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## The Inventory of Gambling Situations in problem and pathological gamblers seeking alcohol and drug abuse treatment

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### Abstract

Identifying situations in which individuals gamble may be important for developing or improving treatments, but few instruments exist for examining high-risk gambling situations. This study evaluated the factor structure of the Inventory of Gambling Situations (IGS), an instrument that assesses situations that may lead to gambling episodes. Individuals seeking alcohol and drug abuse treatment who were identified as problem or pathological gamblers ( $N = 283$ ) completed the IGS, and principal component analysis revealed a 4-factor solution best fit the data; the factors represented items related to Negative Affect, Positive Affect, Gambling Cues, and Social Situations. Across the whole scale, Cronbach's alpha was 0.97, ranging from 0.83 to 0.96 for the four factors. IGS total scores correlated with other indices of gambling problems, including number of pathological gambling criteria endorsed and frequency and intensity of gambling. Race, education, and severity of psychiatric, drug and alcohol problems were significantly predictive of some factor scores. Specifically, African Americans were more likely to gamble in response to Negative Affect situations than Caucasians, and education was inversely associated with wagering in response to Gambling Cues. Psychiatric symptoms were predictive of gambling in response to both Positive and Negative Affect situations and Gambling Cues. Severity of drug and alcohol problems were related to gambling in Social Situations. Results from this study indicate that the IGS has good psychometric properties and suggest areas in which intervention efforts may be tailored to prevent or treat gambling problems among individuals seeking substance abuse treatment.

### Keywords

problem gambling pathological gambling; precipitants; substance abuse

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Substance abusers have high rates of gambling problems. Four nationally representative epidemiological studies in the United States find that pathological gambling is at least 4 times more prevalent among individuals with alcohol dependence than those without alcohol dependence (Gerstein et al., 1999; Kessler et al., 2008; Petry, Stinson, & Grant, 2005a; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001). Further, pathological gambling is

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associated with 4.4-fold increased odds of meeting lifetime criteria for an illicit drug use disorder; 38.1% of pathological gamblers identified in the National Epidemiological Survey of Alcohol and Related Disorders (NESARC) survey met lifetime criteria for an illicit substance use disorder compared with 8.8% of non-gamblers (Petry et al., 2005a).

High rates of comorbidities are noted in treatment-seeking samples as well. Shaffer, Hall, and Vander Bilt (1999) conducted a meta-analysis of 18 surveys of patients in treatment for substance use disorders, and rates of pathological gambling were estimated at 14%. In addition, many substance abusers also experience problem gambling, a sub-diagnostic threshold condition usually defined by meeting 3–4 of the 5 criteria necessary for a diagnosis (Hodgins, 2004). Shaffer et al. (1999) reported that an additional 15% of substance abusing patients were problem gamblers, such that about one-third of treatment-seeking substance abusers have a gambling problem. Recent data confirm high rates of problem and pathological gambling in surveys conducted in patients from drug abuse treatment settings (Cunningham-Williams, Cottler, Compton, Spitznagel, & Ben-Abdallah, 2000; Ledgerwood & Downey, 2002; Sellman, Adamson, Robertson, Sullivan, & Coverdale, 2002; Toneatto & Brennan, 2002; Weinstock, Blanco, & Petry, 2006).

Problem and pathological gambling are related to legal, psychiatric, and substance use difficulties in substance abusers. For example, gambling problems in cocaine-dependent patients are associated with more arrests and time in prison (Hall et al., 2000; Steinberg, Kosten, & Rounsaville, 1992). Increased prevalence rates of attention deficit disorder (Langenbucher, Bavly, Labouvie, Sanjuan, & Martin, 2001; Steinberg et al., 1992) and anti-social personality disorder (Hall et al., 2000) are reported in substance abusers with gambling problems compared to those without, along with elevated psychiatric distress, including mood and anxiety symptoms (Petry, 2000; Weinstock et al., 2006). Further, severity and number of drug use problems are higher in substance abusers with gambling problems compared to their non-problem gambling counterparts (Hall et al., 2000; Langenbucher et al., 2001; Steinberg et al., 1992). Even mild to moderate gambling problems are related to physical disabilities and medical problems (Morasco & Petry, 2006; Morasco et al., 2006), as well as increased utilization of emergency room and inpatient hospitalization services (Morasco et al., 2006).

