

## Psychometric Validation of the Gambling Passion Scale (GPS) in an English-speaking University Sample

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**ABSTRACT** *The Gambling Passion Scale (GPS) is a recently developed research instrument for assessing individuals' passion for gambling. Because the psychometric properties of the GPS have only previously been examined in French Canadians, the aim of this study was to replicate previous psychometric findings in an English-speaking university sample. Participants (female:  $n = 58$ ; male:  $n = 89$ ) were drawn from a university campus based on self-reported experience with gambling indexed by scores on the South Oaks Gambling Screen (SOGS). The two-factor structure reported by Rousseau *et al.* (Journal of Gambling Studies, 18(1), pp. 45–66, 2002) was largely replicated in this sample, as were relationships between 'obsessive passion' and negative consequences stemming from gambling. These results support the validity of the GPS as a measure of gambling passion in English-speaking university gamblers and its potential to contribute to understanding problem gambling.*

### Introduction

While gambling is an occasional recreational activity for many people, for some individuals it leads to serious negative consequences that can extend beyond immediate financial and personal losses (Petry and Armentano, 1999; Petry *et al.* 2005). While diagnostic categories and measures of problematic gambling provide useful descriptive indices of gambling behaviour, there is a need for conceptualisations that offer insight into the underlying motivational mechanisms associated with problem versus non-problem gambling.

One potentially helpful framework in understanding the factors underlying this distinction is Vallerand *et al.*'s (2003) conceptualisation of 'passion'. Within this framework, there are two types of passion: obsessive passion (OP) and harmonious passion (HP). Both are conceptualised as strong inclinations toward an activity (i.e. gambling) that an individual likes, finds important, and in which time is invested. They differ in that OP is proposed to be an internal motivational factor experienced as a compulsive urge to engage in an activity that is difficult to resist. As a result, individuals high in obsessive passion are likely to experience negative consequences during and after the activity (Vallerand *et al.*, 2003). Conversely, HP is proposed to be an individual choice to engage in an activity

(Vallerand *et al.*, 2003). Individuals with high HP feel in control of their activity and decide when to engage in it. Therefore, HP is hypothesised to be associated with positive outcomes during and after engaging in the activity.

In an attempt to assess Vallerand *et al.*'s (2003) concept of passion as it relates to both problem and non-problem gambling, Rousseau *et al.* (2002) developed the Gambling Passion Scale (GPS). The GPS was adapted from the already existing Passion Scale (PS; Ratelle *et al.*, 2004; Vallerand *et al.*, 2003)—a 14 item measure consisting of two, seven-item subscales measuring HP and OP respectively. The PS was developed so that it could be used to assess passion for a variety of activities by changing the instructions at the time of its administration. The PS was adapted for use in assessing gambling passion because gambling differs from other activities conventionally assessed by the PS (e.g. sports or work). The revisions resulted in the GPS—a 10 item self-report measure consisting of two, five-item subscales measuring OP and HP (Ratelle *et al.*, 2004; Rousseau *et al.*, 2002) and assessing both enjoyment and distress from gambling.

The GPS was first validated in a sample of 312 French-speaking individuals recruited in a casino (Rousseau *et al.*, 2002). Exploratory factor analysis using half of the sample revealed a two-factor solution, conforming to OP and HP, and accounting for 56.3% of the variance. This two-factor solution was then confirmed in the other half of the sample using confirmatory factor analysis (CFA). The subscales exhibited good internal consistency and test–retest reliability. These results also suggested that gamblers who scored high on OP perceived themselves to be 'heavier' gamblers, gambled for a longer period of time, and gambled more frequently, with more money and at more games.

Since its initial development, further support for the convergent and divergent validity of the GPS has come from studies examining the correlates of HP and OP. In addition to being associated with higher levels of problem gambling, OP predicted higher levels of ruminations, anxiety and guilt, as well as lower levels of concentration, vitality, perceptions of control, and positive emotions (Ratelle *et al.*, 2004). HP, on the other hand, has been associated with positive outcomes and emotions, and negatively predictive of feelings of guilt or being judged by others (Ratelle *et al.*, 2004; Mageau *et al.*, 2005).

