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Association of Borderline Personality Traits and Impulsivity with Problem Gambling Severity in Gambling Disorder

Kumar Oynama Bozukluğunda Borderline Kişilik Özellikleri ve Dürtüselliğin Problemli Kumar Oynama Şiddetiyle İlişkisi

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ABSTRACT

Objective: This study aimed to examine the associations of borderline personality traits and impulsivity with problem gambling severity in patients with gambling disorder and their relative contributions when considered together.

Method: This retrospective, cross-sectional study included 60 patients aged 18–65 with gambling disorder evaluated at psychiatry outpatient clinic. Records included sociodemographic data, the Problem Gambling Severity Index, Barratt Impulsiveness Scale-11 Short Form, and Turkish Screening Instrument for Borderline Personality Disorder.

Results: Mean age was 35.72 ± 9.24 years; 98.3% were men. Gambling severity correlated positively with total impulsivity, motor impulsivity, and borderline traits. Impulsivity explained 13.4% of the variance. Adding borderline traits increased explained variance by 12.5 percentage points to 25.9%. In the final model, borderline traits remained significantly associated with severity (β=0.429), whereas impulsivity did not (β=0.123).

Conclusion: Borderline personality traits were associated with problem gambling severity after accounting for impulsivity, supporting their consideration in clinical assessment.

Keywords: Borderline personality traits, gambling disorder, impulsivity

ÖZ

Amaç: Çalışmanın amacı kumar oynama bozukluğu olan hastalarda borderline kişilik özellikleri ve dürtüselliğin problemli kumar oynama şiddetiyle ilişkilerini ve birlikte değerlendirildiklerinde göreli katkılarını incelemektir.

Yöntem: Bu retrospektif, kesitsel çalışmaya psikiyatri polikliniğinde değerlendirilen, kumar oynama bozukluğu tanılı, 18–65 yaşlarında 60 hasta alındı. Veriler sosyodemografik veri formu, Problemli Kumar Oynama Şiddet Endeksi, Barratt Dürtüsellik Ölçeği-11 Kısa Formu ve Borderline Kişilik Bozukluğu Tarama Aracı Türkçe Formu kayıtlarından elde edildi.

Bulgular: Yaş ortalaması 35,72 ± 9,24 yıl olup katılımcıların %98,3'ü erkekti. Problemli kumar oynama şiddeti; toplam dürtüsellik, motor dürtüsellikve borderline kişilik özellikleriyle pozitif ilişkiliydi. Dürtüsellik, modelde varyansın %13,4'ünü açıkladı. Borderline kişilik özelliklerinin eklenmesiyle açıklanan varyans 12,5 yüzde puan artarak %25,9'a yükseldi. Son modelde borderline kişilik özelliklerinin ilişkisi anlamlı kalırken (β=0,429), dürtüselliğin ilişkisi anlamlı değildi (β=0,123).

Sonuç: Borderline kişilik özellikleri, dürtüsellik hesaba katıldığında da problemli kumar oynama şiddetiyle ilişkili bulundu. Bulgular, klinik değerlendirmede dürtüselliğin yanı sıra borderline kişilik özelliklerinin de dikkate alınmasını desteklemektedir.

Anahtar sözcükler: Borderline kişilik özellikleri, dürtüsellik, kumar oynama bozukluğu

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Introduction

Gambling disorder is a behavioral addiction characterized by persistent and recurrent maladaptive gambling that results in clinically significant impairment or distress across personal, social, and occupational functioning (APA 2013). This condition is associated with a spectrum of severe adverse outcomes, including comorbid mental health conditions, interpersonal conflicts, profound financial difficulties (e.g., bankruptcy), legal complications, suicidal behavior, and criminal activity (Black et al. 2017, Bowden-Jones et al. 2022). Although a recent systematic review estimated the prevalence of problematic gambling among adults at 1.41%, lower-risk and other at-risk gambling patterns affect a substantially larger proportion of the population (Tran et al. 2024).

Gambling disorder is a biopsychosocial condition arising from the complex interactions among genetic vulnerability, psychological traits, social environment, and the structural features of gambling activities (Griffiths and Calado 2022). Hence, gambling behavior must be examined beyond environmental accessibility and financial motivation to encompass not only individual traits that govern behavioral control but also the evaluation of short- and long-term consequences. Among these traits, impulsivity is an extensively investigated construct in the gambling disorder literature (Grant et al. 2016).

