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## Problem-solving skills in male and female problem gamblers

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### Abstract

The current study was designed to compare the self-reported problem-solving skills of male and female gamblers. In total, 148 females and 112 males (mean age = 43.6 years, SD = 12.0), responding to an advertisement for people concerned about their gambling, completed the Problem Solving Inventory ([Heppner, 1988](#)). The PSI consists of three factors related to self-perception of problem-solving:

confidence, personal control and approach-avoidance style. Gamblers were categorized into three subgroups according to their DSM-IV scores: Asymptomatic, Problem, and Pathological. Results from a series of analyses of co-variance (co-varying for the confounding effects of current emotional distress) revealed that gender had no significant effect, but problem severity on appraisal of problem-solving confidence and sense of personal control had a significant effect. Pathological gamblers were less confident and felt less in control than the other subgroups while engaging in problem-solving activities. Problem gamblers tended to have more negative appraisals of control than Asymptomatic gamblers. Problem-solving skills were also a significant predictor of DSM-IV scores for pathological gambling (i.e., negative appraisals were associated with higher DSM-IV scores). The results suggest that problem-solving skills are deficient in pathological gamblers and problem gamblers, but are not related to gender.

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## Introduction

In a meta-analytic study of gambling disorders in Canada and the United States, [Shaffer, Hall and Vander Bilt \(1997\)](#) estimated that the lifetime prevalence rate of pathological gambling for women in the general population is approximately 1%. Another 3% of women experience a variety of adverse consequences from their gambling activities, despite not meeting diagnostic criteria for pathological gambling. Their analyses, which included studies spanning 20 years of empirical research, suggested that up to a third of pathological and problem gamblers in the general population were women.

The vast majority of empirical studies on gambling have either included only male gamblers or an insufficient number of women to permit meaningful comparisons. [Mark and Lesieur \(1992\)](#), in reviewing this literature, found very few studies that addressed pathological gambling in women. Furthermore, where sizeable numbers of female gamblers have been studied, differences in sampling, methodology, representativeness (e.g., GA membership) and assessment have made comparisons with other studies including women difficult. The available data suggest that women when compared to men generally experience a later onset of gambling ([Lesieur & Rosenthal, 1991](#)), report a shorter duration between non-problem and problem gambling ([Rosenthal, 1992](#); [Lesieur, 1988](#)), tend to gamble within a social context, focus on games that are not considered to require skill (e.g., bingo, slot machines) or intended to enhance social functioning or self-esteem ([Lorenz, 1990](#); [Rosenthal, 1992](#)), tend to wager smaller amounts and adopt gambling as a means to cope with dysphoric emotions ([Rosenthal, 1992](#)). This suggests that there may be important gender differences in problem-solving behaviours that may produce different patterns and characteristics of gambling behaviour. The purpose of the current study is to compare the problem-solving

skills of male and female gamblers.

Cognitive behaviour therapy (CBT) is among the most validated treatment approaches to addictive behaviours (e.g., [Walters, 2000](#)). CBT interventions tend to be goal-oriented, practical and problem-focused. Commonly, distortions in thinking and perception and/or behavioural deficiencies or excesses are targeted. Motivational interventions intended to reduce ambivalence are also routinely used. Cognitive-behavioural treatment of alcohol problems often target deficits in problem-solving skills ([Heather, 1995](#)). While the evidence to date is not yet strong, a recent review of randomized control studies found CBT to be the most effective therapeutic modality for problem gambling ([Toneatto & Ladouceur, in press](#)). Since CBT can be viewed as a form of problem-solving therapy, a greater understanding of the problem-solving characteristics of problem gamblers might be important in informing CBT approaches for problem gambling and may guide the development of gambling-specific CBT interventions. Unfortunately, little is known about the problem-solving behaviours of problem gamblers. After a CBT intervention that included a specific problem-solving training component, [Ladouceur and Sylvain \(1999\)](#) found that treatment outcomes improved in pathological gamblers compared to a wait-list control group. Clearly, more research is needed to directly examine problem-solving skills in gamblers.

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## Method

### Participants

In total, 148 female and 112 male gamblers, age 18 or older, volunteered to participate in a confidential survey about gambling. Participants were recruited primarily from advertisements placed in major urban newspapers seeking people concerned about their gambling.