Although many substance abusers suffer from problem and pathological gambling and gambling problems are associated with morbidity, few individuals seek treatment for gambling. In an analysis of NESARC data, Slutske (2006) reported that only 7–12% of pathological gamblers-- the most severely affected-- accessed treatment. Even among those who do seek treatment, relapse to problem gambling is common (Ledgerwood & Petry, 2006). About 50% to 75% of gamblers resume problem gambling after quit attempts (Hodgins, Peden, & Cassidy, 2005; Petry et al., 2006a), and less than 12% maintain gambling abstinence throughout a one-year period following treatment (Petry et al., 2006a).

Identifying precipitants of gambling episodes should help tailor future intervention efforts, which in turn could reduce relapse rates and adverse consequences associated with gambling. Dixon and Johnson (2007) developed a Gambling Functional Assessment, but it has thus far been tested only in college students, with mixed results on its psychometric properties (Miller, Meier, Muehlenkamp, & Weatherly, 2009; Miller, Meier, & Weatherly, 2009). Weiss and Petry (2008) described psychometric properties of The Inventory of Gambling Situations (IGS), an instrument based on the commonly used Inventory of Drinking Situations (IDS; Annis, Graham, & Davis, 1987). The IDS was developed using Marlatt and Gordon's (1985) model of relapse prevention that identifies high-risk factors for relapse to alcohol and has also been used to classify situations of relapse to heroin use and cigarette smoking. Isenhardt (1993) examined the factor structure of the IDS and identified

five high-risk categories for drinking: Negative Emotions, Social Pressures, Testing Control, Pleasant Emotions and Physical Discomfort. Many of these types of situations have face validity to those in which gambling occurs as well (Holub, Hodgins, & Peden, 2005).

Weiss and Petry (2008) modified the IDS for gambling and evaluated its factor structure and psychometric properties in a sample of 233 treatment-seeking pathological gamblers. This sample contained very few individuals (<10%) who abused drugs, and levels of current alcohol use were also low. In this sample, five factors were identified, representing items related to gambling in response to Negative Affect (e.g., adverse moods), Luck and Control, Positive Affect (e.g., positive moods), Social Situations, and Gambling Cues. Cronbach's alpha for the overall scale was 0.96, and it ranged from 0.82 to 0.94 across the five factors. IGS scores correlated with other indices of gambling problems in our sample of pathological gamblers seeking gambling treatment.

Also using the IDS as a template, Turner, Zangeneh, and Littman-Sharp (2006) independently developed a somewhat similar 63-item questionnaire to tap situations in which individuals may gamble. Stewart, Zack, Collins, and Klein (2008) administered this questionnaire to 158 pathological gamblers who drink while they gamble, and they reported that a two-factor solution representing Positive Emotions and Negative Emotions emerged. Gamblers with high scores on both these factors evidenced greater gambling problems, as well as greater drinking frequency and drinking problems, whereas those with scores low on both the Positive and Negative Emotion factors evidenced reduced gambling frequency and problems, as well as drinking quantity, compared to those who had high scores on one or both of the factors. Stewart and Zack (2008) also administered a shorter 15-item questionnaire to this same sample, along with 39 non-problem gamblers. In that study, they found that three factors emerged, tapping Mood Enhancement, Coping, and Social Situations for gambling. As expected, the pathological gamblers scored higher than the non-problem gamblers on all three factors, with differences greatest between the groups on the Mood Enhancement and Coping factors.

