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Validation of the Persian Version of the Online Problem Gambling Behavior Index and its Association with Gambling Severity Index and Socio-Demographic Factors

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Abstract. Many factors in current evaluations highlight the negative impacts and dangers linked to problem gambling. However, few screening instruments for problem gambling assess behaviors that are exclusively based on real gambling actions such as duration of play, frequency of gambling, and gambling late at night. One new screening instrument that assesses behavioral aspects of problem gambling is the 12-item Online Problem Gambling Behavior Index (OPGBI). The aim of the present study was to validate the Persian version of the scale within the Iranian context, and examine its relationship with the Problem Gambling Severity Index (PGSI) and different socio-demographic variables. A total of 498 participants completed an online survey. The OPGBI scale showed excellent internal consistency (Cronbach's α =0.946). Confirmatory factor analysis was employed to evaluate the validity of the OPGBI, with all loaded items exceeding .50 and all coefficients being significant. There was a strong correlation between the OPGBI and PGSI (r=.846, p<.01). The alpha coefficients for the three factors of OPGBI were equal to or greater than .70. Correlation between the three OPGBI factors were all significantly related to PGSI score: gambling behavior (r=.824, p<.01), communication (r=.764, p<.01), and limit-setting (r=.785, p<.01). The three factors explained almost 72% of the variance (R^2 = 71.9%). The findings demonstrate that the Persian OPGBI is a reliable and valid instrument for assessing problematic online gambling behavior among Iranian adults.

Keywords: Problem Gambling, Online, Behavior Index, Persian validation.

INTRODUCTION

In the most recent (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013), gambling disorder (previously known as pathological gambling) was redefined from an impulse control disorder to a behavioral addiction. This is of great importance because it formally recognizes that some behaviors can be an addiction without the ingestion of a psychoactive substance, and means that other potential behavioral addictions might be included in future editions of the *Diagnostic and Statistical Manual of Mental Disorders* (e.g., gaming addiction, exercise addiction, sexual addiction, and work addiction) (Griffiths, 2016).

Internet gambling has attracted increasing attention among researchers in the social sciences. With the internet providing a platform for gambling, the chances of developing problematic behaviors may be heightened (Griffiths, 2003). This has led to a marked increase in the number of empirical studies examining online gambling. For many participants, gambling appears to be a fairly harmless and enjoyable leisure pursuit (Turner et al., 2019). Due to the swift growth of legal gambling options and the introduction of new types of gambling (e.g., in-play betting), the prevalence of problem gambling may rise markedly in some jurisdictions (Cosenza et al., 2019).

Many studies have noted that the earlier that individual starts to gamble, the greater the likelihood of (i) developing gambling problems (Carbonneau et al., 2015; Griffiths, 1995; Potenza et al., 2011; Rahman et al., 2012), (ii) participating in additional risky behaviors (Lynch et al., 2004; Welte et al., 2009; Raitasalo et al., 2024), and (iii) associated mental health disorders (Grant et al., 2009; Villalba-García et al., 2025). Research has also shown that cognitive distortions related to gambling and struggles to maintain control over behavior during negative emotional states can play a significant role in the development of problematic gambling (Ciccarelli et al., 2021).

There are many specific instruments that assess dysfunctional gambling. One of the first developed to screen for gambling problems was the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987). However, later studies showed that the SOGS did not accurately assess gambling problems in the general population due to both methodological and psychometric problems (Stinchfield et al., 2007). One criticism of this scale compared to others such as the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001), is that the SOGS tends to overestimate the prevalence rates of problem gambling among community-based samples (Auer et al., 2024; Stinchfield, 2002).

The PGSI was specifically developed for use in epidemiological studies on gambling. The PGSI can be utilized to identify gambling issues, customize intervention approaches, or monitor treatment results (Merkouris et al., 2020). It can aid healthcare professionals in differentiating between

casual recreational gamblers and individuals who might be at risk of developing, or currently have, a gambling disorder (Ferris & Wynne, 2001). Many studies have shown that the PGSI possesses good psychometric properties across different cultures (Arcan, 2020; Auer et al., 2024; Currie et al., 2013; Griffiths & Nazari, 2021; James et al., 2025; Loo et al., 2011; Lopez-Gonzalez et al., 2018; Miller et al., 2013; Orford et al., 2010; So et al., 2019). The scale has gained widespread popularity in various countries and is considered one of the most trusted instruments in assessing problem gambling.

Lopez-Gonzalez et al. (2018) validated the Spanish version of the PGSI with 659 sports gamblers who were recruited through an online research panel. The internal consistency was excellent (Cronbach's α=.97) and a confirmatory factor analysis (CFA) demonstrated adequate construct validity (demonstrating it was unidimensional), as well as good convergent validity with DSM-IV problem gambling scores (r =.77). Loo et al. (2011) investigated the psychometric characteristics of the Chinese PGSI with students and community-based adults. The scale showed adequate internal consistency (Cronbach's α=0.77) and demonstrated good convergent validity with SOGS, frequency of gambling, gambling urges, gambling thoughts, depression, anxiety, and stress. Arcan (2020) investigated the psychometric characteristics of the Turkish PGSI with 182 university students. CFA demonstrated its unidimensional factor structure and good internal consistency (Cronbach's α=0.82). It was also positively associated with gambling frequency, gambling harm, and SOGS score.

Griffiths and Nazari (2021) examined the psychometric properties of the Persian PGSI with 858 Iranian online bettors recruited through social media platforms. The findings indicated excellent internal consistency and reliability (Cronbach's α=0.90; composite reliability=0.91). It also confirmed the scale's unidimensional nature and the CFA showed a good fit to the data. The Persian PGSI score was also correlated with both depression and anxiety. So et al. (2019) validated the Japanese PGSI with 5,365 participants. The scale demonstrated very good internal consistency (Cronbach's α=0.89) and the unidimensional factor structure was confirmed. The PGSI scores also correlated with DSM-5 scores for gambling disorder.