To date, two studies have utilised the GPS to examine gambling passion in non-clinical university student samples of problem gamblers. Both used an English version of the GPS. Skitch and Hodgins (2005) found similar results to previous findings. While problem gamblers reported more OP and more HP than non-problem gamblers, when HP was statistically controlled, OP was the only gambling passion subscale related to greater gambling involvement and greater gambling severity. In the second study, MacKillop *et al.* (2006) found that both OP and HP correlated significantly with problematic gambling behaviour. It is of interest that in that study, both OP and HP were also correlated with measures of perceptions of chance being favourable to the individual, perceptions that one's behaviour can influence chance occurrences, impulsiveness and a present-centred time orientation.

Taken together, these findings highlight the potential importance of gambling passion and the role that OP and HP may play in differentiating healthy gambling from problem gambling. Equally, the psychometric validity of an instrument that allows for the accurate assessment of OP and HP in a variety of gambling populations is also important. At present, however, the study of gambling passion is limited by the fact that the GPS has yet to be fully validated for use in samples other than the one in which it was initially developed, namely French Canadians.

While the results from two recent studies using the English versions of the GPS in university samples are suggestive of its generalisability, this remains an open question and it is important to validate the basic psychometric properties of the English version of the GPS in English-speaking samples.

The aim of this study was to replicate previous psychometric findings of the GPS using the English version of the measure in a sample composed of university gamblers who reported having engaged in an array of gambling activities and experienced varying levels of symptoms of problem gambling. Specifically, this study attempted to replicate the two-factor solution of the GPS (OP and HP) found in previous CFA analyses and to evaluate potential ways to improve the model. In addition, to contribute to an understanding of the differential relationship between OP and HP and gambling behaviour, both factors were examined in reference to negative consequences stemming from gambling behaviour, with OP predicted to exhibit a higher association than HP.

## **Method**

### *Participants*

All procedures were approved by the State University of New York at Binghamton Human Subjects Research Review Board (Institutional Review Board). Participants were recruited over two semesters from the Binghamton University Psychology Department Human Subject Pool. The sample was culled from an initial sample of 695 students who were administered both the GPS and the South Oaks Gambling Screen (SOGS; Lesieur and Blume, 1987) by a Research Assistant in a large group. All measures were in self-report format. The inclusion criterion was a score of one or greater on the SOGS (described in detail below), where each point reflects an indicator of problems with gambling. This criterion was intended to ensure that gambling-naïve respondents were excluded from analyses and the appropriate variation in gambling-related problems would be evident. The criterion resulted in a sample consisting of 161 participants endorsing at least one lifetime symptom of problematic gambling. Multivariate outliers for GPS performance were identified using Mahalanobis's distance, a measure of the multivariate distance of a case from the remaining cases. Fourteen multivariate outliers were identified and excluded ( $p < 0.001$ ; Tabachnick and Fidell, 2001). The final sample was composed of 147 individuals (60.5% male). Because the sample was smaller than those typically reported (e.g. Rousseau *et al.*, 2002), special consideration was given to whether the study was adequately powered for CFA analyses. Recent reviews have criticised structured equation modelling sample size 'rules of thumb' as generally invalid and recommend focusing on the anticipated quantitative properties of the analysis (e.g. MacCallum and Austin, 2000), which was the approach used in this case. Specifically, given the conceptual relatedness of many of the items on the GPS, parameter effect sizes were anticipated to be large and communalities were anticipated to be high. Based on these assumptions and the relatively small number of parameters to be estimated, the sample was anticipated to be adequately powered.

