Self-efficacy in Pathological Gambling Treatment Outcome: Development of a Gambling Abstinence Self-efficacy Scale (GASS)

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Abstract

A 21-item measure of gambling abstinence self-efficacy (GASS) was developed. Principal component analyses of 101 pathological gamblers supported the use of a total score that showed good internal (α = .93) and retest reliability (ICC (n = 35) = .86) as well as four subscales: 1) winning/external situations (6 items, α = .91); 2) negative emotions (9 items, α = .87); 3) positive mood/testing/urges (3 items, α = .70); and 4) social factors (3 items, α = .81). The total and subscales showed moderate relationships with single item ratings of confidence to abstain from gambling and weak or non-significance relationships with demographic and gambling-related variables. The total score and three of the subscales showed evidence of predictive validity for gamblers not currently involved with treatment. Higher self-efficacy was related to fewer days of gambling over a 12-month period. These results provide preliminary support for the reliability and validity of the GASS.

Introduction

Pathological gambling, defined as persistent and recurrent maladaptive gambling behaviour (American Psychiatric Association [APA], 1994), affects approximately 1-2% of the adult population in North America (Shaffer, Hall, and Vander Bilt, 1999). Treatment outcome research is limited although cognitive-behavioral (CBT) models are currently being evaluated and show promise (Sylvain, Ladouceur, and Boisvert, 1997; Hodgins, Currie, and el-Guebaly, 2001; Petry, 2002). For example, Ladouceur and his colleagues organize outpatient treatment around four components: cognitive correction of erroneous beliefs concerning randomness, problem-solving training, social skills training, and relapse prevention. In two randomized trials, outpatient gamblers showed better outcomes than a waiting list control group, although a high attrition rate complicates interpretation of the results (Ladouceur, Sylvain, Boutin, Lachance, Doucet, Leblond, et al., 2001; Sylvain et al., 1997). Hodgins, Currie, et al. (2001) have evaluated a similar treatment approach designed in a self-help workbook format. With this approach, motivational enhancement, in the form of a telephone contact with the client, led to superior outcomes than simply receiving the workbook without any additional support.

One assumption that underlies these CBT models is that self-efficacy mediates the change in gambling behavior. Self-efficacy is the degree to which an individual believes that she or he can enact the required behaviours to cope effectively in a situation. It is thought to mediate behaviour change by influencing information processing, motivation, and effort (Bandura, 1982). For example, problem gamblers trying to quit who are confident in their ability to resist relapse will have a lower risk of relapse because they will engage in more effective coping behavior (e.g. correctly estimate the probability of winning, avoid risky situations, etc.) and persist longer in these coping efforts. Efficacy beliefs result from mastery experiences (i.e., successes), vicarious experiences (i.e., modeling), verbal persuasion and physiological or emotional arousal (Bandura, 1989), which occur both inside and outside of the treatment context. Therefore, it is a dynamic concept, expected not only to change over time, but also to be predictive of future

behavior. An individual trying to quit gambling whose self-efficacy increases through treatment and other experiences is expected to have greater long-term success.

A psychometrically sound measure of strength of self-efficacy is crucial in the area of gambling research. To date, simple 10-point Likert scales have been used to demonstrate that self-efficacy increases over the course of cognitive-behavioral treatment (Ladouceur et al., 2001; Sylvain et al., 1997). However, valid and reliable multi-item self-efficacy measures have been developed for other problematic behaviours, including nicotine (Condiotte and Lichenstein, 1981; DiClemente, 1981), alcohol (Annis and Graham, 1990; DiClemente, Carbonari, Rosario, Montgomery, and Hughes, 1994) and other drug use (Stephens, Wertz, and Roffman, 1995). In these areas, self-efficacy is operationalized as the self-rated ability to resist the urge to use (e.g. drink, smoke) either "heavily" or "at all" in a variety of situations that are cues to use. The situations were often derived from Marlatt and Gordon's (1985) typology of relapse precipitants and included unpleasant emotions, pleasant emotions, physical discomfort, testing control, urges and temptations, pleasant times with others, conflict with others, and social pressure to use.