Most recently, James et al. (2025) investigated problem gambling among a large sample of UK gamblers (n=42,422) from 2007 to 2023 using the PGSI. The findings confirmed the unidimensional factor structure, although there was some evidence for a two-factor model. The scale showed adequate internal consistency (Cronbach's α =0.92). Auer et al. (2024) examined the PGSI with 10,000 Croatian online gamblers alongside a newly developed instrument (i.e., the Online Problem Gambling Behavior Index [OPGBI]) in which all the items relate to actual gambling behavior as opposed to the consequences of it. The two scales were significantly correlated (r=0.68). The three factors of the OPGBI—gambling behavior, limit setting, and communication with the operator—all showed a

significant correlation with the PGSI score and explained approximately 52% of the variance (R^2= 51.8%). The scale showed excellent internal consistency (Cronbach's α = 0.91).

Over the past ten years, numerous psychometric instruments have been developed to assess different online problematic gambling behaviors. In Germany, Wejbera et al. (2017) evaluated the efficacy of the DSM-IV criteria-based Berlin Inventory of Gambling Behavior Screening (BIG-S) within a clinical group and modified it for DSM-5 criteria. A total of 432 patients participated and both exploratory factor analysis (EFA) and CFA demonstrated that it had a unidimensional factor structure. The scale showed adequate internal consistency (Cronbach's α =0.96).

Kalkan and Griffiths (2021) developed the Online Gambling Symptom Assessment Scale (OGSAS) and its psychometric characteristics were examined through EFA with 326 US university students. Findings indicated that the OGSAS was reliable. The scale showed good internal consistency (Cronbach's α=0.83) and is a valid instrument for assessing symptoms associated with online gambling disorder.

Stavropoulos et al. (2022) developed the Online Gambling Disorder Questionnaire (OGD-Q) with 968 Australian adults. Findings indicated that the OGD-Q effectively assessed problem gambling and that OGD-Q items had different discrimination abilities, and varied in reliability among individuals exhibiting different levels of disordered gambling behavior. The scale showed excellent internal consistency (Cronbach's α=.95).

Two scales regarding to addiction to online gambling and online gambling disorder were developed by Karaibrahimoğlu et al. (2021), and Unal et al. (2022). Karaibrahimoğlu et al. (2021), developed the Online Gambling Addiction Scale (OGAS) with 650 students. The internal consistency was excellent (Cronbach's α=0.920). EFA and CFA demonstrated a three-factor structure. Unal et al. (2022) developed the Turkish Online Gambling Disorder Questionnaire with 315 students. The internal consistency was excellent (Cronbach's alpha α=0.939). Factor analysis indicated that a single-dimensional structure made up of 11 items accounted for 62.82% of the overall variance in OGD-Q scores. Following principal component analysis, the factor loadings for the scale items varied between 0.601 and 0.871.

Gambling behavior and socio-demographic factors

Individuals with gambling disorder possess inadequate coping abilities and maintain false beliefs regarding gambling (Tabari et al., 2005). Multiple explanations and factors have been suggested and implicated in the development of gambling disorder, such as demographic factors. For instance, Wong et al. (2013) found that men were more inclined to take risks and exhibited lower levels of impulsive coping than women, and individuals who were more risk-taking and had reduced impulsive coping were more likely to participate in gambling. Risk-taking and social anxiety served as key mediators for gender disparities in gambling issues. Men exhibited

higher levels of risk-taking and social anxiety compared to women, and individuals who were more prone to taking risks and experiencing social anxiety generally faced more issues related to gambling.

Bacon et al. (2023) found that males were more likely than females to engage in gambling, and willing to wager considerably larger sums of money. Baggio et al. (2018) demonstrated that among females, problem gambling was associated with slot machines, while for males, it was associated with sports betting, poker, and casino games. Syvertsen et al. (2023) demonstrated that the relationship between age and theoretical loss was more pronounced for men than for women. Expenditure on gambling is associated with disordered gambling, and the results indicate that older adults and women are more vulnerable groups within the electronic gambling machines. Males prioritize financial gain, while females are more motivated by social influences and coping with challenges. Females may engage in gambling as a way to cope with daily challenges, such as financial pressures, marital disputes, or personal loneliness (Brown & Coventry, 1997; Holdsworth et al., 2012; Tang et al., 2007; Wong et al., 2013).

Lind et al. (2022) found that males were more likely than females to engage in online gambling. Estévez et al. (2023) found that females tended to enjoy gambling games that were time-consuming but did not focus on social interaction, such as scratch-cards, bingo, and slot machines. Merkouris et al. (2016) reported that among females, disordered gambling had a stronger association with psychological distress, unemployment, and childhood abuse than among males.

Research has shown that gambling, including both regular and problematic gambling, tends to increase during adolescence, peaks among individuals in their 20s and 30s, and then declines as they grow older (Welte et al., 2011). A British study found that moderate-risk/problem gambling was associated with regular cigarette smoking, elevated illicit drug use, and problematic alcohol consumption by the age of 24 years (Emond et al., 2022). Moreover, they found that a significant minority of young adults (primarily males) displayed problem gambling tendencies that seemed to be formed by the age of 20 years and was associated with other potentially addictive activities.