Impulsivity is generally defined as a multidimensional construct that encompasses the tendencies to respond rapidly without adequately considering the potential consequences of one's behavior, prefer immediate over delayed rewards, and experience difficulty controlling one's impulses (Mitchell and Potenza 2014). Impulsivity—rather than being restricted to a single diagnostic category—is a transdiagnostic construct observed across various psychiatric disorders, including anxiety disorders, substance use disorders, behavioral addictions, mood disorders, and several personality disorders (Hook et al. 2021). In gambling disorder, impulsivity has been consistently implicated across multiple cognitive domains and associated with the clinical expression of gambling-related problems (Ioannidis et al. 2019). Therefore, impulsivity represents a key clinical construct for understanding why gambling behavior persists despite widespread awareness regarding its negative consequences.

Furthermore, personality-related characteristics—including impulsivity, emotional dysregulation, and interpersonal difficulties—have been implicated in problematic gambling behavior (Di Trani et al. 2017, Rogier et al. 2020, Ioniță et al. 2026). A recent systematic review examined personality disorder comorbidity by synthesizing data from eight studies comprising 4,607 adults diagnosed with gambling disorder (Ioniță et al. 2026); the review revealed a high prevalence of personality pathology, with antisocial and borderline personality disorders emerging as the most consistently reported comorbidities. These findings highlight the clinical and research value of jointly evaluating personality traits and problematic gambling behavior.

Borderline personality disorder is characterized by pervasive instability in affect, interpersonal relationships, and self-image, alongside marked impulsivity (APA 2013). Additionally, this clinical presentation is characterized by marked anger, persistent feelings of emptiness, pronounced fear of abandonment, suicidal or self-harming behaviors, and brief episodes of stress-related paranoid thinking or dissociative symptoms (Leichsenring et al. 2023). Recently, emphasis has been increasingly placed on conceptualizing mental disorders as dimensional rather than strictly categorical constructs. This dimensional perspective is particularly relevant to personality disorder assessment, suggesting that borderline personality traits may exist along a continuum of severity within the general population, rather than exclusively among those satisfying full diagnostic criteria. Consistent with this framework, a population-based study reported that approximately one-third of participants exhibited at least one symptom of borderline personality disorder (Ten Have et al. 2016).

Although the roles of impulsivity and personality pathology in gambling disorder have been investigated, the extent to which borderline personality traits contribute to problem gambling severity beyond general impulsivity remains insufficiently understood. Considering the prominence of impulsivity in borderline personality pathology, examining these constructs concurrently may clarify whether their associations with gambling severity reflect shared variance or whether borderline traits provide additional explanatory

information. The present study addresses this question by conducting a dimensional assessment of both constructs in a clinical sample of patients with gambling disorder. This study's contribution lies in assessing the incremental association of borderline personality traits with gambling severity after accounting for overall impulsivity, thereby informing a more nuanced understanding of personality-related variation in the clinical presentation of gambling disorder. Accordingly, we examined the associations of impulsivity and borderline personality traits with problem gambling severity, as well as their relative contributions, using hierarchical multiple linear regression. We hypothesized that both constructs are positively associated with problem gambling severity and that borderline personality traits explain additional variance beyond overall impulsivity.

Method

Sample

This retrospective study comprised patients who had been evaluated and followed up with at the specialized Behavioral Addictions Outpatient Clinic of the Psychiatry Department of Kartal Dr Lütfi Kırdar City Hospital from January 1 to May 1, 2026. All patients underwent comprehensive clinical psychiatric interviews conducted by psychiatrists, including detailed psychiatric history-taking and an assessment of gambling-related symptoms. The evaluating psychiatrists established the diagnoses of gambling disorder following the diagnostic criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5).

The inclusion criteria were as follows: aged 18–65 years and a diagnosis of gambling disorder according to the DSM-5 diagnostic criteria. The exclusion criteria were as follows: a current comorbid psychiatric disorder other than gambling disorder, a history of psychotic disorder or bipolar disorder, intellectual disability, neurodegenerative disease, and an alcohol or substance use disorder within the preceding six months. Eligibility was determined based on clinical psychiatric evaluations and available medical records.

Procedure

Written informed consent for the use of clinical data solely for research purposes was obtained from all patients during their clinical follow-up. Subsequently, ethical approval for the retrospective review and analysis of these data was obtained from the Scientific Research Ethics Committee of Kartal Dr Lütfi Kırdar City Hospital on June 30, 2026 (decision no. 2026/010.99/29/33). Following ethics committee approval, the clinical records were retrospectively reviewed. The relevant data were anonymized before being transferred to the research dataset.