Thus, the nature and structure of situations representing precipitants to gambling episodes appear to vary somewhat across samples and questionnaires. Each study identified a factor comprising items that assess negative mood states, entitled Coping, Negative Emotions, or Negative Affect factors in the Stewart and Zack (2008), Stewart et al. (2008), and Weiss and Petry (2008) studies, respectively. Each of these studies also identified a factor containing situations that lead to gambling during positive mood states: Mood Enhancement, Positive Emotions, or Positive Affect. The differences in the number and nature of other factors likely resulted from administration of different instruments, utilization of different data analytical techniques, and evaluation in different populations (treatment seeking pathological gamblers versus pathological gamblers who wager while drinking).

In this study, we sought to further evaluate the psychometric properties of the IGS in a sample of individuals who were seeking substance abusing treatment and who span a range of severity of gambling difficulties from problem to pathological. We expected that a similar factor structure would emerge as in the original sample of pathological gamblers to whom it was administered (Weiss & Petry, 2008). We also assessed convergent validity of the IGS by correlating scores with other measures of gambling and psychosocial problems in these problem and pathological gamblers who were seeking substance abuse treatment. Finally, we examined the association between patient variables and response patterns on the IGS to identify whether certain demographic or substance use characteristics would relate differently to gambling in response to various situations.

## Method

### Participants

Participants ( $N = 283$ ) were recruited for one of two studies (references removed for maintaining blind) via direct screening efforts conducted at substance abuse treatment centers and ads and flyers placed at those locations between 1999 and 2005. Research assistants (RAs) administered a brief screen consisting of demographic items, recent gambling activities, and the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) to individuals in waiting rooms, or over the phone for those who called.

Inclusion criteria for participation in both studies were identical. They consisted of scores of 3 or more (Shaffer et al., 1999; Welte et al., 2001) on the South Oaks Gambling Screen (Lesieur & Blume, 1987), self-reports of wagering on at least 4 days and spending at least \$100 in total in the past 2 months, and age 18 years or older. Individuals meeting these criteria based on screening responses were invited to participate in a full evaluation, before which RAs obtained written informed consent, approved by the University's Institutional Review Board. Exclusion criteria were suicidal plans or psychotic symptoms in the past month, or a reading level less than 5<sup>th</sup> grade. Because one of the conditions involved assessment-only control, RAs inquired about whether individuals wanted to be ensured of gambling treatment or if they desired more intensive treatment than provided in the studies, and RAs referred such individuals ( $N = 7$ ) to a gambling treatment program.

In total, 283 participants enrolled in the brief intervention studies. The average (standard deviation) age was 40.8 (9.9) years, and 106 (37.5%) were female. Nearly half the participants ( $N = 115$ , 40.6%) self-identified as Caucasian, with large representations of African-American ( $N = 108$ , 38.2%) and Hispanic ( $N = 50$ , 17.7%) participants, but few reporting other races or ethnicities ( $N = 10$ , 3.5%). About one-fifth ( $N = 61$ , 21.6%) were married or cohabitating, 86 (30.4%) were divorced or separated, 8 (2.8%) were widowed, and the remaining ( $N = 128$ , 45.2%) were single. Average education was 12.4 (2.2) years, and income was \$17,243 (21,450), with 104 (36.7%) employed full-time, 44 (15.5%) part-time, 64 (22.6%) on disability, 52 (18.4%) unemployed, 7 (2.5%) retired, and 12 (4.2%) not in the labor force.

In terms of gambling, substance use, and other psychosocial variables, participants wagered an average of 21.2 (9.6) days in the prior month, spending an average of \$1,061 (\$5,000). Average gambling debt was \$15,386 (\$47,575). The average number of days of alcohol, heroin, cocaine, and marijuana use in the past month (among those who self-reported using the substances in the past month,  $N_s = 125, 48, 79, \text{ and } 62$ ) was 11.5 (10.1), 8.9 (9.6), 10.9 (9.7), and 13.2 (11.6), respectively.

