffer from depressive symptoms (Kessler et al. 2008; Petry et al. 2005). Although some studies found that PPG were not significantly more depressed than were non-problem gamblers (Winslow 2001; Zimmerman et al. 2006), the results of the latter studies must be interpreted with caution because of the small sample sizes of depressed problem gamblers. Moreover, in addition to the dearth of literature about the relationship between depression and PPG, many of the studies in this area have significant methodological issues (e.g., small samples, non-validated instruments). Finally, to our knowledge, no studies to date have assessed correlates of depressive symptom severity in PPG in couple relationships. Symptom severity is of clinical significance because depressive symptoms tend to interfere with treatment efficacy, increase the severity of problem gambling, and worsen prognosis (Thomsen et al. 2009). In the next section, factors associated with depressive symptoms in PPG are discussed.

Correlates of Depressive Symptoms in Problem and Pathological Gamblers (PPG)

Where sociodemographic factors are concerned, research suggests that PPG who are female and younger are more prone to depressive symptoms (Boughton and Falenchuk 2007; Desai and Potenza 2008). Financial strain is the factor that is the most strongly related to depressive symptoms in pathological gamblers (Grant et al. 2010). Some researchers (e.g., Clarke 2006; Desai and Potenza 2008, 2009; el-Guebaly et al. 2006; Grant et al. 2009; Thomsen et al. 2009) report a positive correlation between severity of depressed mood and severity of problem gambling. In contrast, Cunningham-Williams et al. (2000) found that PPG were not significantly more depressed than were recreational gamblers. However, the result of the latter study must be interpreted with caution because all of the participants (i.e., both PPG and recreational gamblers) were drug users, a factor that could have reduced the between-group variance in depressive symptoms. Further studies found that PPG with major depression were three times more likely to present a comorbid alcohol use disorder (Kennedy et al. 2010). Finally, PPG demonstrate elevated levels of anxiety (Kennedy et al. 2010), with some studies finding a relationship between trait anxiety and pathological gambling (Elman et al. 2010; Rodda et al. 2004). There exists very little literature on coping strategies used by depressive gamblers. The results of the few studies that have been conducted indicate that some gamblers may use inefficient coping strategies to alleviate or to avoid negative emotions (including symptoms of depression); results also indicate that, in pathological gamblers, inadequate coping strategies are correlated with greater depressive symptom severity (Blaszczynski and Nower 2002; Getty et al. 2000). Finally, there is a significant link between problem and pathological gambling and marital problems; gambling seems to increase conflict, communication problems, and negative emotions such as guilt and anger (Bertrand et al. 2008; McComb et al. 2009). Not surprisingly, an elevated rate of separation or divorce is observed in this population (Abbott et al. 1995). To our knowledge, no study to date has investigated marital distress as a potential correlate of depressive symptoms in PPG in couple relationships. Currently, the clinical comprehension of problem and pathological

gambling is limited to individuals and fails to consider the complex interaction between PPG and the social environment; studying the relationship between marital distress and depressive symptoms in this population would provide greater depth to the conceptualization of PPG. Given the scant scientific literature on depressive symptomatology in PPG, variables that have been demonstrated to be significantly correlated with depressive symptoms in the general population have been selected for the present study. The selected variables are briefly discussed below.

Correlates of Major Depression in the General Population

More and more research is being conducted on psychological disorders that are comorbid with depression; many studies have found a significant relationship between depression and sociodemographic characteristics such as gender, age, socioeconomic status, and employment status (Kairouz et al. 2008; Kessler et al. 2003; Nguyen et al. 2005; Patten et al. 2005). Research evidence also suggests (Eibner et al. 2004) that depressive symptoms are related to the gambler's perceived poverty relative to his reference group (i.e., individuals in the same sociodemographic group). Kessler et al. (2003) found that addictions (e.g., alcoholism) and anxiety disorders were the disorders most commonly observed in comorbidity with depression. Trait anxiety appears to be a predisposing factor for depression; anxiety also influences the course of depressive symptomatology (Gotlib and Hammen 2009). In addition, negative problem orientation and ineffective problem-solving are linked with depression (Nezu 2004). Finally, many studies have found a significant relationship between marital distress and depression. The relationship is bidirectional: relationship problems can trigger depressive symptoms, and depression can in turn increase relationship difficulties (Fincham and Beach 1999).

Objectives and Hypotheses

The objectives of the present study were:

(1) To assess differences between PPG and non-problem gamblers (NPG) in depressive symptom severity, and (2) to explore potential correlates of depressive symptom severity specific to PPG in couple relationships. Since, to our knowledge, no study has examined correlates of depressive symptoms in this population, the second objective was exploratory in nature.