A meta-analysis by Tran et al. (2024) reported that globally, 46.2% of adults and 17.9% of adolescents had gambled in the past 12 months. Rates of gambling were higher among men (49.1%) than women (37.4%). Among adults, 8.7% were classified as engaging in any risk gambling, and 1.41% were engaging in problematic gambling. Among adults, rates of problematic gambling were greatest among online casino or slots gambling (15.8%). There were few data reported on any risk and problematic gambling among adolescent samples (Tran et al., 2024).

Younger males exhibit a greater inclination towards online gambling than older people and females (Gainsbury et al., 2015; Pallesen et al., 2021). Recent findings indicate that youth aged 18-35 years had a 1.51 times greater chance of problem gambling compared to the middle-aged

group, while older individuals were 0.80 times less likely to report problem gambling (Dellosa & Browne, 2024).

In addition, Allami et al. (2021) reported that the relationship between online gambling and problematic gambling is stronger than that of traditional gambling, which may help explain the higher rates of disordered gambling among young men. In a longitudinal study, Hollén et al. (2020) found that gambling rose among young males from 13% at age 17 years to 18% at age 20 years, and down to 17% at age 24 years. While the frequency of gambling rose from ages 17 to 20 years, there was minimal variation in gambling behaviors between ages 20 and 24 years, with the exception of online gambling and horse race betting. The most frequent types of gambling included playing scratch-cards, participating in the lottery, and wagering privately with friends. Online gambling activities saw a significant rise among individuals aged 17 to 24 years, particularly among males.

Lind et al. (2022) indicated that age was associated with online gambling. Their study emphasized that different motives for gambling were influenced by varying gender and age profiles. Positive emotions, social interactions, and escapism associated with gambling were more pronounced among younger participants, while support for meaningful causes was more significant among older gamblers. In another study, younger participants' aged 25-34 years exhibited increased positive feelings, socializing, and a desire to escape, while older individuals showed a greater inclination towards supporting noble causes. Women engaged in gambling for money more frequently than men. The escape motive was associated with problematic gambling (Hagfors et al., 2022)

Several studies have explored the relationship between gambling issues and educational attainment. For example, research by Nower et al. (2023) found that individuals with an associate or bachelor's degree were more inclined to report gambling activities in the past year than those without a degree. Individuals who had only completed elementary school were the least likely to gamble, followed by those with a partial high school education or a high school diploma or general educational development. Other research has shown that individuals with lower levels of education tend to gamble more than usual (Fluharty et al., 2022). Wahlström and Olsson (2023) indicated that subpar school performance was associated with gambling and risky gambling behaviors. Studies have shown that mandatory school performance is associated with both gambling involvement and spending on gambling in later youth. Latvala et al. (2022) showed that individuals with a grade point average that was only mediocre spent 25% more weekly on gambling and had a 30% higher relative gambling expenditure in 2016 compared to those who had an excellent grade point average in compulsory school. In comparison to individuals with an exceptional grade point average, those with a satisfactory to very good grade point average spent 13% more on gambling, with their relative gambling spending being 17% greater. Teenagers who achieved lower final

school grades were more prone to engage in weekly gambling in the future, and reduced final school grades were also associated with at-risk and problematic gambling among females (Latvala, et al., 2018).

Duran et al. (2024) showed that 4.8% of university students were potentially at-risk for gambling addiction. Male students scored significantly higher on the SOGS than female students. Watanapongvanich et al. (2021) found that there was a notable negative association between financial literacy and gambling frequency, whereas financial education did not exhibit any significant association with gambling frequency.

The present study

As aforementioned, many scales exist that assess gambling disorder and its variations. However, there has been a noticeable lack of instruments designed specifically to evaluate the effects of problematic online gambling based on actual gambling behavior, and few in the Persian context. Some existing problem gambling screens include elements that focus on actual gambling habits. These may involve factors such as how long an individual gambles, how often they gamble, and whether they tend to gamble late at night. However, most gambling screens include items that assess the consequences of problem gambling (e.g., relationship problems, compromised education and/or occupation, gambling to escape problems, etc.). Therefore, aim of the present study was to validate the newly developed Online Problem Gambling Behavior Index (OPGBI) (Auer et al., 2024) which is a scale that assesses actual online gambling behavior. The study used a non-clinical sample from Iran. This was crucial in establishing whether the OPGBI is an effective measure for understanding online gambling issues among this specific population. The study also examined the relationship between the OPGBI and PGSI, along with socio-demographic factors such as age, gender, and educational achievement. In the present study, the following research questions (RQs) were addressed: (i) What is the factorial structure of the OPGBI in the Iranian context? (RQ1); (ii) What is the internal consistency of the OPGBI in the Iranian context? (RQ2), and (iii) What associations exist between the OPGBI and PGSI and socio-demographic factors such as age, gender, and educational achievement? (RQ3).

METHODS

Participants, procedure, and ethics

The sample comprised 498 individuals who were recruited via snowball sampling from Zahedan City, Iran, and who completed an online survey hosted on the *Porsline* platform. The participants were requested to complete the OPGBI, PGSI, along with the socio-demographic questionnaire that included age, gender, and education level. On the platform, participants were asked to answer the questions thoughtfully, and they were guaranteed that their answers would remain private and be used solely for research purposes.

The average age of the participants was 29.56 years (SD=9.41), comprising 297 males (59.6%), 72 females (38.8%), and 8 individuals (1.6%) with an ambiguous gender status. The requirements for inclusion were having engaged in gambling within the past 12 months, possessing at least a high school education, being knowledgeable about using social networks and the internet, being an Iranian national, and having proficiency in the Persian language. The exclusion criteria included lacking gambling experience in the past 12 months, no educational qualifications, not being literate in using social networks and the internet, having a nationality other than Iranian, and not being able to speak Persian. All participants hailed from Zahedan, a city situated in the southeastern region of Iran. The first author's university ethics committees granted approval for the study.