The findings concerning the role of self-efficacy in other addictive behaviours are mixed but generally provide some support for the theory. For example, post-treatment self-efficacy ratings have been found to be valid predictors of subsequent smoking (Condiotte and Lichenstein, 1981), drinking (McKay, Maisto, and O'Farrell, 1993) and marijuana use (Stephens et al., 1995). On the other hand, pre-treatment self-efficacy ratings are less consistently related to outcome (Stephens et al., 1995). Furthermore, investigations of more complex, multivariate theoretical models of outcome have been limited to date (Maisto, Connors, and Zywiak, 2000; Stephens et al., 1995) and have yielded complex results. Further refinement of the role of self-efficacy in outcome and its relationship to other constructs such as coping skills, motivation and treatment involvement is necessary (Maisto et al., 2000).

This study analyzes a brief measure of gambling abstinence self-efficacy (GASS) for its factor structure, retest and internal reliability, relationships with other variables and its predictive validity.

Method

Participants

One hundred and one pathological gamblers who had recently quit gambling and who were participating in a prospective study of relapse completed the GASS and concurrent validation measures. Inclusion criteria included a score of 5 or greater on the South Oaks Gambling Screen (SOGS, Lesieur and Blume, 1987) and some gambling in the past four weeks. The sample included 36 women and 65 men with a mean age of 39 (*SD* = 10, range 19 to 77). Cultural group was reported as English Canadian by the majority (76%), with 8% French Canadian, 5% European ancestry, 2% Native, and 9% other groups. The mean score on the SOGS was 12.2 (*SD* = 3.4), which indicates a substantial level of gambling problems, and 89% met the DSM-IV criteria for Pathological Gambling (APA,

1994). Participants reported experiencing a mean of five years of problem gambling (*SD* = 7) with 49% reporting problematic involvement with video lottery terminals (the most accessible type of gambling locally) and 12% with casino games. An additional 34% reported problems with both VLTs and casino games, 3% bingo, and 3% other. Current gambling treatment (including Gamblers Anonymous involvement) was reported by 25%.

Predictive Validity Subgroup Eighty of the 101 participants were followed at 12 months and were included in the predictive validity analyses. No significance differences ($p<.05$) were found between those followed and those not followed, with a slight trend that those followed were more likely to be current smokers ($p<.08$) and less likely to meet DSM-IV criteria for pathological gambling ($p<.07$).

Retest Reliability Subgroup Forty-one consecutive participants (of 101) were approached to be re-assessed after completing their 12-month assessment and all agreed. Thirty-five participants were successfully re-assessed within two to three weeks (M=22 days, SD=8.4) by an independent interviewer blind to the results of the 12-month follow-up interview. This assessment included the GASS as well measures of gambling behaviour (Hodgins and Makarchuk, in press). The other six participants were not interviewed because of difficulty scheduling them within the three-week re-test window. The 35 interviewed did not differ significantly on baseline variables from the other 66 participants in the larger study.

Development of GASS items

In the pilot phase of this project the 16 items from the Reasons for Drinking Questionnaire (RDQ, Zywiak, Connors, Maisto and Westerberg, 1996) were modified into 18 problem gambling items. The RDQ was designed to measure factors associated with relapse and included reasons representing Marlatt's eight relapse categories. The RDQ items were, in turn, derived from items describing heroin relapse (Heather, Stallard, and Tebbutt, 1991). Individual interviews were conducted with a group of ten active and recently recovered problem gamblers to assess the ability of the items to describe recent gambling experiences. Based upon this feedback, items were further modified and eight additional items were developed to cover fully the range of relapse experiences.

Procedure

The initial participant interview lasted about 1.5 hours and assessed gambling behaviour, comorbid mood and substance use disorders, relapse precipitants, and personality characteristics (see Hodgins, el-Guebaly, and Armstrong, 2001). To determine factor structure of the GASS items, a principal component analysis was performed. The number of factors was determined using the Eigenvalue greater than one criterion and scree test. Varimax rotation was used to achieve simple structure of the factor solution. Subscale scores were computed using unit weighting of high loading items. Subscale and total score internal reliability was computed using coefficient alpha (Cicchetti, 1994).

To assess concurrent validity, a number of demographic variables and measures administered during the initial assessment were correlated with GASS scores. These measures included: gender, age, years of education, gambling treatment involvement (no, yes), problem severity (measured by the SOGS), type of gambling problem, comorbid mood disorder (measured by the SCID). As well, participants completed ratings of their confidence in staying abstinence over the next week, month, and year, using a ten-point scale anchored "not at all" and "completely". Pearson correlation coefficients were used with continuous variables and t-tests with categorical variables.