The overall goal of this study was to improve the conceptual comprehension of depressive symptoms in PPG in couple relationships. The results could have significant treatment implications; more specifically, they could improve screening of problem gamblers who are more prone to major depression and to suicide attempts. Further, the results could be used to personalize treatment of depressed PPG by focusing on factors determined to be associated with severe depressive symptoms. Personalized treatment could in turn improve treatment compliance and relapse prevention. It was hypothesized that PPG would present more severe depressive symptoms than would NPG. In addition, we hypothesized that the following variables would be significantly associated with depressive symptom severity in PPG: sociodemographic characteristics (i.e. gender, age, mean annual income, perceived poverty, and employment status), clinical status (i.e., problem or pathological gambler), trait anxiety, alcoholism, poor problem-solving skills, and poor marital adjustment. These correlates were specifically hypothesized to be relevant for PPG and not for NPG.

Method

Participants

A total of 124 couples (84 PPG and 40 NPG) participated in this study. Inclusion criteria for all couples were as follows: at least 18 years old, a good understanding of French, in a heterosexual relationship for more than 1 year, and living together or seeing each other more than three times per week. The sample was composed of couples in relationships, but who were not legally married (i.e., legal marital status was single). Couples who had separated in the past year due to gambling problems were also eligible. To be included in the PPG group, at least one spouse had to score three or higher on the South Oaks Gambling Screen (SOGS). In accordance with Cox et al. (2004), a score of three or more on the Diagnostic Interview for Pathological Gambling was the threshold for being considered a problem or pathological gambler. This decision was made a posteriori in order to reduce the proportion of potentially false positive PPG identified on the basis of the SOGS classification. This criterion excluded fourteen couples from the analyses reported here. Problem and pathological gamblers were both assigned to the PPG group on the basis of shared characteristics such as "chasing losses," gambling to escape problems and relieve dysphoric mood, and adverse consequences related to gambling (Toce-Gerstein et al. 2003). Other studies have found that PPG differ from recreational gamblers (Afifi et al. 2010; Cox et al. 2004). Three other couples were excluded due to missing data (at least 20 % of missing data from one questionnaire) and the final sample was composed of 107 couples, 67 PPG and 40 NPG. NPG were recruited primarily via newspaper articles, magazine ads, and pamphlets seeking participants for a study on couple relationships. The majority of the participants in the PPG group were recruited from newspaper articles or magazines, and from a local addiction treatment center. A research assistant described the goals of the study to groups of PPG prior to their initiation to the center; gamblers and spouses interested in participating gave their phone number to one of the center's professionals, who subsequently contacted the research team. Older gamblers (55 years and older) represented 38.8 % of the PPG group. A large proportion of participants in the PPG group were recruited through advertising on the Internet, through various addiction centers, and from lists of participants in prior gambling studies. The participants in the PPG group ranged in age from 30 to 75 years; participants in the NPG group ranged from 22 to 69 years old. In the NPG group, the partner with the highest score on the SOGS (i.e. 1 or 2) was chosen as the non-problem gambler. However, in 36 of the 40 NPG couples, both partners scored 0. For these couples only, we used a controlled randomization procedure to attribute NPG status to one partner, so as to match the gender ratio of gamblers to non-gamblers in the PPG group, a statistical procedure suggested by Satin and Shastry 1993. The male to female ratio of non-problem gamblers and problem or pathological gamblers was therefore similar across the two groups (NPG = 72.5 % men, PPG = 71.6 % men). Sociodemographic characteristics are presented in Table 1.

Measures

Sociodemographic Characteristics

Some sociodemographic characteristics and inclusion criteria were assessed with a 16-item telephone interview developed by the authors. Others were assessed using a 72-item semi-

Table 1 PPG and NPG socio-odemographic characteristics

Characteristics	PPG $n = 67$ (%)	NPG $n = 40$ (%)
Male	71.6	72.5
Age (years)		
18–54	62.7	52.5
55+	37.3	47.5
Education		
Did not graduate high school	31.3	15.0
High school graduate	68.7	85.0
Gambler's annual income ($ CAD)*		
0–19,999	38.8	30.0
20,000–34,999	23.9	17.5
35,000–49,999	22.4	17.5
50,000+	14.9	35.0
Unemployed	37.3	40.0
Civil status*		
Married	43.3	47.5
Common-law	46.3	22.5
Separated but still legally married	1.5	0.0
Single (not legally married)	9.0	30.0
Duration of relationship (years)		
1–19	67.2	60.0
20+	32.8	40.0
DSM-IV score		
3–4	19.4	N/A
≥5	80.6	

* $p < .05$

structured interview derived from the "Enquête Santé Québec" [Quebec Health Survey] (Quebec Ministry of Health and Social Services 1992–1993).