### Procedure

Individuals interested in the study contacted the research coordinator by telephone. The coordinator described the study, answered any questions and screened individuals to see if they met the primary study criteria: Are they concerned about their gambling behaviour? Those consenting to participate were mailed a self-administered questionnaire booklet. Participants who returned completed booklets received \$40 in gift certificates.

### Measures

#### *Gambling severity*

The Diagnostic and Statistical Manual ([American Psychiatric Association, 1994](#)) criteria for pathological gambling was used to assess gambling severity.

Participants answered 10 questions related to symptoms experienced within the past 12 months. Scores ranged from zero to 10, and individuals scoring five or higher met criteria for pathological gambling. For the current study, gamblers were categorized into one of three levels of gambling-problem severity based on their DSM-IV gambling scores: asymptomatic (score of 0), problem (1 to 4) and pathological (5 or higher).

### *Problem-solving skills*

The Problem Solving Inventory (PSI) ([Heppner, 1988](#)) was administered as the key measuring device of problem-solving skill. The PSI is a 35-item instrument measuring how individuals believe they react to personal problems encountered in their daily lives. The instrument consists of three sub-scales: Problem-Solving Confidence (scores range from 11 to 66), Approach-Avoidance Style related to problem-solving activities (scores range from 16 to 96) and degree of Personal Control of emotions and behaviours while engaging in problem-solving activities (scores range from 5 to 30). Low scores are associated with a positive view of problem-solving skills. This instrument possesses good internal consistency (alphas range from .72 to .85 on the sub-scales and .90 on the entire test) and there is good test-retest reliability. The validity of the PSI has been evaluated in various populations including adolescents, psychiatric populations and university students. For example, validity studies have shown that the PSI is linked to psychological well-being (e.g., [Heppner & Anderson, 1985](#)); symptoms of generalized anxiety disorder ([Ladouceur, Blais, Freeston, & Dugas, 1998](#)); hopelessness, depression severity and dysfunctional attitudes in depressed outpatients ([Cannon et al., 1999](#); [Otto et al., 1997](#))' depression, hopelessness, and psychosocial impairment in patients with chronic low back pain ([Witty, Heppner, Bernard, & Thoreson, 2001](#)).

### *Current psychiatric distress*

The Brief Symptom Inventory (BSI) ([Derogatis, 1993](#); [Derogatis & Melisaratos, 1983](#)) consists of 53 symptoms designed to measure nine dimensions of psychopathology experienced by individuals within the past week. The Global Severity Index (GSI), based on the mean rating for all 53 items, is scored on a five-point scale, ranging from zero, meaning “not at all,” to four, meaning “extremely,” and provides an overall index of current emotional distress. Internal consistency coefficients for the nine sub-scales cluster around .80 with test-retest correlations ranging from .68 to .91 over a two-week period ([Derogatis & Melisaratos, 1983](#)). The GSI has a stability coefficient of .90 over a two-week period.

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## **Data analysis**

A series of 2x3 analyses of covariance (ANCOVAs) were conducted to explore the

effects of gender and gambling severity on each of the measures of problem-solving skills while controlling for current psychiatric distress (measured by the GSI on the BSI) that may confound coping activities ([Stanton, Danoff-Burg, Cameron, & Ellis, 1994](#)). The alpha level was set at .05 for main effects and interaction effects. Observations that were two or more standard deviations away from the mean were considered outliers, and were excluded from the analyses of covariance. A regression analysis using the STEPWISE method (SPSS 10.0) was also conducted to determine whether self-perception of problem-solving skills predicted DSM-IV scores when other demographic variables, psychiatric variables and gambling frequency were included in the regression equation.

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## Results

Demographic characteristics of the sample are found in [Table 1](#). There were significantly more unmarried men (68.8%) than women (54.1%) in the sample ( $\chi^2$ ,  $p = .016$ ).

Otherwise, there were no other gender differences. About half of the sample was employed, reported some post-secondary education and earned more than \$20,000 per year. The proportion of men and women whose gambling severity was asymptomatic, problem and pathological is also reported in [Table 1](#). Within each severity category, there were comparable proportions of men and women. Almost half of the sample consisted of gamblers whose problem severity was pathological while approximately 13% were asymptomatic.