### Assessments

The National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS; Gerstein et al., 1999) assessed lifetime and past-year pathological gambling using DSM-IV criteria. The NODS is valid and reliable, identifying 95% of treatment-seeking gamblers as pathological, and test-retest reliability is 0.99 (Gerstein et al., 1999; Hodgins, 2004). In this sample, average (SD) lifetime and past-year DSM-IV pathological gambling criteria endorsed was 6.2 (2.9) and 5.2 (3.0), respectively, with 201 (70.1%) meeting lifetime criteria for pathological gambling and 156 (55.1%) meeting past-year criteria.

Although formal substance use diagnoses were not conducted, participants were seeking substance abuse treatment services. To assess severity of recent substance use, research assistants administered the Addiction Severity Index (ASI; McLellan et al., 1988). Psychometric properties are established in substance abusers (McLellan et al., 1988) and

gamblers (Petry, 2003, 2007). Composite scores are derived for each problem area, which range between 0 and 1, with higher scores indicative of more severe problems. The average (standard deviation) composite scores on the alcohol and drug sections in this sample were 0.11 (0.14) and 0.09 (0.09), respectively. Other substance abusing samples seeking outpatient treatment generally have similar or higher drug and alcohol composite scores (Petry et al., 2006b; Petry, Alessi, Marx, Austin, & Tardif, 2005b; Rikoon, Cacciola, Carise, Alterman, & McLellan, 2006).

The ASI has been adapted to include a gambling section that includes questions about dollars wagered (net expenditures) and days gambled in the past month. The ASI-Gambling section has good internal consistency, test-retest reliability and validity in assessing gambling (Lesieur & Blume, 1991; Petry, 2003, 2007). In 176 treatment-seeking gamblers (Petry et al., 2006a), days and dollars wagered in the past month as determined by the ASI were highly correlated with collateral reports of frequencies and amounts gambled ( $r = .62$  and  $.68$ ,  $ps < .001$ ). In this sample, the average ASI Gambling composite score was 0.47 (0.22).

The Brief Symptom Inventory (Derogatis, 1992) is a reliable and valid 53-item scale assessing past week psychiatric symptoms. A Global Severity Index score is derived, ranging from 0 to 4, with higher scores indicative of greater severity of symptoms. The average BSI score in this sample was 1.0 (0.8).

The IGS (Weiss & Petry, 2008) asked participants to report on a scale of 1–4 (1=never, 2=rarely, 3=frequently, 4= almost always) how often they gambled in response to a variety of different situations during the past two months. Because recruitment occurred at substance abuse treatment facilities, two additional items related to situations in which people may gamble were added to the questionnaire: “When I was under the influence of any drugs,” and “When I had drunk some alcohol.” In total, 47 situations were presented, and higher scores indicate a greater frequency of gambling in the situations.

## Data Analysis

Principal components analysis (PCA) with varimax rotation evaluated responses to the 47 items of the IGS. PCA simplifies the description of variables by defining a smaller set of combinations that explains most of the variance in responses. Examination of scree plots was used to ascertain the best number of factors with eigenvalues of 1 or higher (Cattell, 1966), and the most parsimonious solution that provided theoretically viable constructs was selected. Cronbach’s alpha examined internal consistency across all 47 items as well as within each factor.

Using the rotated factor solution, a  $z$ -score for each factor was calculated for each participant, such that the mean  $z$ -score on each factor was 0 for the sample as a whole. In addition, a total IGS score was derived by summing up the factor scores for each participant. Concurrent validity was examined by correlating IGS total and factor scores with other indices of gambling frequency and severity.

MANCOVA evaluated association between patient characteristics and factor scores, with  $z$ -scores on the individual factors as the dependent variables. Independent variables were age, years of education, severity of psychiatric symptoms, gender, and race. The first three of these variables were included as continuous variables, and gender and race were categorical variables. Analyses were conducted on SPSS for Windows (version 15), with two-tailed  $p$ -values of  $< .05$  interpreted as statistically significant.