Predictive validity was tested by examining the relationship between the GASS scores and subsequent gambling with the prediction that lower self-efficacy would be associated with more gambling. Given the inconsistent findings concerning the role of treatment as a moderator of self-efficacy for substance abuse (Stephens et al., 1995), treatment was included as a potential predictor. Separate standard regression models were computed for the total GASS score and each of the four subscales with days of gambling over the 12-month follow-up as the dependent variable. Three factors were entered into the model: GASS score, current treatment and the interaction of treatment and GASS score. When the interaction term was significant, simple effects were examined by computing the regression models separately for participants receiving current treatment and those not receiving treatment.

Retest reliability was assessed on the retest subgroup by computing intraclass correlation coefficients (ICC, formula 2.1 summarized by Shrout and Fleiss, 1979) between the GASS scores for the two occasions. Interpretation guidelines for ICC are provided by Cicchetti (1994); below .4 =poor, .40 to .59=fair, .60 to .74=good, and .75 to 1.00=excellent.

Measures

South Oaks Gambling Screen (SOGS; Lesieur and Blume, 1987). The SOGS was used as a descriptive measure of gambling severity. It is a 20-item self-report questionnaire that assesses lifetime gambling-related difficulties. A score of 5 or greater indicates probable pathological gambling as validated against clinician ratings (Lesieur and Blume, 1987; Stinchfield, 2002).

Structured Clinical Interview for the DSM-IV (SCID; Spitzer, Williams, Gibbon, and First, 1990). The SCID is a structured interview that examines the frequency and intensity of DSM-IV symptoms, providing Axis 1 diagnoses. The Mood Disorder module was administered to determine DSM-IV diagnosis. Inter-rater diagnostic agreement across 12 audiotapes was 100%.

Results

Factor Structure and Internal Reliability

One item was eliminated from the scale because of infrequent endorsement (I felt physically ill or in pain) and two others were removed because they failed to load on the principle component or rotated factors in a preliminary analysis (I felt bored, I had the opportunity to gamble and just had to give in). The principle component analysis of the remaining 21 items (see Table 1) showed evidence of a strong principle factor accounting for 42% of the variance. All 21 items loaded greater than .48 on this factor. Four factors, accounting for 66% of the variance, were rotated using varimax rotation. Table 1 displays that variables loading greater than .30 on these factors. Based upon the item content these factors were labeled: 1) winning/external situations (6 items, α = .91); 2) negative emotions (9 items, α = .87); 3) positive mood/testing/urges (3 items, α = .70); and 4) social factors (3 items, α = .81). The total summed score of the 21 items yielded a high level of internal reliability, α = .93.

Concurrent Validity

The GASS total and subscales scores did not vary according to gender, education, comorbid mood disorder, or treatment involvement. However, they did vary according to age and problem severity as measured by the SOGS (see Table 2). Older and less severe problem gamblers had greater overall abstinence self-efficacy. Participants who identified VLTs as their primary problem had significantly higher total scores (M = 68, SD = 23) than those who reported other types of gambling problems (M = 58, SD = 21), $t(99) = 2.3$, $p<.03$, as well as higher scores on the winning/external situations subscale, $t(99) = 2.1$, $p<.05$.

Table 2 also displays the relationship between self-ratings of confidence and GASS scores. Greater confidence in the next month and year was significantly associated with all GASS total and subscale scores. Confidence in the next week was significantly associated with the total GASS score and two of the four subscales (see Table 2).

Predictive Validity

Results of the evaluation of assumptions for multiple regression led to recoding the days gambled for one participant to one day above the next highest score. One participant was identified as a multivariate outlier and was omitted. Three participants provided maximum self-efficacy scores, which may reflect invalid responding (Annis and Graham, 1988), were also omitted. Logarithmic transformation of days gambled was used to reduce skewness.