Measures

Demographic and gambling variables

Participants were asked questions about their age in years, gender, and level of education.

Problem Gambling Severity Index (PGSI)

The nine-item PGSI (Ferris & Wynne, 2001) was used to assess problem gambling over the past 12 months. Items (e.g., *"Have you wagered more than you can truly afford to lose?"*) are rated as either 'Never' (0), 'Sometimes' (1), 'Most of the time' (2), or 'Almost always' (3), resulting in scores that range from 0 to 27. Individuals scoring 8 or more are classed as having a gambling problem. Cronbach's alpha was excellent (α=0.924). The PGSI was previously adapted and validated in the Persian language to align with Iranian culture by Griffiths and Nazari (2021).

Online Problem Gambling Behavior Index (OPGBI)

The 12-item OPGBI (Auer et al., 2024) was used to assess online problem gambling over the past month. The OPGBI includes three sub-scales: gambling behavior, communication, and limit-setting. Items (e.g., *"Do you re-gamble your online winnings straight after you have won?"*) are rated as either 'Never' (0), 'Sometimes' (1), 'Most of the time' (2), and 'Almost always' (3), resulting in scores that range from 0 to 36. Higher scores indicate greater risk of online problem gambling. In the present study, Cronbach's alpha was excellent (α=.953).

The OPGBI in English was translated into Persian (the Iranian language) by at two separate translators from the English department at the University of Sistan and Baluchestan in Zahedan, Iran, and whose native language was Persian. The translators were proficient in both English and Persian, and came from different backgrounds (one was from Zahedan while the other was from Karaj). The initial translator had expertise in psychological terminology and was familiar with the subject matter of the instrument in the Persian language. The second translator was well-versed in colloquial phrases, psychological slang and jargon, idiomatic

expressions, and emotionally charged terminology prevalent in the Persian language. The second translator lacked familiarity with psychological terminology and/or the framework of the OPGBI. This method produced two translated variations featuring terms and sentences that encompassed both the psychological aspects and the everyday spoken language along with its cultural subtleties. Finally, the two translators were requested to translate the OPGBI back into English.

RESULTS

Data were analyzed for the OPGBI factor structures, criterion-related validity, relationship between OPGBI and PGSI, and comparing age, gender, and education level using SPSS version 26 and Smart PLS version 4.1.0.1. To evaluate the factor structures of OPGBI, measurement models utilizing CFA with maximum likelihood estimation were applied.

Table 1. Percentage distribution of the responses to the PGSI and OPGBI items (N=498)

OPGBI	Item	Never,	Sometimes	Most of the Time	Almost Always
1	Do you reload your wallet during an online gambling session?	59	29.9	8	3
2	Do you increase your stakes after losing in an online gambling session?	59.6	22.7	13.9	3.8
3	Do you increase your stakes the following day after you have lost in an online gambling session?	58.4	21.5	15.1	5
4	Do you gamble online for longer than 4 hours a day?	60.8	19.3	12.4	7
5	Do you gamble online with a variety of different stakes?	60.6	16.7	18.5	4.2
6	Do you play more than five types of online gambling games in a month?	60.6	21.9	12.9	4.6
7	Do you re-gamble your online winnings straight after you have won?	61	21.3	12.9	4.8
8	Do you use different debit or credit cards to load up your wallet during an online gambling session?	62	21.7	12.9	3.4
9	Do you act aggressively in online gambling chat rooms?	59.2	14.9	16.1	9.8
10	Do you contact customer services to complain about your online gambling losses?	74.1	16.5	7.2	2.2
11	Do you hit your (or the website's) money spending limits (if you have any)?	60.8	21.5	12.9	4.8
12	Do you hit your (or the website's) time spending limits (if you have any)?	62.7	19.1	12.7	5.6

PGSI					
1	Have you bet more than you could really afford to lose?	61.2	20.3	14.9	3.6
2	Have you needed to gamble with larger amounts of money to get the same excitement?	59.4	16.9	13.5	10.2
3	Have you gone back to try to win to back the money you'd lost?	60.4	19.1	13.9	6.6
4	Have you borrowed money or sold anything to get money to gamble?	59.6	15.5	17.5	7.4
5	Have you felt that you might have a problem with gambling?	54.6	17.5	13.7	14.3
6	Have you felt that gambling has caused you any health problems, including stress or anxiety?	59.6	13.7	15.1	11.6
7	Have people criticized your betting, or told you that you have a gambling problem, whether or not you thought it is true?	61	17.7	12	9.3
8	Have you felt your gambling has caused financial problems for you or your household?	58.6	17.5	11.4	12.4
9	Have you felt guilty about the way you gamble or what happens when you gamble?	60.4	15.7	11.8	12

Table 1 shows the percentage distribution of the responses to the OPGBI and PGSI items. In Table 1, there are 12 items concerning gambling behavior on the OPGBI (e.g., *"Do you re-gamble your online winnings straight after you have won?"*) and nine items are related to problem gambling severity on the PGSI (e.g., *"Have you gone back to try to win to back the money you'd lost?"*). The results indicated excellent Cronbach's alphas for both the OBGBI (α=.953) and PGSI (α=.924). Descriptive analysis included calculating averages, percentages, and correlations of demographic details along with responses to the 12 OPGBI items and nine PGSI items.