[Table 2](#) shows the frequency of gambling behaviours for the male and female participants. Lottery, scratch tickets, casino slot machines and bingo were popular gambling activities.

Male and female participants playing lottery, scratch tickets or pull tabs were playing on average between 1.5 and 2.5 times per week. Participants also reported playing a variety of casino games between 30 and 60 times per year. About twice as many women reported playing bingo than men. Few participants engaged in real estate or Internet gambling. The gambling activities that were identified as causing the biggest concern for men were casino card games (23.2%), lotteries/scratch tickets (13.7%), sports lotteries (13.7%) and race track betting (12.6%). For women, the gambling activities that caused the most concern were bingo (34.1%), casino card games (27.8%) and lotteries/scratch tickets (15.0%).

Treatment by a psychiatrist was reported by 40.2% of the sample while 45.6% reported receiving treatment by a psychologist or other mental health professional. Almost one-third had been prescribed anti-anxiety medication, 42.9% prescribed anti-depressants and 7.7% prescribed anti-psychotic medication or mood

regulators. Almost one-fifth (18%) of the sample reported having been hospitalized for a mental health problem. No gender differences were found on any of these variables.

[Figure 1](#) displays the mean scores for problem-solving confidence, personal control and approach-avoidance sub-scales of the PSI by gender and gambling severity. Results of the ANCOVA on the Problem-Solving Confidence sub-scale revealed that there was a significant main effect of gambling severity ( $F_{2,250} = 5.02$ ,  $p = .007$ ) and no significant gender or interaction effects. Simple contrasts of the severity subgroups revealed that the pathological gamblers rated themselves as significantly less confident in their problem-solving skills than both the asymptomatic subgroup (mean difference = 4.41; 95%CI = 1.52 to 7.30;  $p = .003$ ) and the problem gambler subgroup (mean difference = 2.20, 95%CI = 0.16 to 4.23;  $p = .035$ ). The difference in confidence scores between the asymptomatic and problem groups was not significant ( $p > .10$ ).

On the Personal Control sub-scale, there was also a significant effect of gambling severity ( $F_{2,247} = 13.09$ ,  $p < .001$ ), but no significant gender or interaction effects. Simple contrasts revealed that pathological gamblers felt significantly less personal control during problem-solving than the problem gamblers (mean difference = 1.66; 95%CI = 0.67 to 2.65;  $p = .001$ ), and the problem subgroup, in turn, reported less control than the asymptomatic subgroup (mean difference = 1.83, 95%CI = 0.49 to 3.18;  $p = .008$ ).

[Figure 1](#) shows that the pathological gambling subgroup had a higher mean score on the Approach-Avoidance Style sub-scale (higher scores signify a more avoidant style to problem-solving activities) than the other gambling subgroups; however, the ANCOVA revealed no significant effects of gambling severity ( $p = .13$ ), gender, and gender by severity interaction effects.

To examine whether problem-solving skills predicted DSM-IV scores for pathological gambling, the following variables were entered into a stepwise regression: age, gender, employment status, GSI from the BSI, history of treatment by psychiatrist (yes/no), gambling frequency (frequency of the gambling activity with the highest level of participation within the past year) and total score on the PSI. The PSI total score measures perception of general problem-solving abilities and was included instead of the individual PSI sub-scale scores to avoid problems of multicollinearity. (Pearson correlation coefficients ranged from .51 to .69 among the various sub-scales in this sample.) The Global Severity Index, gambling frequency and total PSI score were the only variables retained in the final regression model ([Table 3](#)). Higher psychiatric distress, higher gambling frequency and more negative views of problem-solving ability predicted higher DSM-IV scores. The final regression model explained 31.5% (adjusted  $R^2 = 30.6\%$ ) of the

variance in DSM-IV gambling scores, with PSI scores contributing to a small ( $\Delta R^2 = 2.6\%$ ) but significant increase in explained variance. If instead the three sub-scales scores (in place of the PSI total score) are allowed to compete for entry into the regression, the Personal Control sub-scale enters as the third step in the model following the BSI global index severity and gambling frequency, and predicts 4.4% of the total (33.2%) explained variance.