The overall regression models (N = 75) predicting the number of days gambling were significant for the total GASS score (R^2 = .18, $F(3, 71) = 5.1$, $p< .003$), subscale 1 (R^2 = .16, $F(3, 71) = 4.5$, $p< .006$), subscale 3 (R^2 = .27, $F(3, 71) = 8.8$, $p< .0001$), and subscale 4 (R^2 = .15, $F(3, 71) = 4.1$, $p< .01$) but not subscale 2 ($F(3, 71) = 2.2$, $p< .09$). The unstandardized and standardized regression coefficients and significant levels for the significant models are displayed in Table 3. As can be seen, the GASS total score and

subscales 3 and 4 contributed significantly to the prediction, but for all four models the interaction of GASS and treatment was also significant. Simple effect analyses, computing regression models separately for participants receiving treatment and those not receiving treatment, indicated that treatment involvement moderated the relationship between self-efficacy and gambling. A higher GASS total score and subscales 1, 3, and 4 significantly predicted fewer days gambled only for participants who were not in treatment (Pearson r = -.33, -.38, -.34, and -.27 respectively), but not for participants currently in treatment.

Retest Reliability

The retest reliability ICCs between the GASS administered at the 12-month follow-up and a re-administration two to three weeks later (N=35) were all in the good or excellent range: .86 for the total score, .89 for winning/external situations, .66 for negative emotions, .79 for positive mood/testing/urges and .71 for social.

Discussion

The present study evaluated the psychometric properties of a brief measure of abstinence self-efficacy for pathological gamblers. The exploratory principal components analysis indicated that 21 items load on a common dimension with high internal reliability. This total score also showed good retest reliability over a two to three week period. Concurrent validity analyses indicated that, as expected, the total score did not vary according to demographics such as education and gender. Scores, however, did show a weak relationship with age - older participants had higher self-efficacy scores. Lower self-efficacy was associated with higher gambling severity as measured by the SOGS. It is also notable that VLT players had higher self-efficacy than other types of gamblers. Further investigation of differences among gambling subtypes is important, with larger samples of each type of gambling (Blaszczynski and Nower, 2002).

The GASS total score correlated moderately with simple single item participant ratings of their degree of confidence in maintaining abstinence over the next week, month and year. The finding that these relationships were only moderate (i.e., r = .31 to .47) reflects in part the lower reliability of single item scales, but also suggests that there is some unaccounted for variance in the GASS scores. Construct validation studies of the GASS are important.

In terms of predictive validity, the GASS total score showed a significant relationship with subsequent gambling as predicted by self-efficacy theory. Higher GASS scores predicted fewer days of gambling over a 12-month follow-up, for participants not in treatment. Again, there is a large degree of variance that was unaccounted in these simple models, which supports the need for multivariate modeling of outcome (Maisto et al., 2000).

The principal component analysis, as well as supporting the existence a single construct, suggested four underlying factors. The pattern of item loadings suggested that these

factors are not conceptually homogeneous. The first factor was comprised mostly of items reflecting aspects of winning money but also included an item on gambling because of habit. This six-item subscale was the most reliable of the four, both in terms of internal and retest reliability. The second factor was more overtly homogeneous, including nine items reflecting gambling due to negative emotional factors. A similar factor is typically uncovered when the factor structure of self-efficacy measures in the substance abuse area is reported (Annis and Graham, 1988, Breslin, Sobell, Sobell, and Agrawal, 2000; DiClemente, 1986). The third factor was comprised of three seemingly disparate items, positive emotions, a temptation out of the blue and a testing control item. This subscale, not surprisingly, was the least internally reliable although it still showed good internal and retest reliability for a three-item scale. Finally, the fourth factor was comprised of three social items, also showing high internal and good retest reliability.

Generally, the four subscales showed similar psychometric qualities as the total score and, in terms of concurrent validity, the pattern of correlations with other variables was generally similar. In terms of predictive validity, the negative emotions subscale did not significantly predict days of gambling unlike the other three subscale and total scores. Whether this finding reflects the lower reliability of this subscale or a true lack of predictive validity for this aspect of self-efficacy is unclear. The comparatively low retest reliability may reflect the influence of negative affect mood at the time of the self-efficacy report on the ratings provided (Hodgins, el-Guebaly, and Armstrong, 1995).

The role of treatment as a moderator of the relationship between self-efficacy and subsequent behaviour requires further exploration. In this sample, the gamblers attending treatment, including Gamblers Anonymous, did not provide self-efficacy ratings that predicted future gambling. One possibility is that their sense of self-efficacy was more dynamic, currently being influenced by treatment experiences, compared with gamblers not participating in treatment. Prospective studies with repeated measures of self-efficacy are required to understand further this relationship.