The three-factor model was examined (see Table 2). The fit indices utilized in the analysis included: comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), Akaike information criterion (AIC), and Bayesian information criterion (BIC). The chi-square test was additionally applied to evaluate the models' goodness of fit. The chi-squared model evaluates the overall fit and the difference between the sample and the estimated covariance matrices. Its *p*-value must be > .05 (meaning the assumption of an ideal fit cannot be dismissed). However, it is responsive to sample size. Typically, a strong model fit is considered to

be between .95 and 1.00, while an acceptable fit is from .90 to .95 for both the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) (Hu & Bentler, 1998, 1999; Lance & Vandenberg, 2001; Shinaprayoon et al., 2018). For the Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR), an excellent fit ranges from 0.00 to 0.08, whereas a satisfactory fit falls between 0.08 and 0.10 (Browne & Cudeck, 1992; Hu & Bentler, 1999; Kline, 2016; MacCallum et al., 1996; Shinaprayoon et al., 2018). A reduced Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) suggest a superior fit and a more straightforward model (Kline, 2016; Raftery, 1995; Shinaprayoon et al., 2018). The adjusted goodness of fit (AGFI) represents the proportion of variance explained by the estimated covariance of the population. Similar to R^2, the GFI and AGFI values ought to exceed .95 and .90, respectively (Byrne, 1994). In the present study, a satisfactory fit was .96 for CFI and .95 for TLI. The RMSEA was found to be 0.088, which is acceptable, while the SRMR was 0.027, which is not satisfactory. The AIC value was 247.69, while the BIC was 352.95. The values for GFI and AGFI were .93 and .89, respectively.

Table 2. Fit indices of measurement models for OPGBI

AGFI	AIC	BIC	CFI	χ^2	χ^2/df	Df	GFI	NFI	Sig.	RMSEA	SRMR	TLI
.89	247.69	352.95	.96	197.69	4.82	41	.93	.94	.0001	.088	.027	.95

Note. RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index; CFI = comparative fit index; SRMR = standardized root mean square residual; AIC = Akaike information criterion; BIC = Bayesian information criterion; GFI= Goodness of fit index; AGFI= Adjusted goodness of fit index; NFI= Normed fit index

As shown in Table 3, each factor demonstrated a satisfactory value above .40, and all three subscale factors (gambling behavior, communication, and limit-setting) within the OPGBI were suitable.

Table 3. Structural equation modeling of OPGBI

OPGBI		Item	Factor loading
1	GB	Do you reload your wallet during an online gambling session?	.731
2	GB	Do you increase your stakes after losing in an online gambling session?	.829
3	GB	Do you increase your stakes the following day after you have lost in an online gambling session?	.840
4	GB	Do you gamble online for longer than 4 hours a day?	.810
5	GB	Do you gamble online with a variety of different stakes?	.867
6	GB	Do you play more than five types of online gambling games in a month?	.808
7	GB	Do you re-gamble your online winnings straight after you have won?	.807
9	C	Do you act aggressively in online gambling chat rooms?	.836
10	C	Do you contact customer services to complain about your online gambling losses?	.537
11	LS	Do you hit your (or the website's) money spending limits (if you have any)?	.879
12	LS	Do you hit your (or the website's) time spending limits (if you have any)?	.829

***Note:** GB= Gambling Behavior; C= Communication; LS= Limit-Setting.

The correlations between the three sub-scale factors (see Table 4) varied from r=.916 to r=.988, and PGSI score was significantly correlated with the three sub-scale factors of the OPGBI: gambling behavior (r=.824, p<.01), communication (r=.764, p<.01), and limit-setting (r=.785, p<.01). There was a high significant correlation between scores on the OPGBI and PGSI (r=.846, p<.01).

Table 4. Factor correlations of the three-factor model of OPGBI and PGSI

Variable	1	2	3	4	5
1. Gambling behavior	1				
2. Limit-setting	.813**	1			
3.Communication	.865**	.763**	1		
4. OPGBI	.981**	.883**	.916**	1	
5.PGSI	.824**	.764**	.785**	.846**	1

Discriminant validity

To assess the goodness-of-fit of the data to the model (see Table 5 and Figure 1), standard criteria were employed. Typically, values ranging from 0.70 to 0.95 for Cronbach alpha and composite reliability are commonly accepted (Aburumman et al., 2023). In the present study, the three constructs obtained values that ranged from 0.62 to 0.93 for the Cronbach alpha and the internal consistency for the whole OPGBI was equal to .946. Additionally, all three constructs attained values between 0.70 and 0.93 for CR and the CR for the whole OPGBI was equal to .95. The McDonald's omega (Ω) for gambling behavior and whole scale was .934 and .955, respectively. Consequently, the scale exhibited good internal consistency reliability.

Conversely, Average Variance Extracted (AVE) values exceeding 0.5 are generally recognized as acceptable (Chin & Yao, 2014). In the present study, each indicator possessed a loading exceeding 0.5, except the communication factor which was .49. Meanwhile, all constructs achieved values above 0.5 for the AVE, indicating adequate convergent validity. Typically, values below 0.85 for the Heterotrait-Monotrait Ratio of Correlations (HTMT) criterion are broadly accepted values (Henseler et al., 2015). In the present study, the HTMT value for overall OPGBI was .79 which was an acceptable value. The construct of gambling behavior, limit-setting, and communication attained values higher than .85, and they were between 0.92 and 0.1.008 for discriminative validity according to the HTMT standard.