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## Discussion

This study revealed that there were differences in perceived problem-solving skills among gamblers with different levels of problem severity. However, there were no significant gender differences. Both male and female pathological gamblers reported being less self-assured while trying to solve problems they encountered in their lives and felt less in control over their emotions and behaviours during problem-solving activities than either the asymptomatic or problem gamblers. The problem gamblers perceived themselves to have less control over their emotions and behaviours during problem-solving compared to the asymptomatic gamblers.

A comparison of PSI scores observed in the pathological gamblers, and to some extent the problem gamblers, were quite similar to those reported in other clinical populations (e.g., inpatient males with alcohol problems, [Larson & Heppner, 1989](#); generalized anxiety disorders, [Ladouceur, et al., 1998](#)). These clinical populations tended to have more negative appraisals of problem-solving skills than undergraduate student populations or adult populations. This suggests that pathological gamblers and patients with substance use disorders or psychiatric disorders might benefit from interventions addressing these deficits. Both male and female gamblers in this study appear to require some problem-solving skills training.

The absence of significant gender differences in various aspects of problem-solving skills also suggests that CBT gambling-treatment interventions for men and women do not need to be drastically different with respect to problem-solving skills training. CBT interventions for problem gamblers and especially pathological gamblers may also benefit from targeting problem-solving skills that need attention (e.g., enhancing emotional and behavioural control when handling high-risk gambling situations). The relatively high avoidance scores observed in the pathological gamblers also seem to indicate that CBT interventions may be a good treatment approach in teaching gamblers a more effective style of dealing with problems.

A limitation of the study is that the PSI measures perceived and not actual problem-solving skills; however, there is some evidence that they are related ([Heppner, Hibel, Neal, Weinstein & Rabinowitz, 1982](#)). Furthermore, there does

seem to be a pattern among clinical populations to report negative appraisals of problem-solving skills, suggesting that these problem-solving skills warrant attention. While [Dixon, Heppner, Burnett, Anderson and Wood \(1993\)](#) found that PSI scores were both an antecedent and predictor of a depressed mood, it not possible in this study to determine whether deficits in problem-solving appraisal was a symptom of or precursor to gambling problems. Deficits in problem-solving skills may contribute to vulnerability in the development of gambling problems, or conversely, having a gambling problem may, over time, negatively influence problem-solving skills. The current study was correlational in nature, and additional controlled research is needed to further explore problem-solving abilities in problem gamblers.

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## References

- American Psychiatric Association. ( 1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed..). Washington, D.C.: Author.
- Cannon, B.. Mulroy, R.. Otto, M.W.. Rosenbaum, J.F.. Fava, M.. Nierenberg, A.A.. ( 1999). Dysfunctional attitudes and poor problem solving skills predict hopelessness in major depression. *Journal of Affective Disorders*, 55(1), 45-49.
- Derogatis, L.R.. ( 1993). *Brief Symptom Inventory (BSI): Administration, Scoring, and Procedures Manual* (3rd. ed.). Minneapolis, MN: National Computer Systems.
- Derogatis, L.R.. Melisaratos, N.. ( 1983). The Brief Symptom Inventory: An introductory report. *Psychological Medicine*, 13, 595-605.
- Dixon, W.A.. Heppner, P.P.. Burnett, J.W.. Anderson, W.P.. Wood, P.K.. ( 1993). Distinguishing among antecedents, concomitants, and consequences of problem-solving appraisal and depressive symptoms. *Journal of Counseling Psychology*, 40, 357-364.
- Heather, N.. ( 1995). *Treatment Approaches to Alcohol Problems*. Copenhagen: World Health Organization, Regional Office for Europe.
- Heppner, P.P.. ( 1988). *The Problem Solving Inventory: Manual*. Palo Alto, CA: Consulting Psychologists Press.
- Heppner, P.P.. Anderson, W.P.. ( 1985). The relationship between problem-solving self-appraisal and psychological adjustment. *Cognitive Therapy & Research*, 9(4), 415-427.
- Heppner, P.P.. Hibel, J.H.. Neal, G.W.. Weinstein, C.L.. Rabinowitz, F.E.. ( 1982). Personal problem solving: A descriptive study of individual differences. *Journal of Counseling Psychology*, 29, 580-590.
- Ladouceur, R.. Blais, F.. Freeston, M.H.. Dugas, M.J.. ( 1998). Problem solving and problem orientation in generalized anxiety disorder. *Journal of Anxiety Disorders*, 12(2), 139-152.
- Ladouceur, R.. Sylvain, C.. ( 1999). Treatment of pathological gambling: A controlled study. *Anuário de Psicologia*, 30(4), 127-135.
- Larson, L.M.. Heppner, P.P.. ( 1989). Problem-solving appraisal in an alcoholic population. *Journal of Counseling Psychology*, 36(1), 73-78.
- Lesieur, H.R.. ( 1988). Altering the DSM-III criteria for pathological gambling. *Journal of Gambling Behavior*, 4(1), 38-47.
- Lesieur, H.R.. Rosenthal, R.J.. ( 1991). Pathological gambling: A review of the literature. *Journal of Gambling Studies*, 7(1), 5-39.