### *Measures*

*Gambling Passion Scale (GPS).* The GPS (Ratelle *et al.*, 2004; Rousseau *et al.*, 2002) is a 10-item self-report measure of gambling passion. The GPS consists of two subscales (OP and HP) each consisting of five Likert-type items that are endorsed

on a scale from one to seven ranging from 'Not agree at all' (1) to 'Very strongly agree' (7) (Rousseau *et al.*, 2002). GPS directions instructed participants to think about their favourite gambling game and to indicate their degree of agreement for each item. Although the original version of the GPS is in French, this study used the English translation of items, as presented elsewhere (Ratelle *et al.*, 2004; Rousseau *et al.*, 2002; see Appendix A). As described above, previous psychometric evaluation of the GPS has revealed two factors, adequate internal reliability and some degree of construct validity (Ratelle *et al.*, 2004; Rousseau *et al.*, 2002).

*South Oaks Gambling Screen (SOGS).* The SOGS (Lesieur and Blume, 1987) is a 20-item self-report measure that is used to identify pathological gamblers. The SOGS is based on the criteria presented in the *Diagnostic and Statistical Manual of Mental Disorders* (3rd edn, *DSM-III*; American Psychiatric Association, 1980). It assesses the number of pathological gambling symptoms experienced by an individual over his or her lifetime. The SOGS has demonstrated good reliability and validity in clinical samples, and has shown to identify 'probable' pathological gamblers using a cut-off score of five or more (Lesieur and Blume, 1987). An unscored portion of the SOGS serves as a brief inventory of gambling activities most frequently undertaken by respondents.

#### *Factor Analytic Strategy*

Confirmatory factor analysis was undertaken using AMOS 4.0 (Arbuckle, 1999). Employing an approach similar to Rousseau *et al.* (2002), goodness-of-fit was assessed using four indices. First, the comparative fit index (CFI; Bentler, 1990) and normed fit index (NFI) (Bentler and Bonett, 1980) were calculated to assess the fit of the tested model relative to the data. Values of greater than 0.90 were used as the criterion for sufficiently good fit of CFI (Ullman, 2001) and NFI (Tabachnik and Fidell, 2001). The root mean square error of approximation (RMSEA; Browne and Cudek, 1993) was calculated with 90% confidence intervals (CI) to assess the lack of fit of the tested model compared to perfect model; RMSEA values of 0.08 and below reflect a good model fit (Browne and Cudek, 1993). Lastly, a chi-square test was used to test whether the observed covariance matrix significantly diverged from the proposed covariance matrix. Importantly, the chi-square test examines the relative difference between the two matrices; therefore, a non-significant chi-square test value supports a proposed model. Because the significance of the chi-square test is highly dependent on the number of degrees of freedom, the ratio of chi-square test to degrees of freedom was also calculated; a ratio of less than 1 is considered reflective of a good model fit (Byrne, 1989).

The previously identified two-factor model was tested first. Given the high internal consistency, a single-factor model in which the theoretically distinct types of passion (HP and OP) were undifferentiated was tested as a control model. Because the models were not nested, relative goodness of fit was assessed using Aikake's Information Criterion (AIC; Tabachnick and Fidell, 2001). Smaller AIC values indicate a better-fitting, more parsimonious model.

## **Results**

### *Descriptive Statistics*

The internal consistency of the OP and HP subscales, as indexed by Cronbach's  $\alpha$  were 0.90 and 0.89 respectively. Mean OP and HP scores were 7.19 (*SD*

= 4.21) and 9.45 ( $SD = 6.51$ ), respectively. Males scored higher than females on OP (Males:  $M = 7.89$ ,  $SD = 4.92$ ; Females:  $M = 6.12$ ,  $SD = 2.46$ ;  $t(145) = -2.535$ ;  $p < 0.05$ ), and HP (Males:  $M = 11.07$ ,  $SD = 7.47$ ; Females:  $M = 6.97$ ,  $SD = 3.45$ ;  $t(145) = -3.914$ ;  $p < 0.001$ ). Pearson's  $r$  between OP and HP was 0.64,  $p < 0.001$ .