Following ethics committee approval, the clinical records of patients with a diagnosis of gambling disorder according to DSM-5 diagnostic criteria who had been evaluated or followed up with from January 1 to May 1, 2026, were retrospectively reviewed. Data derived from patients with complete and valid scale and form records were anonymized and transferred to the research dataset. No additional patient interviews were conducted. Further, no new scales or assessments were administered, and no treatment-related intervention was performed.

As part of the routine clinical assessment protocol of the Behavioral Addictions Outpatient Clinic, the Problem Gambling Severity Index (PGSI), the Barratt Impulsiveness Scale-11 Short Form (BIS-11-SF), and the Turkish version of the Screening Instrument for Borderline Personality Disorder (SI-Bord) were systematically administered to all patients with gambling disorder. Clinical records—based on standardized routine assessments conducted by psychiatrists—were systematically documented in the hospital electronic medical record system. During the study period, 72 patients diagnosed with gambling disorder were screened for eligibility. Eight patients—three with bipolar disorder, four with major depressive disorder, and one with attention-deficit/hyperactivity disorder—were excluded owing to comorbid psychiatric disorders. Of the remaining 64 eligible patients, four were excluded because of incomplete or invalid data on the sociodemographic data form, the PGSI, BIS-11-SF, or SI-Bord. No a priori

power analysis was performed owing to the retrospective design; accordingly, the final analytic sample comprised all 60 patients who satisfied the eligibility criteria and had complete and valid data during the predefined study period.

Measures

Sociodemographic Data Form

The form—developed by the researchers in accordance with this study's objectives—collected information regarding participants' basic sociodemographic characteristics and psychiatric history, as well as age at gambling initiation, gambling duration and frequency, types of gambling activities, indebtedness, family history of gambling, and gambling-related legal problems.

Problem Gambling Severity Index (PGSI)

The Turkish version of the nine-item PGSI, developed by Ferris and Wynne (2001), was employed to assess problem gambling severity. This self-report instrument captures gambling behavior and gambling-related problems experienced during the preceding 12 months. Items are rated from 0 ("never") to 3 ("almost always"), yielding a total score of 0–27. Higher scores indicate greater problem gambling severity. Established categories comprise non-problem gambling (0), low-risk gambling (1–2), moderate-risk gambling (3–7), and problem gambling (8–27).

The original instrument demonstrated internal consistency, with a Cronbach's alpha coefficient of .84, and adequate test–retest reliability (Ferris and Wynne 2001). The Turkish adaptation supported a single-factor structure and exhibited high internal consistency (Cronbach's α = .96) and adequate two-week test–retest reliability (Altıntaş et al. 2022). In the present study, PGSI scores were analyzed as a continuous measure of gambling-related problem severity rather than utilized to establish gambling disorder status.

Barratt Impulsiveness Scale-11 Short Form (BIS-11-SF)

The Turkish short form of the Barratt Impulsiveness Scale-11 was employed to assess impulsivity. While the original 30-item instrument was developed by Patton et al. (1995), a short form was designed by Spinella (2007). Tamam et al. (2013) developed the Turkish short form. This scale assesses non-planning, motor, and attentional impulsivity. Items are rated on a four-point Likert scale ranging from "rarely/never" to "almost always/always," yielding a total score of 15–60. Higher scores indicate greater impulsivity. Spinella (2007) reported a three-factor structure and total-score Cronbach's alpha coefficients of .81 and .79 across two samples. The Turkish validation study reported Cronbach's alpha coefficients of .82 for the total score and .80, .70, and .64 for the non-planning, motor, and attentional impulsivity subscales, respectively (Tamam et al. 2013).

Screening Instrument for Borderline Personality Disorder (SI-Bord)

The Turkish version of the SI-Bord was employed to assess borderline personality traits. Developed by Lohanan et al. (2020) based on the Short-Bord, this five-item self-report instrument assesses efforts to avoid abandonment, unstable interpersonal relationships, identity disturbance, suicidal or self-harming behavior, and affective instability. Thus, it covers a subset of DSM-5 borderline personality features and does not directly assess the impulsivity criterion. Items are scored from 0 ("never") to 3 ("very often"), yielding a total score of 0–15. Higher scores indicate more prominent borderline personality traits.