Lorenz, V.. ( 1990). *Compulsive Gambling Hotline: Fiscal Year 1990, Final Report*. Baltimore, MD: National Center for Pathological Gambling, Inc.

Mark, M.. Lesieur, H.. ( 1992). A feminist critique of problem gambling research. *British Journal of Addiction*, 87, 549-565.

Otto, M.W.. Fava, M.. Penava, S.J.. Bless, E.. Muller, R.T.. Rosenbaum, J.F.. ( 1997). Life event, mood, and cognitive predictors of perceived stress before and after treatment for major depression. *Cognitive Therapy and Research*, 21(4), 409-420.

Rosenthal, R.J.. ( 1992). Pathological gambling. *Psychiatric Annals*, 22(2), 72-78.

Shaffer, H.J.. Hall, M.H.. Vander Bilt, J.. ( 1997). *Estimating the Prevalence of Disordered Gambling in the United States and Canada: A Meta-Analysis*. Boston, MA: President and Fellows of Harvard College.

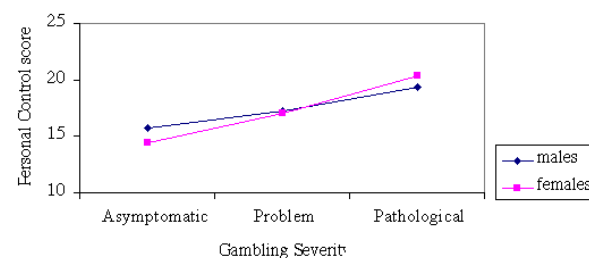
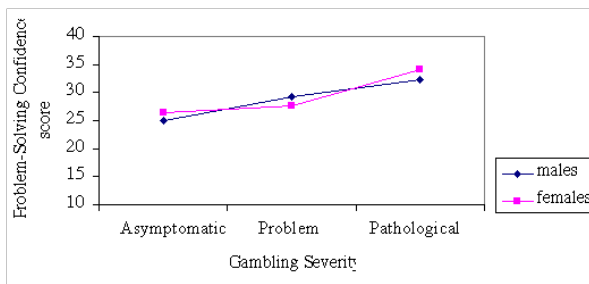
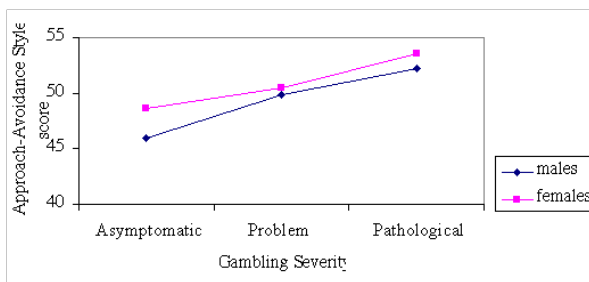
Stanton, A.L.. Danoff-Burg, S.. Cameron, C.L.. Ellis, A.P.. ( 1994). Coping through emotional approach: Problems of conceptualization and confounding. *Journal of Personality and Social Psychology*, 66(2), 350-362.

Toneatto, T.. Ladouceur, R.. ( in press). Treatment of pathological gambling: A critical review of the literature.

Walters, G.D.. ( 2000). Behavioral self-control training for problem drinkers: A meta-analysis of randomized control studies. *Behavior Therapy*, 31, 135-150.

Witty, T.E.. Heppner, P.P.. Bernard, C.B.. Thoreson, R.W.. ( 2001). Problem-solving appraisal and psychological adjustment of persons with chronic low-back pain. *Journal of Clinical Psychology in Medical Settings*, 8(3), 149-160.