The internal consistency of the SOGS was 0.76. The mean SOGS score of all participants was 2.60 ( $SD = 2.50$ ). Males scored higher on the SOGS than females (Males:  $M = 2.94$ ,  $SD = 2.70$ ; Females:  $M = 2.07$ ,  $SD = 2.07$ ;  $t(145) = -2.097$ ;  $p < 0.05$ ). Unsourced SOGS items inquiring into the types of gambling games that the participants engaged in showed that three particular gambling activities were endorsed more frequently than others. These activities included: playing cards for money (75%); playing the stock and/or commodities market (63%); and bowling, shooting pool, playing golf, or some other skill for money (61%). Twenty-three (15.6%) participants scored at or above the recommended cut-off score of five that has been used to identify potentially pathological gamblers ( $M = 7.26$ ,  $SD = 3.06$ ; Lesieur and Blume, 1987).

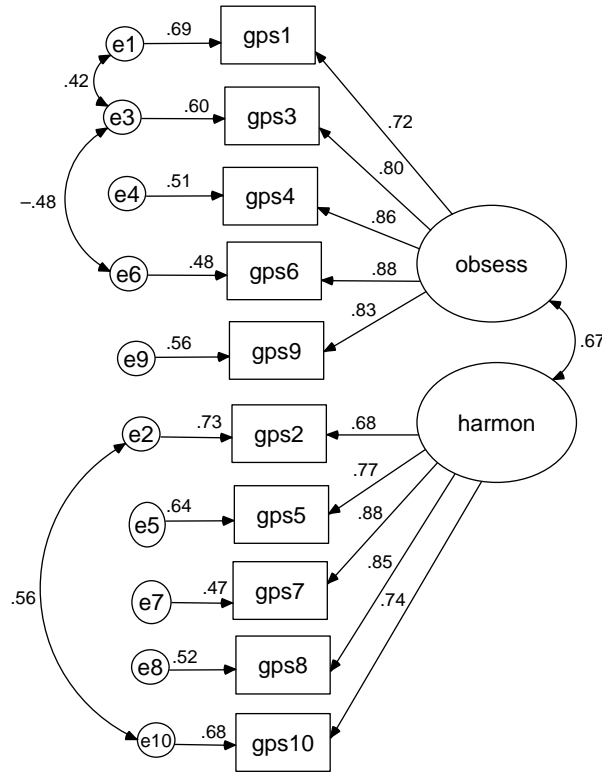
#### *Initial Confirmatory Factor Analysis*

The two-factor model was not identified by any of the goodness of fit indices. However, CFI and NFI approached the predetermined criterion of good-fit (CFI = 0.89; NFI = 0.86; RMSEA = .16;  $\chi^2$  [35,  $N = 147$ ] = 153.59,  $p < 0.01$ ;  $\chi^2/df = 4.39$ ). In this model, OP and HP correlated 0.71. The single-factor model, also, was not identified (CFI = 0.74; NFI = 0.72; RMSEA = 0.23;  $\chi^2$  [35,  $N = 147$ ] = 308.52,  $p < 0.01$ ;  $\chi^2/df = 8.81$ ). Comparison of the two models revealed a better fit for the two-factor model both in terms of goodness of fit indices and the AIC (Two-factor AIC = 195.59, One factor AIC = 348.52).

#### *Model Modifications*

Following initial CFAs, modification indices were examined to evaluate potential ways to improve the models. In the case of the two-factor model, it was indicated that permitting the error variance of items #2 and #10, #3 and #6, #1 and #3 to covary would substantially enhance the fit (see Fig. 1). Additional modifications yielded no substantial improvements to the model. The new model was then examined using CFA, which indicated a good fit according to all indices of fit (CFI = 0.97; NFI = 0.95; RMSEA = 0.08), except for the chi-square analysis ( $\chi^2$  [31,  $N = 147$ ] = 58.05,  $p < 0.01$ ; see Fig. 1). Again, because the significance of the chi-square test is highly dependent on the number of degrees of freedom, the ratio of chi-square test to degrees of freedom was also calculated and was reflective of a good fitting model ( $\chi^2/df = 1.87$ ).