The original validation study supported a single-factor structure, reported a Cronbach's alpha coefficient of .76, and demonstrated criterion validity against SCID-II diagnoses, with an area under the receiver operating characteristic curve of .83 (Lohanan et al. 2020). The Turkish validation study reported a Cronbach's alpha coefficient of .74 and an area under the curve of .96 against SCID-5-PD diagnoses (Ünsal et al. 2022). In the present study, SI-Bord scores were utilized as a dimensional measure of borderline traits, rather than to establish a diagnosis of borderline personality disorder.

Statistical Analysis

All statistical procedures were performed in Jamovi (version 2.7). Descriptive statistics for continuous variables comprised mean ± standard deviation, median with interquartile range, and minimum and maximum values. Categorical data were summarized as counts and percentages. The reliability of the study measures, including their respective subscales, was assessed by computing Cronbach's alpha coefficients.

Distributional characteristics of continuous variables were evaluated using the Shapiro–Wilk test, alongside the visual examination of histograms and assessment of skewness and kurtosis. Skewness and kurtosis values—examined as indicators of the magnitude and direction of distributional asymmetry and tail characteristics—were interpreted in conjunction with the Shapiro–Wilk test and visual inspection, rather than using a single cut-off criterion. As some of the study variables exhibited departures from normality, bivariate associations among the BIS-11-SF total and subscale scores, PGSI total score, and SI-Bord total score were assessed using Spearman's rank-order correlations.

Factors associated with problem gambling severity were examined by fitting a hierarchical multiple linear regression model with the PGSI total score as the outcome variable. The BIS-11-SF total score was entered into the model in the first step, followed by the SI-Bord total score in the second step. This ordering was selected to evaluate whether borderline personality features accounted for additional variance in problem gambling severity beyond that accounted for by overall impulsivity. Moreover, considering the conceptual overlap between the two constructs, a complementary hierarchical regression with the entry order reversed was performed to quantify the incremental variance attributable to impulsivity after accounting for SI-Bord scores. This ordering sought to address this specific incremental research question, rather than to imply causal or conceptual precedence between the two constructs.

As motor impulsivity was the only BIS-11-SF subscale that was significantly associated with PGSI scores in the bivariate analyses, an additional exploratory hierarchical regression was performed wherein the motor impulsivity subscale replaced the BIS-11-SF total score. The BIS-11-SF total score and motor impulsivity subscale were not entered simultaneously because of their substantial overlap. Considering the exploratory nature of this analysis and the motor impulsivity subscale's modest internal consistency in the present sample, the findings were interpreted cautiously.

The primary findings' robustness to potential sociodemographic and gambling-related covariates was evaluated by performing an additional adjusted hierarchical regression using a parsimonious covariate set. Age and gambling duration were entered together in the first step, followed by the BIS-11-SF and SI-Bord total scores in the second and third steps, respectively. Considering the limited sample size, the adjusted analysis was intentionally parsimonious to minimize overfitting risk. Age was included to account for general sociodemographic variation, while gambling duration was included as an indicator of the chronicity of gambling involvement. Regression results were reported using unstandardized and standardized regression coefficients, standard errors, 95% confidence intervals (CIs), R^2, adjusted R^2, and the change in explained variance between models. Regression assumptions were evaluated through the visual inspection of residual and Q–Q plots, alongside the assessment of multicollinearity, residual independence, and influential observations using Cook's distance. Considering the bounded distribution of the PGSI and sample size, the primary hierarchical regression's final model was additionally re-estimated using HC3 heteroscedasticity-robust standard errors as a sensitivity analysis. No adjustment for multiple comparisons was applied to the correlation analyses. Therefore, these findings were interpreted as exploratory and should be considered with appropriate caution.

Results

The study sample comprised 60 patients. The participants' mean age was 35.72 ± 9.24 years, and 98.3% were men. Of the participants, 55.0% and 78.3% were married and regularly employed, respectively. Further, 5.0% and 10.0% had a history of psychiatric illness and a history of suicide attempt, respectively. Table 1 presents the participants' sociodemographic and clinical characteristics.