Gambling Behavior

The South Oaks Gambling Screen (SOGS) is a 17-item questionnaire developed by Lesieur and Blume (1987) to detect gambling problems. It was adapted for use over the telephone (Volberg and Steadman 1988) and translated into French (Ladouceur et al. 2000). In the present study, we used the time period of the past 12 months to evaluate gambling behavior. The SOGS questionnaire allows for identification of three groups: NPG, problem gamblers, and probable pathological gamblers. The SOGS has good predictive validity (Lesieur and Blume 1987, 1993; Stinchfield 2002) and a Cronbach's α reliability coefficient of .94.

To validate group assignment, we compared the diagnostic criteria section of the Diagnostic Interview for Pathological Gambling (American Psychiatric Association 1994; Beaudoin and Cox 1999; translated to French by Ladouceur et al. 2000) with the gambler's SOGS score. The Diagnostic Interview for Pathological Gambling is a semi-structured interview that assesses each DSM-IV criterion for pathological gambling, as well as medical and psychiatric history, and history of the gambling problem and its negative

consequences. This instrument determines two clinical statuses: individuals who meet five or more criteria are categorized as pathological gamblers; participants who meet three or four criteria are identified as problem gamblers (Cox et al. 2004). The psychometric properties of this interview are not known. However, the DSM-IV diagnostic criteria for Pathological Gambling demonstrated satisfactory reliability and predictive validity (Stinchfield 2003).

Mental Health

The Beck Depression Inventory, second edition (BDI-II; Beck et al. 1996; translated into French by the same authors) is a 21-item scale that assesses depressive symptom severity, with higher scores indicating greater severity. This instrument has good predictive validity (Dozois et al. 1998) and strong internal consistency and test–retest reliability (Beck et al. 1996). In the present study, the BDI-II was found to be reliable (Cronbach's $\alpha = .93$).

The IPAT Anxiety Scale (IPAT-AS; Cattell and Sheier 1957; translated and adapted for French-Canadians by Cormier 1962) is a 40-item questionnaire that evaluates trait anxiety; higher scores indicate greater anxiety. The instrument has good convergent validity with the State-Trait Anxiety Inventory (Spielberger et al. 1970) and good test–retest reliability ranging from .82 to .93 in four different studies. Further, IPAT-AS scores are highly correlated with BDI-II score (Krug et al. 1976). In the present study, the measure demonstrated acceptable internal consistency (Cronbach's $\alpha = .83$).

The Brief Michigan Alcoholism Screening Test (B-MAST; Pokorny et al. 1972) is a subtest composed of ten items from the Michigan Alcoholism Screening Test. The measure assesses alcohol dependence, with a score of six or higher indicating dependence. Three studies reported specificity for the B-MAST ranging from .77 to .99 (Mackenzie et al. 1996). In the present study, Cronbach's α was .86.

Marital Life

The Dyadic Adjustment Scale (DAS; Spanier 1976; translated and adapted for French-Canadians by Baillargeon et al. 1986) is a 32-item instrument that measures perception of marital life. Higher scores indicate greater dyadic adjustment. The DAS has great construct validity and in the present study, internal consistency was good (Cronbach's $\alpha = .93$).

Problem-Solving Skills

The Problem-Solving Inventory (PSI; Heppner and Petersen 1982; translated and adapted for French-Canadians by Laporte et al. 1988) is 35-item questionnaire that assesses behaviors and attitudes associated with problem-solving. Lower scores indicate better problem-solving skills. The PSI has good test–retest reliability ($r = .81$). In the present study, Cronbach's α was .85.

Procedure

Participants were initially screened with a telephone interview. Individuals who did not meet the inclusion criteria for the study were referred to professional therapists as needed; suitable candidates were scheduled for a face-to-face appointment. The appointments involved the completion of a consent form, followed by a semi-structured interview

conducted by a trained research assistant. For participants who scored three or higher on the SOGS, the interviewer also completed the diagnostic criteria section of the Diagnostic Interview for Pathological Gambling. Participants further completed a questionnaire package including measures designed to evaluate marital relationship, sexuality, and physical health. Couples received $50 CAD for their participation. In addition, all participants were offered the opportunity to participate in a relationship enrichment workshop led by two therapists with expertise in couple relationships.