## Results

### Principal component analysis

In the initial PCA, six factors were identified with eigenvalues greater than 1.0. However, two of these factors had only 2 items loading on them and explained very little of the variance. Further, examination of the scree plot revealed that a 4-factor solution best fit the data, as factors 5 and 6 each accounted for 2% or less of the variance. The 4-factor solution accounted for 57.6% of the variance in responses. Table 1 shows the individual items on the IGS and factor loadings above 0.4, a standard indicator of appropriate loading (Clark & Watson, 1995). Most items loaded above 0.4 on only one of the factors. A few loaded above 0.4 on two factors (see Table 1), and one item (#14) did not load above 0.4 on any of the factors, but loaded at 0.38 and was retained with that factor.

Factor 1 accounted for 24.6% of the variance, and it contained 21 items, mainly those associated with situations related to Negative Affect such as gambling in response to having an argument with a friend, feeling anxious, tense, angry or stressed. Factor 2 consisted of 14 items; it explained 15.2% of the variance and contained items related to Positive Affect such as wanting to celebrate or feeling confident and relaxed. Factor 3 was labeled the Gambling Cues factor, and included 6 items such as thinking about debt and seeing reminders of gambling. This factor contributed to 9.5% of the variance. Factor 4, with 6 items, explained 8.3% of the variance and related to Social Situations, such as being out with friends who were gambling. The two items about using substances also loaded on this factor.

### Internal consistency

Overall, Cronbach's alpha for the 47-item questionnaire was 0.97. For the Negative Affect, Positive Affect, Gambling Cues, and Social Situations factors, the respective alphas were 0.96, 0.92, 0.87, and 0.82.

### Concurrent validity

Concurrent validity was assessed by examining correlations between IGS scores (total and subscale scores), and indices of gambling frequency and severity, along with measures of psychiatric symptoms. Correlations are shown in Table 2, and these should be interpreted with caution as corrections for multiple testing were not conducted due to the exploratory nature of these analyses. The IGS total score was significantly correlated with all indices of gambling severity, with effect sizes in the small to medium range (Cohen, 1988). In addition, it was significantly correlated with ASI Drug (but not Alcohol) composite scores and BSI scores, an index of severity of psychiatric symptoms.

The Negative Affect factor was significantly correlated with number of DSM pathological gambling criteria endorsed and ASI Gambling composite scores; in addition, it correlated significantly with ASI Drug composite scores and BSI scores. The Positive Affect factor was correlated with all the above variables and days gambled in the past month. The Gambling Cues factor correlated with all gambling severity variables assessed other than dollars wagered, and it also was associated with BSI scores.

Although it correlated with DSM pathological gambling criteria endorsed and debt, the Social Situations factor did not correlate significantly with other indices of gambling problems, nor was it associated with psychiatric symptoms other than substance use. The Social Situation factor did correlate significantly with ASI alcohol and drug composite scores. Even when the two items that related directly to alcohol and drug use were removed from the scale, and IGS Social Situation factor scores recalculated without these two items, results remained similar (data not shown). Social Situation factor scores with and without

the two substance use items correlated at 0.97 ( $p < .001$ ). Without the substance use items, this factor score marginally, but not significantly, correlated with ASI alcohol composite scores,  $r = 0.110$ ,  $p = .06$ , and significantly correlated with ASI drug composite scores,  $r = 0.137$ ,  $p < .05$ .

### Predictors of IGS factor scores

In the multivariate analysis, neither gender nor age were significantly related to IGS factor scores,  $ps > .17$ . Race was significantly associated with IGS factor scores, with scores on the Negative Affect factor differing between Caucasians and African Americans,  $F(3, 273) = 2.21$ ,  $p < .05$ . The mean (and standard error)  $z$ -score for Caucasians was  $-0.131$  ( $0.086$ ) and it was  $0.21$  ( $0.86$ ) among African Americans, indicating that African Americans were significantly more likely than Caucasians to wager in response to negative mood situations. Education was significantly associated with scores on the Gambling Cues factor,  $F(1, 273) = 14.84$ ,  $p < .001$ . Years of education were significantly inversely associated with scores on this factor. Scores on the BSI were related to IGS factor scores, with significant positive associations with Negative Affect, Positive Affect and Gambling Cues factors,  $F(1, 273) = 86.89$ ,  $10.21$ , and  $7.54$ ,  $ps < .01$ . Further, ASI alcohol and drug composite scores were positively and significantly related to the Social Situation factor scores,  $F(1, 273) = 6.79$  and  $5.93$ ,  $ps < .01$ .