Table 1. Sociodemographic and clinical characteristics of participants				
Variable	**n (%)**	**M (SD)**	**Median**	**Range**
Age, years	60	35.72 (9.24)	36.00	19–55
Gender				
Men	59 (98.3)			
Women	1 (1.7)			
Marital status				
Married	33 (55.0)			
Single/divorced	27 (45.0)			
Educational level				
Primary education	13 (21.7)			
High school	23 (38.3)			
University or higher	24 (40.0)			
Employment status				
Employed	47 (78.3)			
Unemployed	11 (18.3)			
Student	2 (3.3)			
Living arrangement				
Alone	5 (8.3)			
With parent(s)	19 (31.7)			
With spouse and/or children	35 (58.3)			
Other	1 (1.7)			
Family history of psychiatric disorder				
No	55 (91.7)			
Yes	5 (8.3)			
History of psychiatric disorder				
No	57 (95.0)			
Yes	3 (5.0)			
History of suicide attempt				
No	54 (90.0)			
Yes	6 (10.0)			

M = mean; n = number of participants; SD = standard deviation

The mean age at gambling initiation was 23.82 ± 7.43 years. The mean gambling duration was 10.02 ± 8.20 years. Overall, 65.0% and 73.3% of the participants reported gambling daily and having current gambling-related debt, respectively. Strategic games were the first and most recent type of gambling activity for 85.0% and 56.7%, respectively. Moreover, 26.7% reported a family history of gambling, while 10.0% had experienced gambling-related legal problems. Table 2 presents detailed findings regarding gambling characteristics.

The mean BIS-11-SF, PGSI, and SI-Bord total scores were 31.88 ± 8.55, 19.57 ± 6.08, and 6.50 ± 3.60, respectively. Furthermore, PGSI scores ranged from 6 to 27, with a median of 21.00. Eight participants (13.3%) scored the maximum possible value of 27. Skewness and kurtosis values were −0.502 and −0.807 for the PGSI, 0.743 and 0.451 for the BIS-11-SF total score, and 0.166 and −0.573 for the SI-Bord total score, respectively. Internal consistency was acceptable to excellent across all study measures. Cronbach's alpha was .91, .89, and .74 for the PGSI, BIS-11-SF, and SI-Bord total scores, respectively. For the BIS-11-SF subscales, Cronbach's alpha coefficients were .75, .71, and .84 for non-planning, motor, and attentional impulsivity, respectively (Table 3).

Correlation analyses indicated that gambling severity was positively associated with the BIS-11-SF total score ($\rho = 0.331$, $p < .01$) and motor impulsivity subscale score ($\rho = 0.404$, $p < .01$). A moderate positive correlation was observed between borderline personality traits and gambling severity ($\rho = 0.537$, $p < .001$). Additionally, the SI-Bord total score was positively correlated with the BIS-11-SF total score and all of its subscale scores. Table 4 presents the detailed results of the correlation analyses.

Table 2. Gambling characteristics of participants				
Variable	**n (%)**	**M (SD)**	**Median (Q1–Q3)**	**Range**
Age at gambling onset, years	60	23.82 (7.43)	22.50 (18.00–27.25)	15–49
Duration of gambling, years	60	10.02 (8.20)	7.00 (3.00–15.00)	1–35
Time since last gambling episode, days	60	49.13 (69.35)	30.00 (7.00–48.75)	1–300
Longest period without gambling, weeks	60	27.33 (33.35)	16.00 (4.00–33.00)	1–120
Type of gambling first played				
Strategic games	51 (85.0)			
Non-strategic games	9 (15.0)			
Type of gambling most recently played				
Strategic games	34 (56.7)			
Non-strategic games	26 (43.3)			
Gambling frequency				
1–2 times per week	7 (11.7)			
3–6 times per week	14 (23.3)			
Daily	39 (65.0)			
Current debt				
No	16 (26.7)			
Yes	44 (73.3)			
Hidden debt				
No	56 (93.3)			
Yes	4 (6.7)			
Family member who gambles				
No	44 (73.3)			
Yes	16 (26.7)			
Legal problems owing to gambling				
No	54 (90.0)			
Yes	6 (10.0)			

M = mean; n = number of participants; Q1 = first quartile; Q3 = third quartile; SD = standard deviation

Table 3. Descriptive statistics and internal consistency coefficients for scale scores				
Variable	**M (SD)**	**Median**	**Range**	**Cronbach's α**
BIS-11-SF – Non-planning impulsivity	11.88 (3.23)	12.00	5–19	.75
BIS-11-SF – Motor impulsivity	9.97 (3.03)	10.00	5–17	.71
BIS-11-SF – Attentional impulsivity	10.03 (3.48)	9.00	5–20	.84
BIS-11-SF – Total score	31.88 (8.55)	30.00	16–56	.89
PGSI	19.57 (6.08)	21.00	6–27	.91
SI-Bord	6.50 (3.60)	7.00	0–15	.74