Results

Preliminary Analyses

ANOVA and Chi square tests were performed to compare sociodemographic characteristics between PPG and NPG. Statistically significant differences ($p < .05$) between PPG and NPG were observed for mean annual income and civil status. In order to meet the assumption of normality, a square root transformation was conducted on BDI-II score and on mean annual income in the PPG group. Further, IPAT scores were highly correlated with BDI-II scores ($r = .65$, $p < .01$). In order to evaluate whether or not the IPAT and the BDI-II measure psychometrically different constructs, a factorial analysis was performed. There were not enough participants to conduct a factorial analysis on the scores from the complete questionnaires, so we used ten randomly selected items from the BDI-II and ten from the IPAT (i.e. two items from each subscale) to conduct this analysis. The items were forced to load on two factors and were rotated to a varimax solution. Factor 1 was composed of all the BDI-II items and only one IPAT item (loading = .31). Factor 2 was composed of all of the other IPAT items. This result suggests that the two questionnaires measure different constructs.

Comparison of Depressive Symptom Severity Between PPG and NPG

An ANCOVA was used to compare depressive symptom severity between PPG and NPG. Mean annual income and perceived poverty were significantly correlated with BDI-II score ($r = -.25$, $p < .05$ and .42, $p < .01$, respectively). We used these variables as covariates in order to control for differences between groups in sociodemographic characteristics. PPG had significantly greater depressive symptom severity ($M = 17.36$, $SD = 11.41$) than did NPG ($M = 6.25$, $SD = 5.95$), F (1, 103) = 21.62, $p < .001$. This result supports our first hypothesis.

Correlates of Depressive Symptom Severity in PPG

Six variables correlated significantly ($p < .05$) with depressive symptoms: age, perceived poverty, trait anxiety, clinical status (i.e., problem or pathological gambler), problem-solving skills, and dyadic adjustment. A STEPWISE multiple regression analysis was performed with these variables in order to produce a model to help predict depressive symptom severity in PPG. PPG gender, mean annual income, employment status, SOGS score, and alcohol dependence were not correlated with depressive symptoms, and were therefore not included in the model. Correlation coefficients are presented in Table 2.

Table 2 Correlations between potential predictors and depressive symptom severity in PPG

Predictors	Depressive symptom severity
Trait anxiety	.65**
Dyadic adjustment	−.45**
Clinical status	.35**
Perceived poverty	.34**
Age	−.31*
Problem-solving skills	.27*

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

Table 3 Summary of multiple regression for correlates of depressive symptom severity in PPG

Variable	*B*	*SE B*	*β*	*t*
Trait anxiety	.08	.01	.56	5.70**
Dyadic adjustment	−.02	.01	−.23	−2.35*

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

In the final model, trait anxiety and dyadic adjustment were significant predictors of depressive symptom severity in PPG, F (2, 64) = 28.2, $p < .001$. More specifically, stronger trait anxiety and lower dyadic adjustment predicted greater symptom severity, and these predictors accounted for 46.8 % of the variance. Table 3 summarizes these results. In order to evaluate the specificity of the correlates of depressive symptom severity in PPG, we also investigated predictors of depressive symptoms in NPG. A STEPWISE multiple regression analysis was performed with the same predictors, with the exception of clinical status. Trait anxiety and problem-solving skills were significant correlates of depressive symptomatology, F (2, 37) = 19.0, $p < .001$, and these predictors accounted for 50.7 % of the variance. The correlation between dyadic adjustment and depressive symptom severity was statistically different between PPG and NPG ($Z = 2.97$, $p < .05$). This result suggests that the final models were specific to each group.

Discussion

The objectives of the present study were to improve understanding of the relationship between problem gambling and depressive symptoms, and to identify correlates of depressive symptom severity in PPG. First, it was hypothesized that PPG would have significantly more severe depressive symptoms than would NPG. This hypothesis was confirmed, a result that is consistent with prior research (Kessler et al. 2008; Petry et al. 2005; Thomsen et al. 2009). The present study is unique in that it is the first to assess correlates of depressive symptom severity in PPG in couple relationships. Of the potential correlates assessed, trait anxiety and dyadic adjustment were demonstrated to be significant predictors of depressive symptom severity. The relationship between stress and depression is well known (Liu and Alloy 2010). While the role of depression and stress in substance use disorders has been well established, less research has been conducted on depression and stress in gambling disorders (Kim et al. 2006). It is possible that trait anxiety amplifies gamblers' stress reactions and creates a predisposition toward negative thoughts (Sandi and Richter-Levin 2010). Gamblers may use alcohol or other substances to try to avoid

negative feelings triggered by stressors such as debt, job loss, or interpersonal conflict, and may in turn develop an addiction or a related disorder (Chou and Afifi 2011; Cohn et al. 2011). Trait anxiety may also maintain problem gambling (Rodda et al. 2004). Our results highlight the importance of assessing and addressing trait anxiety in treatment of depressive PPG.