## Figures



**Figure 1.**

PSI problem-solving confidence, personal control and approach-avoidance style sub-scale scores by gender and gambling severity.

## Tables

**Table 1**

Demographic characteristics by gender

	N	Males	Females	Total sample
<b>Age (M years [SD])</b>	260	42.9 (11.4)	44.2 (12.4)	43.6 (12.0)
<b>Marital status:<sup>1</sup> n (%)</b>	260			
Married/partnered		35 (31.3%)	68 (45.9%)	103 (39.6%)
Not married/partnered		77 (68.8%)	80 (54.1%)	157 (60.4%)
<b>Education level:<sup>2</sup> n (%)</b>	260			
Secondary or less		50 (44.6%)	79 (53.4%)	129 (49.6%)
Post-secondary		62 (55.4%)	69 (46.6%)	131 (50.4%)
<b>Employment status:<sup>3</sup> n (%)</b>	258			
Employed		59 (53.6%)	76 (51.4%)	135 (52.3%)
Not employed		51 (46.4%)	72 (48.6%)	123 (47.7%)
<b>Gross annual income (\$) ; n (%)</b>	258			
< 20 000		44 (39.6%)	78 (53.1%)	122 (47.3%)
20 000 — 39 000		32 (28.8%)	44 (29.9%)	76 (29.5%)
40 000 — 59000		23 (20.7%)	19 (12.9%)	42 (16.3%)
60 000 +		12 (10.8%)	6 (4.1%)	18 (7.0%)
<b>Gambling categories n (%)</b>	260			
Asymptomatic		16 (14.3%)	18 (12.2%)	34 (13.1%)
Problem		44 (39.3%)	57 (38.5%)	101 (38.8%)
Pathological		52 (46.4%)	73 (49.3%)	125 (48.1%)

<sup>1</sup>  $\chi^2$ ,  $p = .016$

<sup>2</sup>  $\chi^2$ ,  $p = .163$

<sup>3</sup>  $\chi^2$ ,  $p = .716$

**Table 2**

Description of gambling behaviour by gender

Gambling activity	Number of times per year Mean (SD)			
	N	Males	N	Females
Lottery	97	97.6 (69.4)	129	126.3 (131.4)
Scratch tickets	64	104.2 (108.8)	101	130.6 (147.3)
Pull tabs	25	106.5 (129.2)	50	76.6 (116.0)
Card games (private)	34	54.9 (62.7)	28	45.0 (72.7)
Casino card games	37	56.9 (87.3)	22	31.1 (48.6)
Casino table games	19	58.2 (74.5)	8	40.3 (69.1)
Casino slot machines	42	54.6 (77.6)	79	61.7 (89.4)
Casino video gambling	11	55.3 (112.0)	16	37.2 (53.1)
Stock market	10	45.3 (33.8)	11	23.5 (53.1)
Race track	39	50.7 (84.8)	29	59.8 (123.0)
Real estate	2	3.0 (1.4)	2	53.0 (72.1)
Sports lotteries	53	148.4 (125.0)	16	91.4 (123.0)
Sports betting	25	92.6 (116.3)	5	56.1 (61.3)
VLTs	9	129.7 (145.1)	12	44.0 (50.2)
Bingo	25	41.2 (64.3)	98	96.3 (85.2) <sup>1</sup>
Charity	15	76.4 (99.5)	15	47.7 (99.5)
Internet gambling	1	4 (-)	3	160.3 (183.1)

<sup>1</sup> excludes one extreme outlier

**Table 3**

### Predictors of DSM-IV pathological gambling scores

Predictors <sup>1</sup>	Step	Stepwise multiple regression <sup>2</sup>				
		$\beta$	$\Delta R^2$	<i>df</i>	Total $R^2$	Adjusted $R^2$
<b>BSI<sub>18</sub> Global Severity Index</b>	1	.370	-	1,251	.227	.224
<b>Gambling frequency measure</b>	2	.223	.062	1,250	.288	.283
<b>PSI total score</b>	3	.183	.026	1,249	.315	.306

<sup>1</sup> Variables entered into the stepwise regression but excluded from the final regression equation include: age, gender, employment status, psychiatric treatment.

<sup>2</sup>  $\beta$  denotes standardized beta coefficients of the final regression equation.