Potential improvements to the one-factor model were also examined using modification indices. Permitting the error variance of items #2 and #10, #1 and #3, #8 and #5 to covary substantially enhanced the fit. To ensure that the one-factor model was modified to a similar degree as the two-factor model, it was adjusted only using the three modification indices that improved the model the most. The new model was then examined using CFA, which indicated an inadequate fit according to all indices of fit (CFI = 0.87; NFI = 0.85; RMSEA = 0.17;  $\chi^2$  [32,  $N = 147$ ] = 167.08,  $p < 0.01$ ) except  $\chi^2/df$  (5.22). See Table 1 for fit indices of



**Figure 1.** Confirmatory factor analysis of a modified two-factor model of the Gambling Passion Scale. *Note:* 'gps(#)' signifies Gambling Passion Scale Item number; 'e' signifies error variance; 'obsess' signifies obsessive passion, 'harmon' signifies harmonious passion.

all models. As anticipated, the two-factor model showed a better fit when directly compared to the modified one-factor model (Two-factor AIC = 106.05, One factor AIC = 213.08).

#### *Relationship to Negative Consequences*

In terms of the relationship between the GPS and problems with gambling, as indexed by SOGS total scores, participants scoring at or above the recommended cut-off score of 5 ( $n = 27$ ) for identifying pathological gambling on the SOGS scored higher on OP ( $t(145) = -5.191$ ;  $p < 0.001$ ) and HP ( $t(145) = -4.267$ ;  $p < 0.001$ ) than those scoring below this cut-off. OP and HP correlated significantly with SOGS total scores (OP:  $r = 0.39$ ,  $p < 0.001$ ; HP:  $r = 0.37$ ,  $p < 0.001$ ). To account for shared variance, partial correlations were conducted between GPS subscales and SOGS total scores while controlling for the other gambling passion subscale. Both correlations were significant, OP: partial  $r = 0.22$ ,  $p < 0.01$ ; HP: partial  $r = 0.16$ ,  $p < 0.05$ ). Although OP showed a higher correlation with SOGS total than HP, these partial correlations were not significantly different ( $s = 0.53$ ;  $p = 0.30$ ).



**Table 1.** Confirmatory fit indices of confirmatory factor analysis of the Gambling Passion Scale in university gamblers

	Two-factor model	One-factor model	Two-factor model (modified)	One-factor model (modified)
CFI <sup>a</sup>	0.89	0.74	0.97	0.87
NFI <sup>b</sup>	0.86	0.72	0.95	0.85
RMSEA <sup>c</sup>	0.16	0.23	0.08	0.17
$\chi^2$ <sup>d</sup>	153.59	308.52	58.05	167.08
$\chi^2/df$ <sup>e</sup>	4.39	8.81	1.87	5.22

<sup>a</sup>Confirmatory fit index.<sup>b</sup>Normed fit index.<sup>c</sup>Root mean square error of approximation.<sup>d</sup>Chi-square test.<sup>e</sup>Chi-square test divided by degrees of freedom.

## Discussion

This study largely supported the psychometric validity of the GPS in English-speaking university gamblers. In line with previous research, estimates of internal consistency were high for both OP and HP subscales and were similar to those reported in previous analyses using French-speaking casino gamblers (Ratelle *et al.*, 2004; Rousseau *et al.*, 2002) and those administered the English version of the GPS (Skitch and Hodgins, 2005). With respect to the factor structure of the GPS, results from a slightly modified two-factor model confirmed the two-factor solution of the GPS (OP and HP) that was reported in previous analyses (Ratelle *et al.*, 2004; Rousseau *et al.*, 2002). Furthermore, comparisons of the two- and one-factor models showed the two-factor model to be superior. The confirmed two-factor model in this study differed slightly from the previously defined two-factor model in that it permitted error variance between some GPS items to covary; however, given that the modifications were consistent with the theoretical underpinnings of both OP and HP, we interpret the two models as fundamentally alike. Finally, the results suggested that both OP and HP are associated with negative consequences stemming from gambling. While it was hypothesised that OP would be significantly more associated with problems than HP, there was no compelling evidence of that relationship.