Where dyadic adjustment is concerned, many studies have suggested a relationship between marital distress and both problem gambling and depressive symptoms (Bertrand et al. 2008; Hodgins et al. 2007; Lorenz and Shuttlesworth 1983; Lorenz and Yaffee 1986, 1988, 1989; McComb et al. 2009; Petry 2005). Gambling problems and their consequences create conflict and hostility in relationships, further impacting gamblers' wellbeing (Proulx et al. 2007) and potentially triggering depressive symptoms (Beach and O'Leary 1993). In our study, dyadic adjustment specifically predicted depressive symptomatology in PPG and not in NPG. These results highlight the influence of the marital relationship on mood, and possibly the influence of the marital relationship on gambling habits in PPG. These findings suggest that it could beneficial to integrate gamblers' spouses into treatment for PPG (Bertrand et al. 2008; Lee and Rovers 2008).

Our hypothesis concerning predictors of depressive symptoms in PPG was not supported. First, the predictive relationship between perceived poverty and depressive symptoms remained below statistical significance ($p = .07$). Previous literature has found that financial strain is highly correlated with depressive symptoms (Zimmerman and Katon 2005). PPG frequently face financial problems, and it is a common factor in suicide attempts in this population (Blaszczynski and Farrell 1998). Second, gender and age were not significant predictors of depressive symptoms in PPG. These results are inconsistent with prior results that found that women, younger people, and unemployed people are more prone to depressive symptoms (Desai and Potenza 2008; McCormick et al. 1984; Petry et al. 2005). This inconsistent result may be attributable to the similarities in sociodemographic characteristics (except for mean annual income) and scores on gambling, depression, and trait anxiety questionnaires between the men and women in our sample. Similarity across genders in these variables was not observed in epidemiological studies that found stronger relationships between problem gambling and depression in women than in men (Desai and Potenza 2008). Our inconsistent result may further be a function of our sample: we had a small proportion of female (28.4 %), young (13.4 % between 18 and 34 years) and unemployed gamblers (37.3 %), and our sample may have lacked the statistical power necessary to reach significance. These variables are important, and professionals who treat PPG should take them into account as possible influences on depressive symptoms. Third, the clinical status of the gambler (i.e., problem versus pathological gambler) was not a significant predictor of depressive symptoms. This finding is inconsistent with previous reports (el-Guebaly et al. 2006, Momper et al. 2010; Thomsen et al. 2009). One possible explanation is that intensity of depressive symptoms may fluctuate less once a certain threshold of gambling severity is reached. The lack of fluctuation may reduce the variance in gambling severity to the point that it no longer predicts depressive symptom severity. Finally, problem-solving skills did not significantly predict depressive symptoms in PPG. PSI scores were highly correlated with scores on the trait anxiety scale, suggesting that variance in depressive symptoms that could have been explained by problem-solving skills was already explained by trait anxiety. Nonetheless, addressing coping strategies and problem-solving skills constitutes an important component of treatment for both problem gambling and major depression (Ladouceur and Lachance 2008). Therapists must not overlook deficits in problem-solving skills in depressive PPG.

This study is the first to assess several important correlates of depressive symptom severity in PPG in couple relationships. The major strengths of this study include the use of a control group and the use of valid instruments. The results of the current study are limited by the study's correlational design and by the use of self-report questionnaires, limitations that prevent us from making conclusions about the role of depression in problem gambling. A longitudinal study using a diagnostic interview such as the Structured Clinical Interview for DSM-IV Axis I Disorders (First 1997) would further contribute to our understanding of the relationship between the variables explored here. Another limitation to the present study is that participants were initially recruited for a larger study evaluating various aspects of marital life for PPG, and some variables known to be highly related to depression (e.g., personality disorders, cognitive distortions; Beck 2011) were therefore not included. Future studies may wish to explore factors that protect from depression in problem and pathological gambling. Finally, the use of a control group of PPG not in relationships would allow evaluation of the role of marital issues in depressive symptom severity in PPG.

Nonetheless, the present study contributes to the clinical comprehension of depressive symptoms in PPG in couple relationships. Further studies are warranted to help therapists improve their conceptualization of comorbid disorders in PPG, and to improve prevention and treatment of depression in PPG.

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