### Discussion

Weiss and Petry (2008) developed and evaluated the IGS in a sample of treatment-seeking pathological gamblers, the vast majority of whom reported little or no substance use. This study provides information regarding the psychometric properties of the IGS using a sample of gamblers seeking treatment for alcohol or drug abuse with a wider range of gambling severity. The results suggested a 4-factor solution best fit the data and accounted for 58% of the variance; these factors were labeled Negative Affect, Positive Affect, Gambling Cues, and Social Situations. Internal consistency was excellent for the IGS total score (0.97), and good to excellent for each subscale (ranging from 0.82–0.96). Typically, Cronbach's alpha is lower when fewer items are contained in a scale relative to when more items are included (Cortina, 1993; Schmitt, 1996).

Compared to the factor structure obtained in the Weiss and Petry (2008) report, the current solution produced similar, but one less, factors. Items previously loading in the factor labeled Luck and Control are now largely subsumed under the Positive Affect factor. Because this sample includes individuals with a wide range of gambling severity, this change may reflect a differentiation of gambling precipitants as severity of gambling problems progress. Early in the gambling career, precipitants might be fairly vague (e.g., excitement), but after years of gambling, these precipitants may differentiate into separate factors (e.g., positive affect generally vs. feeling lucky or in control). Greater differentiation of factors with drug use experience has been noted in questionnaires assessing drug expectancies (Copeland, Brandon, & Quinn, 1995). Although the current analyses cannot determine if such shifts occur with the progression of gambling problems because the sample contained too few participants for a PCA (Gorsuch, 1983) when subdivided into problem and pathological gamblers, further research may address this question.

The retention and primacy of factors related to affect in this sample of individuals seeking substance abuse treatment are consistent with efforts to subtype drinking gamblers. Stewart et al. (2008) identified three gambler subtypes, of which two clusters (82% of their sample) comprised individuals with primarily positive and/or negative affect gambling motives. The cross-study consistency of positive and negative affect factors in this report and others

(Stewart & Zack, 2008; Stewart et al., 2008; Weiss & Petry, 2008) suggests that affect-related gambling motives and precipitants may be particularly important.

Total IGS and subscale scores were significantly correlated with multiple indices of gambling problems in this and another sample (Weiss & Petry, 2008), providing concurrent validity for the IGS. The data also suggest that as gambling problem severity increases, so do the number of gambling precipitants and/or the frequency in which gambling occurs in given situations (i.e., gambling in a specific situation increases from 2 “rarely” to 4 “almost always”).

Race and education were significantly associated with the Negative Affect and Gambling Cues subscales, respectively. African Americans were more likely to endorse gambling in response to negative affect compared to Caucasians, suggesting that adverse moods may be particularly problematic for triggering gambling episodes in African Americans. Those with fewer years of education were more likely to endorse gambling in response to environmental cues compared to those with more years of education. Thus, future therapy development may focus explicitly on methods for managing adverse moods or gambling-related environmental cues in patients who score high on these subscales.

Neither gender nor age were significantly related to IGS factor scores in this sample. In prior reports, females reported higher endorsement of gambling in response to Gambling Cues (Weiss & Petry, 2008) and Coping and Social Motives (Stewart & Zack, 2008), and a large literature exists on gender differences in problem and pathological gamblers (e.g., Blanco, Hasin, Petry, Stinson, & Grant, 2006; Ibanez, Blanco, Moreryra, & Saiz-Ruiz, 2003; Ladd & Petry, 2002). The reasons for the lack of gender differences in this sample are unclear, but they may be related to the focus on individuals seeking substance abuse treatment, inclusion of individuals with a range of gambling problems, or large representation of ethnic minorities, effects of which (Alegria et al., 2009) may have masked gender differences.