Table 5. Cronbach's alpha, omega, Composite reliability (CR), AVE, HTMT and Fornell-Larcker Criterion (FLC)

Variable	alpha	CR	AVE	omega	1	2	3
Factor 1: Gambling behavior	.93	.93	.66	.934	- (.70)	-	-
Factor 2: Limit-setting	.84	.84	.73	-	1.008 (.99)	- (.81)	-
Factor 3: Communication	.62	.70	.49	-	.98 (.94)	.92 (.92)	- (.85)
OPGBI	.946	.95	.624	.955	- (.79)	-	-

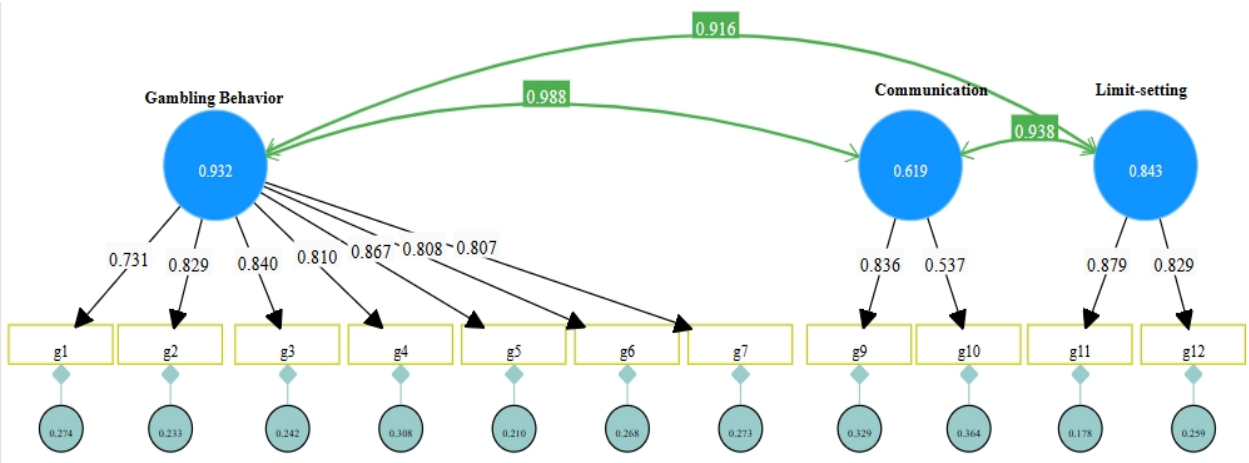

Figure 1. CFA for OPGBI factors

The findings in Table 6 indicate that the three OPGBI factors—gambling behavior, limit-setting, and communication—accounted for 71.9% of the variance in PGSI scores. Each of the three OPGBI factors—gambling behavior (Beta=.433, *p*=.0001), limit-setting (Beta=.240, *p*=.0001), and communication (Beta=.226, *p*=.0001)—showed a significant positive relationship and significantly predicted the PGSI scores.

Table 6. Regression of OPGBI factors on PGSI

Factor	Std. Error	Beta	*t*	Sig.
(Constant)	.228		6.376	.0001
Gambling behavior	.075	.433	8.021	.0001
Limit-setting	.184	.240	5.724	.0001
Communication	.201	.226	4.633	.0001
R^2=.719, ΔR^2=.717, F=419.088				

The results in Table 7 show that there was a statistically significant difference in OPGBI factors based on gender: F(4, 483) = 14.39, p<.0001; Wilk's Λ = 0.894, partial η^2 = .106. Gender had a statistically significant effect on gambling behavior (F= 53.99; p<.0001; partial η^2=.100), limit-setting (F=40.81; p<.0001; partial η^2=.077), communication (F=50.13; p<.0001; partial η^2=.094), OPGBI scores (F=54.94; p<.0001; partial η^2=.102), and PGSI scores (F=46.90; p<.0001; partial η^2=.088). According to Table 7, males had significantly higher mean scores across all three factors of OPGBI and PGSI scores when compared to females.

There was a significant difference in gambling behavior at least between two groups of education level on gambling behavior: F(3.486)=4.383, p=.005, limit-setting F(3.488)=4.906, p=.002, communication F(3.488)=4.559, P=.004, OPGBI scores F(3.488)=5.13, P=.002), and PGSI F(3.488)=4.956, p=.002. The results of the Tamhane post hoc test indicated that individuals with PhD degrees exhibited notably higher scores on: (i) gambling and (ii) limit-setting (M=2.12, SD=1.84) compared to those with diplomas or lower degrees (M=1.00, SD=1.63), (iii) communication (M=2.03, SD=1.55) compared to those with diplomas or lower degrees (M=1.11, SD=1.65), and (iv) PGSI (M=9.71, SD=6.17) compared to those with diplomas or lower degrees (M=5.45, SD=7.25). Morover, the results of the Tamhane post hoc test indicated that individuals with PhD degrees exhibited notably higher scores on the OPGBI (M=11.68, SD=1.26) compared to those with diplomas or lower degrees (M=6.02, SD=8.16) and those with BA/BSc degrees (M=7.56, SD=8.85). No significant differences were observed among the other groups regarding gambling behavior, limit-setting, communication, and PGSI scores.

Table 7. F-test on OPGBI factors and PGSI with regard to socio-demographic factors

Variable	Category	Groups	Mean	SD	Test	Sig.	η^2
Gambling behavior	Age	Below 20 years	3.49	4.76	.91[a]	.43	.006
		20-30 years	4.53	5.45			
		31-40 years	4.65	5.15			
		41 years and above	4.38	5.01			
	Gender	Male	5.73	5.52	53.99[b]	.0001	.10
		Female	2.36	3.91			
	Education	Diploma and below	9.37	4.53	4.38[a]	.005	.03
		BA/BSc	3.55	4.77			
		MA/MSc	4.66	5.53			
		Ph.D.	5.16	5.47			
Limit-setting	Age	Below 20 years	1.20	1.85	.231[a]	.87	.001
		20-30 years	1.21	1.62			
		31-40 years	1.17	1.55			
		41 years and above	1.36	1.77			