BIS-11-SF = Barratt Impulsiveness Scale-11 Short Form; M = mean; PGSI = Problem Gambling Severity Index; SD = standard deviation; SI-Bord = Screening Instrument for Borderline Personality Disorder

Table 4. Spearman correlations among impulsivity, gambling severity, and borderline personality traits						
Variable	**1**	**2**	**3**	**4**	**5**	**6**
1. BIS-11-SF – Non-planning impulsivity	—					
2. BIS-11-SF – Motor impulsivity	.524***	—				
3. BIS-11-SF – Attentional impulsivity	.628***	.678***	—			
4. BIS-11-SF – Total	.811***	.864***	.869***	—		
5. PGSI	.210	.404**	.242	.331**	—	
6. SI-Bord	.501***	.459***	.391**	.514***	.537***	—

BIS-11-SF = Barratt Impulsiveness Scale-11 Short Form; PGSI = Problem Gambling Severity Index; SI-Bord = Screening Instrument for Borderline Personality Disorder; *p < .05. **p < .01. ***p < .001

Table 5. Hierarchical linear regression analysis predicting problem gambling severity						
Predictor	**B**	**SE**	**β**	**95% CI**	**t**	**p**
Model 1						
Intercept	11.260	2.864	—	[5.527, 16.993]	3.931	< .001
BIS-11-SF Total	0.261	0.087	.367	[0.087, 0.434]	3.001	.004
Model 2						
Intercept	12.079	2.686	—	[6.700, 17.458]	4.497	< .001
BIS-11-SF Total	0.087	0.098	.123	[−0.110, 0.284]	0.886	.379
SI-Bord	0.724	0.234	.429	[0.256, 1.192]	3.096	.003

For Model 1, R = .367 and R^2 = .134; for Model 2, R = .509 and R^2 = .259. Adding the SI-Bord total score in Model 2 significantly increased the explained variance (ΔR^2 = .125, $\Delta F(1, 57)$ = 9.587, p = .003). Confidence intervals refer to unstandardized regression coefficients. B = unstandardized regression coefficient; SE = standard error; β = standardized regression coefficient; CI = confidence interval; t = t statistic; p = p value; R = multiple correlation coefficient; R^2 = coefficient of determination; ΔR^2 = change in R^2; ΔF = F-change statistic; BIS-11-SF = Barratt Impulsiveness Scale-11 Short Form; SI-Bord = Screening Instrument for Borderline Personality Disorder

The BIS-11-SF total score was significantly associated with gambling severity (β = 0.367, p = .004) in the first step of the hierarchical linear regression analysis, with the model explaining 13.4% of the variance in PGSI scores. Adding the SI-Bord total score in the second step increased the explained variance to 25.9% (R^2 = .259; adjusted R^2 = .233); this 12.5% increase in explained variance was significant (ΔR^2 = .125, $\Delta F(1, 57)$ = 9.587, p = .003). In the final model, the SI-Bord total score remained significantly associated with gambling severity (β = .429, p = .003), whereas the association with the BIS-11-SF total score was no longer significant (β = .123, p = .379). Visually inspecting the diagnostic plots indicated no major departures from linearity or homoscedasticity, with only minor deviations from normality observed at the Q–Q plot's tails. No evidence of problematic multicollinearity was noted (VIF = 1.48; tolerance = .68), while residual independence was within acceptable limits (Durbin–Watson = 2.28). Cook's distance values did not indicate undue influence by individual observations (maximum = .194).

In a complementary hierarchical regression with the entry order reversed, SI-Bord scores entered in the first step explained 24.9% of the variance in PGSI scores (R^2 = .249; adjusted R^2 = .236). Adding the BIS-11-SF total score in the second step increased the explained variance by 1.0%. The incremental contribution was not significant (ΔR^2 = .010, $\Delta F(1, 57)$ = 0.785, p = .379).

In an additional exploratory analysis, the motor impulsivity subscale replaced the BIS-11-SF total score. Motor impulsivity was significantly associated with gambling severity when entered in the first step (B = .850, SE = .239, β = .423, 95% CI [.372, 1.329], p < .001), explaining 17.9% of the variance in PGSI scores (R^2 = .179; adjusted R^2 = .165). Adding SI-Bord scores increased the explained variance to 29.1% (adjusted R^2 = .266), representing a significant 11.2% increase (ΔR^2 = .112, $\Delta F(1, 57)$ = 9.007, p = .004). In the final model, SI-Bord scores remained significantly associated with gambling severity (B = .647, SE = .216, β = .384, 95% CI [.215, 1.079], p = .004), whereas the association with motor impulsivity was no longer significant (B = .474, SE = .257, β = .236, 95% CI [−.040, .988], p = .070).