The present study has a number of limitations. The GASS assesses confidence in abstaining from gambling versus moderate or controlled gambling and this sample was comprised of individuals who had a goal of quitting. The feasibility of non-abstinent goals has been raised in gambling as in other types of addictions (Blaszczynski, McConaghy, and Frankova, 1991). Although the GASS assesses confidence of not gambling at all, it may also be an appropriate measure of self-efficacy for individuals with a goal of moderating their gambling. To moderate one's gambling one must be able to exercise control over it. However, it is also possible that an alternative set of rating instructions (e.g. confidence of not gambling heavily) would be a more valid operationalization.

The results of this study suggest that the GASS has promise as a psychometrically sound measure of self-efficacy. Such a measure has utility in theory testing and development and also has potential clinical applicability. For example, understanding an individual's confidence in abstaining from gambling generally and in specific areas can be helpful in

treatment planning. However, replication of these findings with independent samples is essential.

Acknowledgements

This research was funded by grants from the National Center for Responsible Gaming and the Alberta Gaming Research Institute. We would like to acknowledge the participation of Julia Ungar and Tracy Wityk in data collection and Erin Cassidy for help with preparation of the manuscript.

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Table 1

Rotated Factor Loadings for the GASS Items

	Loading*			
Item	1	2	3	4
I wanted to win	.85			
I needed to win back past losses	.83			
I felt lucky	.78			
I felt pressured by financial debts	.76			
An opportunity to gamble happened out of the blue	.61		.40	.43
When I am in a situation in which I am in the habit of gambling	.58			.42
When I didn't care anymore	.63	.55		
I felt worried or tense because of my relationship with someone else		.84		
I felt angry or frustrated because of my relationship with someone else		.77		
I felt sad		.74		
I felt frustrated or angry either with myself or because things were not going my way		.59		
When I wanted to escape from my thoughts and feelings		.58	.46	
I felt others were being critical of me		.56		.55

	Self-efficacy		
I felt anxious or tense	.55		
I felt physically uncomfortable because I wanted to gamble	.49	.45	
I was in a good mood		.74	
I just felt tempted to gamble out of the blue		.62	
I wanted to see what would happen if I gambled just a little		.59	
I was with others having a good time and we felt like gambling together			.79
Someone invited me to gamble			.77
I saw others gambling	.51		.62

Note. GASS = Gambling Abstinence Self-efficacy Scale.

Instructions: The following questions are a list of reasons why people begin to gamble again after they have given up gambling. Please rate these on how confident you are that you will not gambling in that situation. Zero means that you are not at all confident and five means that you are extremely confident.

* only loadings > .40 are displayed

Table 2

Pearson Correlations Between GASS Scores and External Indicators

Variable	GASS Score				
	Total	Winning/ External situations	Negative emotions	Positive mood/ Testing/ Urges/	Social
Age	.22*	.17	.23*	.11	.12
Grade Completed	.10	.03	.07	.11	.20*
SOGS	-.27**	-.22*	-.27**	-.20*	-.16
Confidence					
Next week	.31***	.32***	.19	.36***	.18
Next month	.47***	.43***	.33***	.40***	.40***
Next year	.39***	.36***	.30**	.28**	.35***

Note. GASS = Gambling Abstinence Self-efficacy Scale; SOGS = South Oaks Gambling Screen. *p< .05. **p< .01. ***p< .001.

Table 3

Regression of GASS Total and Subscale Scores and Treatment Involvement on Days Gambled

GASS Score	Dependent Variable	B	*β*	*t*	*p*
Total	GASS	4.21	1.2	3.5	.001
	Treatment	0.15	1.9	2.7	.008
	GASS x treatment	0.06	-2.2	-2.9	.005
Winning/	GASS	.20	1.1	1.7	.09
External (1)	Treatment	2.48	0.7	2.9	.006
	GASS x treatment	-.10	-1.4	-2.1	.04
Positive mood/	GASS	0.95	2.4	4.1	.0001
testing/urges (3)	Treatment	4.52	1.3	5.0	.0001
	GASS x treatment	-.43	-2.8	-4.4	.0001
Social (4)	GASS	.49	1.5	2.3	.02
	Treatment	2.75	0.8	3.2	.002
	GASS x treatment	-.23	-1.6	-2.5	.01

Note. GASS = Gambling Abstinence Self-efficacy Scale