	Gender	Male	1.60	1.76	40.81[b]	.0001	.077
		Female	.65	1.32			
	Education	Diploma and below	1.00	1.63	4.91[a]	.002	.03
		BA/BSc	1.25	1.58			
		MA/MSc	1.48	1.86			
		Ph.D.	2.12	1.84			
Communication	Age	Below 20 years	1.14	1.60	.50[a]	.68	.003
		20-30 years	1.35	1.81			
		31-40 years	1.45	1.79			
		41 years and above	1.36	1.78			
	Gender	Male	1.78	1.89	50.13[b]	.0001	.094
		Female	.68	1.29			
	Education	Diploma and below	1.11	1.65	4.56[a]	.004	.03
		BA/BSc	1.34	1.77			
		MA/MSc	1.91	2.12			
		Ph.D.	2.03	1.55			
OPGBI	Age	Below 20 years	6.28	8.30	.47[a]	.70	.003
		20-30 years	7.41	.59			
		31-40 years	7.67	8.44			
		41 years and above	7.54	8.71			
	Gender	Male	9.56	9.05	54.94[b]	.0001	.102
		Female	3.95	6.58			
	Education	Diploma and below	6.02	8.16	5.13[a]	.002	.031
		BA/BSc	7.56	8.85			
		MA/MSc	8.98	9.20			
		Ph.D.	11.68	1.26			
PGSI	Age	Below 20 years	5.22	6.83	1.55[a]	.20	.009
		20-30 years	6.79	7.18			
		31-40 years	7.41	7.83			
		41 years and above	5.22	6.83			
	Gender	Male	8.39	7.56	46.90[b]	.0001	.088
		Female	3.98	5.92			
	Education	Diploma and below	5.45	7.25	4.96[a]	.002	.03
		BA/BSc	6.92	7.22			
		MA/MSc	8.48	7.45			
		Ph.D.	9.71	6.17			

[a]= F(one way ANOVA), [b]= F(one way MANOVA), *p<.01, Tamhane post hoc test

DISCUSSION

The present study validated the Persian version of a new online problem gambling screening instrument, the OPGBI (Auer et al., 2024), and the evaluated its psychometric properties. Auer et al. (2024) utilized EFA to determine its validity, and their study showed that the 12-item scale had three latent factors. The initial factor included eight of the items and concerned gambling behavior, the second factor contained two items that concerned limit-setting, and the third factor contained two items that concerned communication with operators. In the present study, CFA was used to evaluate the validity and reliability of the scale. The 12 items had a satisfactory value above .40, and each construct in the three OPGBI factors was suitable.

The OPGBI scores demonstrated a strong correlation with the PGSI scores (r=0.846). The relationship between the three factors varied from r= .916 to r= .988, with the PGSI score indicating a strong correlation with the three OPGBI factors, specifically gambling behavior (r=.824), communication (r=.764), and limit-setting (r=.785). The regression analysis showed that these three OPGBI factors represented 71.9% of the variation in PGSI scores. The results of the present study closely correspond with those from Auer et al.'s (2024) original validation study. A notable significant correlation was found between OPGBI and PGSI in the original validation study (r=.68, p<.01), with three OPGBI factors explaining 51.8% of the variance in PGSI and positively predicting PGSI scores.

The correlation coefficients for OPGBI and PGSI in the present study were greater (r= .846) than those found in the original validation study by Auer et al. (2024) (r=.68, p<.01). The three factors of the OPGBI (gambling behavior, communication, and limit-setting) explained 71.9% of the variance in PGSI, a figure that surpasses the original validation research conducted by Auer et al. (2024), where these three OPGBI factors accounted for 51.8% of the variance in PGSI. The Cronbach's alphas for both PGSI and OPGBI in the present study were .924 and .953, respectively, indicating excellent internal consistency for each screening instrument. The internal consistency in the present study surpassed that of Auer et al.'s (2024) original validation study, which reported Cronbach alpha values of .91 and .82 for PGSI and OPGBI, respectively.

The results of CFA showed that inter-correlations existed among the three factors of the OPGBI. The findings of the present study indicated a good fit, with .96 for CFI and .95 for TLI. The RMSEA was 0.088, which was deemed acceptable. In the present study, the three constructs had values between 0.62 and 0.93 for Cronbach's alpha. Moreover, all constructs had values ranging from 0.70 to 0.93 for composite reliability, indicating that the convergent validity is satisfactory. The findings of the present study also indicated that the three dimensions of communication, gambling behavior, and limit-setting displayed significant associations between each other. This suggests that the CFA demonstrated adequate validity for Iranian online

gamblers, and the instrument is a valid and reliable measure for online gamblers within an Iranian cultural context.

In the original study by Auer et al. (2024), the three-factor solution's goodness of fit statistics were: RMSEA: 0.077 (0.074–0.08); TLI: 0.891; χ^2: 1,985 (p<0.001, df=33), while in the present study the three-factor solution's goodness of fit statistics were: RMSEA: 0.088; TLI: 0.95; χ^2: 197.69 (p<0.0001, df = 41). The validity indices of the present study were greater than the original validation study.

The research findings showed clear and statistically significant differences in OPGBI factors regarding gender. Male gamblers exhibited higher average scores across all three OPGBI factors and the PGSI compared to female gamblers. This observation aligns with previous studies (e.g., Bacon et al., 2023; Lind et al., 2022; Wong et al., 2013). Evidence supports these gender-based disparities in OPGBI and PGSI scores. For instance, males tend to prioritize monetary gains when engaging in gambling activities. In contrast, women often find motivation in social factors, as well as in coping with various challenges. Females may participate in gambling as a way to manage daily stressors, such as financial problems, conflicts in relationships, or feelings of loneliness. These results are supported by earlier research (e.g., Brown & Coventry, 1997), Holdsworth et al., 2012; Tang et al., 2007; Wong et al., 2013). Additionally, Lind et al. (2022) noted that males were more prone than females to participate in online gambling.