In an additional adjusted analysis, age and gambling duration—entered as covariates in the first step—explained 6.9% of the variance in PGSI scores (R^2 = .069; adjusted R^2 = .037). Adding the BIS-11-SF total score increased the explained variance by 10.9% (ΔR^2 = .109, $\Delta F(1, 56)$ = 7.410, p = .009). The subsequent addition of SI-Bord scores increased the total explained variance to 32.8% (R^2 = .328; adjusted R^2 = .279), corresponding to a significant additional 15.0% of explained variance (ΔR^2 = .150, $\Delta F(1, 55)$ = 12.278, p < .001). In the final adjusted model, SI-Bord scores remained significantly associated with gambling severity (B = .803, SE = .229, β = .476, 95% CI [.344, 1.263], p < .001), whereas the BIS-11-SF total score was not significant (B = .038, SE = .098, β = .054, 95% CI [−.157, .234], p = .696). Moreover, gambling duration was significantly associated with PGSI scores (β = .319, p = .023), whereas age was not (β = −.224, p = .103).

As a sensitivity analysis, the final model of the primary hierarchical regression (including the BIS-11-SF and SI-Bord total scores) was re-estimated using HC3 heteroscedasticity-robust standard errors. The results remained substantively unchanged: SI-Bord scores remained significantly associated with gambling severity (B = .724, robust SE = .249, 95% CI [.226, 1.223], p = .005), whereas the association with overall

impulsivity remained non-significant (B = .087, robust SE = .110, 95% CI [−.132, .307], p = .429). Table 5 presents the results of the hierarchical regression analysis.

Discussion

This study examined the associations of borderline personality traits and impulsivity with problem gambling severity among patients with gambling disorder. The primary finding was that borderline traits remained associated with gambling severity after accounting for overall impulsivity, as well as age and gambling duration. This result highlights that general impulsivity as measured by the BIS-11-SF cannot fully explain the association between borderline traits and gambling severity. Therefore, jointly assessing these features contributes to our understanding of how overlapping personality characteristics are associated with the severity of gambling-related problems.

Previous research has established personality pathology's relevance to gambling disorder. Personality disorders—common in this population—have been associated with more complex clinical presentations, poorer treatment outcomes, and relapse (Vaddiparti and Cottler 2017, Ioniță et al. 2026). Borderline and antisocial personality disorders seem particularly prominent among these comorbidities (Ioniță et al. 2026). Brown et al. (2016) found that, in a treatment-seeking sample, Cluster B personality disorder symptoms were associated with problem gambling severity. Sacco et al. (2008) reported that borderline symptom burden was associated with the likelihood of pathological gambling following adjustment for sociodemographic characteristics, substance use problems, and other personality disorders. However, this association was no longer significant after depressive symptoms were additionally considered. More recently, Lind et al. (2024) found that borderline personality indicators were associated with probable problem gambling in an incarcerated sample following adjustment for demographic characteristics, depressive and trauma-related symptoms, abuse history, and antisocial traits. The present findings extend this literature by demonstrating that, within a clinical sample of patients with gambling disorder, borderline traits retained an association with gambling severity when overall impulsivity was considered concurrently. Nevertheless, differences in populations, instruments, and outcome definitions constrain direct comparisons between these studies.

Among the dimensions of impulsivity, motor impulsivity exhibited the clearest relationship with gambling severity. This finding broadly aligns with evidence indicating impaired response inhibition and elevated motor impulsivity among individuals with gambling disorder (Chowdhury et al. 2017), particularly among those with more severe gambling problems (Odlaug et al. 2011, Brevers et al. 2012). Likewise, Mestre-Bach et al. (2020) found that response impulsivity is the only impulsivity domain associated with gambling disorder severity. From a clinical perspective, diminished inhibitory control may contribute to difficulty interrupting gambling behavior despite mounting financial losses or other adverse consequences. However, behavioral response-inhibition paradigms and self-report instruments, such as the BIS-11-SF, capture related but not identical aspects of impulsivity, which should be considered when comparing findings across studies.