After controlling for demographics, psychiatric severity predicted scores on three out of four IGS subscales (i.e., Negative Affect, Positive Affect, Gambling Cues), suggesting that gamblers with psychiatric problems may develop a wide range of influential gambling precipitants and are likely to gamble in response to affect laden situations and gambling stimuli. The associations between psychiatric severity and these gambling precipitants may be useful for designing or improving treatments for these patients. For example, interventions that focus on addressing multiple gambling triggers ranging from mood-related gambling precipitants to environmental exposures may improve outcomes in substance abusing gamblers with concurrent anxiety or depression diagnoses, and others who score high on these items on the IGS. Psychiatric comorbidities are over represented in problem and pathological gamblers compared to the general population (Hodgins et al., 2005; Petry et al., 2005a). Although Petry et al. (2006a, 2008) found no association between severity of psychiatric symptoms and gambling treatment outcomes, Hodgins et al. (2005) found that some disorders, particularly lifetime mood disorders, may be associated with poorer gambling treatment outcomes. Given limited data on the role of other psychiatric conditions in gambling treatments, more research is needed in this area (Winters & Kushner, 2003), and the IGS may help guide a better understanding of these issues. Interesting, in both this and a prior report (Weiss & Petry, 2008), psychiatric symptoms were unrelated to gambling in response to social situations, suggesting that gambling in social contexts is unrelated to severity of psychiatric problems.

Drug and alcohol problems predicted scores solely on the factor representing Social Situations, and severity of drug use problems was correlated with scores on this factor even when the two substance-related items that loaded on the factor were removed from the factor

scores. These results indicate that gamblers with substance use problems tend to gamble more in response to social triggers and when under the influence of alcohol and drugs. The maintenance of social motives among these gamblers may be a feature unique to this subgroup, as social motives for gambling are thought to reduce in influence as gambling severity increases (e.g., Lee, Chae, Lee, & Kim, 2007). Similarly, with alcohol consumption, the focus on nonsocial use to intoxication and motives (e.g., drinking to cope) has been associated with more negative consequences (e.g., Bourgault & Demers, 1997; Gonzalez, Collins, & Bradizza, 2009).

Results of this study are limited by the lack of structured psychiatric diagnoses for disorders other than pathological gambling and the retrospective assessment of gambling precipitants. Future research might incorporate more advanced sampling methods and newer technologies (e.g., interactive voice response systems) that facilitate these sampling methods to better assess gambling antecedents without concerns of retrospective recall bias. In addition, prospective validity of the IGS has not yet been examined.

Strengths of the study include the large and diverse sample, including large proportions of racial and ethnic minorities. The high internal consistency and the general similarity in factor structure between this and another study (Weiss & Petry, 2008) provide support for the psychometric properties of the instrument. The IGS examines a wide range of precursors to gambling, and as such may be a valuable tool in clinical settings. It may be useful for identifying specific gambling antecedents to address in therapy (Morasco, Weinstock, Ledgerwood, & Petry, 2007). In addition, if reliable and valid in gamblers with lower levels of gambling difficulties, the IGS eventually may lead to a better understanding of precipitants of problematic gambling episodes, which ultimately may guide development of gambling prevention interventions.

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**Table 1**

Items on the Inventory of Gambling Situations and their factor loadings.