These results revealed some disparities between the findings of the present study and those found in previous research. The correlation between OP and HP was higher in this study than those reported in previous studies [present study:  $r = 0.64$ ; Ratelle *et al.* (2004):  $r = 0.39$ ; Rousseau *et al.* (2002):  $r = 0.28$ ; Mageau *et al.* (2005):  $r = 0.44$ ]. These differences may be attributed to dissimilarities between the sample in the present study and those employed in previous research. It is notable that Skitch and Hodgins (2005) also found relatively high correlations between OP and HP. Similar to that study, participants in the present study were university students who were not recruited from a gambling site and who reported heterogeneity in gambling activities. The higher correlations between OP and HP scores may therefore reflect genuine differences between these and previously studied populations, although it should be noted that these samples differed in that Skitch and Hodgins (2005) examined gambling passion in active and regular gamblers. It is of interest to note that the high correlation may explain the significant associations between both OP and HP and negative consequences

from gambling. If OP is associated with more negative consequences from gambling and HP closely corresponded to OP in this sample, a similar relationship between HP and negative consequences would not be unexpected. However, the high correlation between the two factors and relatively little difference between their associations with negative consequences suggests the need for further construct validation of the GPS to clarify meaningful differences between the two.

It should be noted that a limitation of the present study was that the sample consisted exclusively of English-speaking young adults, which does not address the validity of the GPS in English-speaking adults in general. First, the types of gambling endorsed as being a characteristic of the participant group may not generalise to adult gambling populations as a whole. Secondly, adolescents have been shown to differ from adults on measures of abilities hypothesised to be related to gambling including decision-making (Ernst *et al.*, 2003; Ernst *et al.*, 2004). The full development of the brain's frontal lobes, which are responsible for abstract reasoning and behavioural inhibition is not evident until adulthood (Spear, 2000, 2002). Developmental differences may therefore affect the expression of passion toward gambling as well and suggest that it would be prudent for the GPS to be validated in a general adult English-speaking sample also. Finally, given the sample size of the current study, it was not feasible to conduct more fine-grained examinations of the factor structure of the GPS in subsamples segregated by gender, level of problems with gambling, or mode of gambling preferred. As a result, it is possible that some of the ambiguity in the current findings was related to subgroup differences that were not readily discernible. Such examinations may be highly informative and would be worthwhile in future studies with larger samples.

Nonetheless, taken together, these results support the validity of the GPS as a research measure of individuals' passion towards gambling in English-speaking university gamblers. The successful replication of these analyses in a sample dissimilar to that used in its original validation underscores the robustness of the GPS's psychometric properties. Although the GPS is a new measure and in need of further construct validation, it appears to be a promising research assessment instrument. While validated only as a research measure at present, the GPS provides measures of motivational mechanisms that may enable clinicians to gain more comprehensive assessments of gambling-related cognitions fundamental to cognitive-behavioural treatments of problem gambling (e.g. Ladouceur *et al.*, 2001; Sylvain *et al.*, 1997; Mageau *et al.*, 2005; Toneatto, 2002). Therefore, validation of the GPS in clinical samples may be a valuable direction for future research.

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## Appendix A

### *Gambling Passion Scale* (Rousseau et al., 2002)

1. I cannot live without this gambling game. (OP1)
2. I am emotionally dependent on this gambling game. (OP2)

3. I have a tough time controlling my need to play this gambling game. (OP3)
4. I have an almost obsessive feeling for this gambling game. (OP4)
5. The urge is so strong, I cannot help myself from playing this game. (OP5)
6. This gambling game allows me to live memorable experiences. (HP1)
7. This gambling game is in harmony with the other activities in my life. (HP2)
8. The new things I discover with this gambling game allow me to appreciate it even more. (HP3)
9. This gambling game reflects the qualities I like about myself. (HP4)
10. This gambling game allows me to live a variety of experiences. (HP5)