Importantly, general impulsivity did not fully account for the association between borderline personality features and gambling severity. This pattern underscores that borderline features may capture clinically relevant variance beyond the broad tendency toward impulsive behavior measured by the BIS-11-SF. Nevertheless, the two constructs should not be viewed as entirely independent. Although the SI-Bord does not directly assess the DSM-5 impulsivity criterion, some features captured by the instrument—particularly affective instability and self-harming behavior—may be conceptually linked to broader difficulties in behavioral regulation. Therefore, the observed incremental contribution of borderline features should be interpreted as evidence of partially distinct, rather than completely independent, clinical dimensions.

The association between the borderline personality features assessed in this study and gambling severity may be considered within the broader literature indicating that affective and interpersonal difficulties are relevant to gambling disorder. Evidence from previous studies has suggested that difficulties in these domains are associated with greater gambling severity. Difficulties in emotion regulation and deficits in cognitive reappraisal have been linked to greater gambling disorder severity (Rogier et al. 2020).

Reportedly, individuals with moderate or severe gambling disorder experience greater difficulties in emotion regulation than those with mild gambling disorder (Mide et al. 2023). Within the interpersonal domain, insecure attachment seems common among individuals with gambling disorder, while attachment anxiety has been significantly associated with gambling severity (Di Trani et al. 2017). Collectively, these studies emphasize that the association between borderline features and gambling severity may extend beyond impulsive behavior alone and may involve difficulties in affect regulation and interpersonal functioning. However, as emotion regulation, attachment, and interpersonal functioning were not directly assessed, these mechanisms remain hypothetical and should be examined explicitly in future studies rather than inferred from the present findings.

The demographic composition of the sample places these findings in context. Previous research has identified greater vulnerability to problem gambling among younger adults than among middle-aged adults (Dellosa and Browne 2024). Although the age distribution of the present sample is broadly compatible with this literature, the study did not compare age groups and cannot establish an age-related risk pattern. Further, the predominantly male sample aligns with epidemiological evidence demonstrating higher gambling participation and problem gambling prevalence among men (Dellosa and Browne 2024, Tran et al. 2024).

Several methodological limitations should be considered. The retrospective, cross-sectional design precludes conclusions regarding the direction or causality of the associations. All three constructs were assessed using self-report instruments, rendering the findings susceptible to recall and social desirability biases. Borderline traits were assessed using a brief screening instrument covering only a subset of DSM-5 features; a structured personality disorder interview was not administered. Hence, the findings concern dimensional borderline features rather than a diagnosis of borderline personality disorder.

The small, single-center, treatment-seeking sample limits generalizability and the precision of regression estimates. The extremely small number of women precluded sex-based comparisons and substantially constrains the findings' generalizability to women. Moreover, it restricts the complexity of multivariable models that may be evaluated reliably. The PGSI scores were concentrated toward the upper end of the scale, potentially diminishing outcome variability and attenuating associations. Restricting the analysis to patients with complete records may have introduced selection bias. Additionally, the correlation analyses were exploratory and, thus, not adjusted for multiple comparisons, thereby increasing the possibility of Type I error. Although psychiatric comorbidities were evaluated using comprehensive clinical interviews, standardized diagnostic instruments were not employed, and the contribution of subthreshold symptoms cannot be excluded. Medication and treatment characteristics were not systematically recorded in the research dataset and could not be incorporated into the analyses. Larger longitudinal studies utilizing structured diagnostic assessments and direct measures of affective, interpersonal, and behavioral functioning are warranted to clarify these relationships and the processes underlying them.

Conclusion

In this predominantly male, treatment-seeking, single-center clinical sample of individuals with gambling disorder, both impulsivity and borderline personality features were associated with greater problem gambling severity. Importantly, SI-Bord scores remained significantly associated with gambling severity after accounting for overall impulsivity and following additional adjustment for age and gambling duration. However, considering the conceptual overlap between borderline personality features and impulsivity, as well as the potential influence of unmeasured clinical factors, these findings should not be interpreted as demonstrating a fully independent or specific contribution of borderline personality pathology. Further, this study does not identify the affective, interpersonal, or other psychological mechanisms that may underlie these associations. Nevertheless, the findings support a broader, multidimensional conceptualization of gambling disorder wherein personality-related characteristics may contribute alongside impulsivity-related processes. Larger, more diverse, and longitudinal studies utilizing direct measures of affective, interpersonal, and behavioral functioning are required to clarify these relationships and the clinical heterogeneity of gambling disorder.

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