Item	Factor Loading			
	1	2	3	4
10. When other people treated me unfairly	0.78			
18. When other people didn't seem to like me	0.73			
3. When someone criticized me	0.72			
6. When other people around me made me tense	0.71			
36. When I was not getting along with others at work	0.73			
41. When there were problems with people at work	0.70			
21. When other people interfered with my plans	0.71		0.45	
2. When I felt tense or nervous	0.69			
1. When I had an argument with a friend	0.68			
30. When I would feel under a lot of pressure from family members at home	0.68			
9. When I felt that I had let myself down	0.68			
40. When there were fights at home	0.67			
43. When my stomach felt like it was tied in knots	0.66			
34. When I felt confused about what I should do	0.65			
19. When I felt anxious	0.65			
29. When I was angry at the way things turned out	0.63		0.46	
25. When I was afraid that things weren't working out	0.61			
4. When I would have trouble sleeping	0.58			
20. When I would wonder about my self-control over gambling and would feel like making a bet to try it out	0.58		0.40	
37. When I would feel that nothing was going right for me, so that it was about time that I should win at gambling	0.57		0.40	
44. When I wanted to be around people	0.51	0.41		
31. When something good would happen and I would feel like celebrating		0.71		
42. When I would be relaxed and wanted to have a good time		0.71		
27. When I felt lucky		0.70		
28. When I wanted to celebrate		0.69		
22. When everything was going well in my life		0.68		
12. When I felt confident and relaxed		0.64		
38. When I would suddenly have an urge to gamble		0.63		
8. When I felt I was on a lucky streak		0.62		
26. When I felt satisfied with something I had done		0.61		
11. When I remembered how great gambling was		0.57		
39. When I wanted to prove to myself that I could gamble a little without going overboard	0.42	0.54		
13. When I would convince myself I was a new person now and could control my gambling	0.44	0.47		
33. When I would start to think that just one bet would cause no harm		0.40		
14. When I would pass by a convenience store, the OTB, the casino, or somewhere where I used to gamble		0.38		
15. When I felt the only way I could pay my debts was to win big			0.70	
24. When I would start thinking about all the money I owe	0.42		0.60	
17. When I would unexpectedly find some old gambling paraphernalia (old ticket stubs, etc.)	0.50		0.55	

Item	Factor Loading			
	1	2	3	4
46. When I would see an advertisement about gambling			0.52	
5. When I wanted to win big to show others			0.49	0.42
45. When I would hear about someone winning big			0.47	
23. When I was with friends and they were gambling				0.80
7. When I would be out with friends and they would want to gamble				0.77
16. When I would be out with friends "on the town" and wanted to increase my enjoyment				0.67
35. When I would meet a friend and s/he would suggest that we gamble buy a ticket, go to the casino, etc.				0.66
47. When I had drunk some alcohol.				0.44
32. When I was under the influence of any drugs.	0.42			0.42

Table 2

Correlations between Inventory of Gambling Situations (IGS) scores and other measures of gambling severity and frequency, psychological symptoms, and drug use frequency.

Measure	IGS total	Negative Affect	Positive Affect	Gambling Cues	Social Situations
NODS Lifetime score	<b>0.577</b> ***	<b>0.359</b> ***	<b>0.209</b> ***	<b>0.418</b> ***	<b>0.127</b> *
NODS Past-year score	<b>0.633</b> ***	<b>0.421</b> ***	<b>0.271</b> ***	<b>0.394</b> ***	<b>0.179</b> **
Gambling debt (\$)	<b>0.161</b> **	0.012	0.020	<b>0.142</b> *	<b>0.148</b> *
Past month days gambled	<b>0.245</b> ***	0.108	<b>0.121</b> *	<b>0.173</b> **	0.084
Past month dollars gambled	<b>0.168</b> **	-0.007	-0.069	-0.047	-0.049
Addiction Severity Index					
Gambling composite score	<b>0.514</b> ***	<b>0.367</b> ***	<b>0.217</b> ***	<b>0.393</b> ***	0.052
Alcohol composite score	0.057	0.076	-0.059	-0.055	<b>0.152</b> **
Drug composite score	<b>0.210</b> ***	<b>0.176</b> **	-0.013	0.110	<b>0.146</b> **
Brief Symptom Inventory score	<b>0.460</b> ***	<b>0.507</b> ***	<b>0.205</b> ***	<b>0.207</b> ***	0.000

Statistically significant correlations are bolded.

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$

NODS= National Opinion Research Center Diagnostic and Statistical Manual for Mental Disorders (revision IV) Screen for Gambling Problems