The results of the present study indicated that there was no notable difference in the scores associated with the OPGBI factors (gambling behavior, communication, and limit-setting) and the PGSI scores across various age groups. This result is in contrast to earlier studies in the area. Emond et al. (2022) found that a significant minority of young adults (predominantly males) showed problem gambling behaviors that seemed to emerge by the age of 20 years and were associated with other potentially addictive behaviors. In the worldwide meta-analysis by Tran et al. (2024), 46.2% of adults engaged in gambling over the past year. Among adults, 8.7% were identified as participating in any form of risky gambling, while 1.41% were involved in problematic gambling. The prevalence of problematic gambling was highest among adults who engaged in online casino or slots gambling (15.8%).

Gainsbury et al. (2015) and Pallesen et al. (2021) highlighted that younger males are more inclined to engage in online gambling than their older and female counterparts. A recent study by Dellosa and Browne (2024) found that young people have a 1.51 times greater chance of reporting issues with gambling when compared to middle-aged individuals. In contrast, older adults were found to be 0.80 times less likely to report similar problems. Lind et al. (2022) highlighted an association between age and behaviors related to online gambling. Their research indicated that different age demographics possess distinct reasons for gambling. Young individuals frequently perceive gambling as a source of positive feelings,

social connections, and an escape from reality. Conversely, older individuals tend to associate gambling more with supporting meaningful causes, as highlighted by Hagfors et al. (2022). The stark differences between the present study's results and prior findings may be attributed to the unique cultural context of Iran. In Iran, gambling is restricted due to Islamic beliefs and traditional customs, which heavily influence individuals' attitudes and behaviors towards gambling. This cultural backdrop likely impacts the prevalence and nature of gambling within the country compared to other regions where gambling is more accepted.

The present study showed a clear distinction in gambling behavior, limit-setting, and communication based on educational attainment. Individuals with PhD degrees showed significantly higher gambling behavior compared to those with diplomas or lower educational qualifications and participants who had BA/BSc education level. They also scored higher in limit-setting than diploma holders and individuals with lower education levels. Participants with PhD degrees had a higher mean score on the communication factor in comparison to participants who had either diplomas or less education. Additionally, when comparing scores on the PGSI, individuals with PhD degrees again had higher scores than those with diplomas and lower educational credentials. However, no significant differences were found among the other groups, suggesting no significant differences in gambling behavior, limit-setting, communication, and PGSI outcomes.

These findings contradict previous research, which indicated that individuals with lower educational qualifications tend to gamble more. For instance, a study by Nower et al. (2023) found that individuals with an associate or bachelor's degree were more likely to participate in gambling activities over the past year. Those who only completed elementary school were the least likely to gamble, with individuals holding partial high school qualifications or a high school diploma following closely behind. Fluharty et al. (2022) further illustrated that individuals with lower levels of education tended to engage in more frequent gambling. Wahlström and Olsson (2023) reported a positive relationship between poor academic performance and both gambling and risky gambling behaviors. Research by Latvala et al. (2022) suggested that individuals with an average grade point average spent 25% more money per week on gambling and had a 30% higher relative gambling expenditure in 2016 compared to those with an outstanding grade point average in compulsory school. Compared to individuals with an exceptional grade point average, those with a satisfactory to very good grade point average spent 13% more money on gambling, and their relative gambling expenditures were 17% higher.

Limitations

The present study has limitations concerning the snowball sampling method, which involves non-random selection processes, relationships between network size and selection likelihood, and dependence on the

subjective assessments of participants. The present study's sample included 498 gamblers from Zahedan city, Iran, which may be too small for factor analysis, therefore generalizing the results of the study to Iranian society more generally should be interpreted with caution. The present study also utilized self-reporting, and the dependence on self-reports for assessing both the dependent and independent variables raises questions regarding the validity of causal inferences due to various factors, such as systematic response biases, method variance, and mono-method bias.

Conclusion

The present study's findings show that the OPGBI is both reliable and valid for assessing problem online gambling behavior among Iranian gamblers. It also demonstrated a high correlation with the PGSI which can be used for similar assessments. In fact, three key factors from the OPGBI (gambling behavior, communication levels, and the ability to set limits) were found to significantly predict PGSI scores. Additionally, the results showed that gender and education were significantly associated with these three OPGBI factors and were also associated with scores on the PGSI. Males and those with higher education levels showed stronger connections to gambling behaviors and better communication and limit-setting skills. However, age did not appear to be an important factor in relation to OPGBI and PGSI scores among Iranian individuals. This suggests that while male gamblers and those with better education are more affected by these factors, age does not significantly impact gambling behavior in this cultural context.

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Availability of data and material

The dataset generated during the study is available from the first author upon reasonable request.

Statement of Competing Interests

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Author contributions

All authors contributed equally to this work and approved the final version of the manuscript for submission

Ethics Approval

Ethical approval was provided by the ethics committees of the University of Sistan and Baluchestan, Zahedan, Iran.

Research Promotion

This study validated the Persian version of the Online Problem Gaming Behavior Index (OPGBI), providing a culturally relevant and psychometrically robust tool for assessing online gambling behaviors among Iranian adults. By demonstrating strong reliability and validity, and by examining its associations with gambling severity and socio-demographic factors, the research advances screening capabilities and supports the development of targeted prevention and intervention strategies. These findings contribute valuable insights to the global understanding of problem gambling behaviors and promote evidence-based practices within culturally diverse populations.

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