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Interrelationships among gambling-related cognitions, gambling severity, depression severity, and treatment motivation in individuals with gambling disorder

İrem Peker[1], Hakan Coşkunol[2], Oğuz Peker[3]

[1]Department of Psychiatry, Dr. Abdurrahman Yurtaslan Oncology Training and Research Hospital, Ankara, Türkiye
[2]Department of Psychiatry, Faculty of Medicine, Ege University, İzmir, Türkiye
[3]Department of Psychiatry, Faculty of Medicine, Ankara Yıldırım Beyazıt University, Ankara, Türkiye

Abstract

This study aims to identify the factors influencing treatment motivation in individuals with gambling disorder, assess the presence of co-occurring depression, and examine cognitive distortions related to gambling to inform targeted treatment strategies. The study included 60 patients who sought help for gambling-related issues. Participants were assessed for depression severity, gambling-related cognitive distortions, and treatment motivation. Additionally, information regarding their gambling history was obtained from both themselves and their relatives. The results indicated that higher depression severity was positively associated with greater gambling problem severity and an increased inability to control gambling behavior. Conversely, depression severity was negatively associated with confidence in treatment. Furthermore, gambling problem severity showed positive associations with heightened gambling-related expectations, interpretative biases, and extrinsic treatment motivation. These findings suggest that depression severity, cognitive distortions related to gambling, and treatment motivation play a significant role in gambling disorder. Consequently, these factors should be carefully assessed in individuals seeking treatment to develop effective intervention strategies.

Keywords: cognition, depression, distortion, gambling disorder, motivation

Main points

- A positive relationship was found between the severity of depression and the severity of gambling, as well as the cognition of not being able to stop gambling.
- A negative relationship was found between depression severity and treatment confidence and motivation.
- A positive relationship was found between gambling severity and gambling expectations, cognitive interpretive bias, and extrinsic motivation.
- In the treatment of gambling disorder, the severity of depression, gambling-related thoughts, and treatment motivation are important, and these variables should be carefully questioned by the clinician.

Introduction

Gambling disorder is characterized by persistent and recurrent gambling behavior that leads to significant impairment in personal, social, or occupational functioning. While its annual prevalence in the general population is estimated at 0.2% to 0.3%, lifetime prevalence ranges between 0.4% and 1% (American Psychiatric Association, 2013). Beyond its prevalence, gambling disorder is associated with substantial psychological, social, and financial burdens, making it a significant public health concern (Calado & Griffiths, 2016).

Corresponding author: İrem Peker • **Email:** irem_calisir@hotmail.com
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A growing body of research highlights the role of cognitive distortions in the onset and persistence of gambling behavior. Distorted beliefs such as the illusion of control, gambler's fallacy, and recall bias contribute to individuals overestimating their ability to influence gambling outcomes, despite the inherent randomness of these activities (Oei & Gordon, 2008). Studies indicate that individuals with severe gambling problems tend to have stronger gambling-related cognitive distortions, which further reinforce maladaptive behaviors (Leonard et al., 2021; Myrseth et al., 2010). Cognitive-behavioral interventions targeting these distortions have been shown to effectively reduce gambling frequency, financial losses, and gambling-related urges (Fortune & Goodie, 2012; Ledgerwood et al., 2020). Variables such as gambling expenditure, past gambling duration, and gambling preferences have been shown to be associated with gambling cognitions and the severity of gambling (Boffo et al., 2017; Castrén et al., 2017; Nicholson et al., 2016). In particular, it has been demonstrated that individuals with a longer history of gambling tend to have more entrenched gambling cognitions and lower motivation to seek treatment. Therefore, gambling participation variables were also examined in this study. Previous research has demonstrated that individuals who prefer strategic games tend to exhibit higher cognitive distortions such as the illusion of control, whereas those who prefer non-strategic games are more likely to display impulsive behaviors and report higher gambling severity (Mallorquí-Bagué et al., 2018). This distinction is crucial as different gambling types may reflect distinct psychological characteristics, influencing both gambling behavior and treatment motivation.

Depression constitutes a significant comorbid condition frequently observed among individuals diagnosed with gambling disorder. Empirical evidence indicates a bidirectional relationship between depressive symptoms and gambling behavior, whereby gambling-related financial hardships, interpersonal conflicts, and emotional distress contribute to the onset or exacerbation of depression. Conversely, individuals experiencing depressive symptoms may turn to gambling as a maladaptive coping mechanism, seeking relief through escapism or self-medication (Buckholtz & Meyer-Lindenberg, 2012; Dowling et al., 2015). Importantly, depressive symptomatology has been associated not only with increased gambling severity but also with the presence of gambling-related cognitive distortions (Schluter et al., 2019). Furthermore, research suggests that cognitive distortions may mediate the relationship between depression and gambling severity, underscoring the complex and interrelated nature of these psychological constructs (Schluter et al., 2019).

Motivation for treatment is a crucial factor in the prognosis of individuals with gambling disorder, influencing treatment engagement, adherence, and outcomes (Hodgins et al., 2011). Individuals with severe depressive symptoms may demonstrate a greater readiness to seek treatment but are also at higher risk of early dropout due to feelings of hopelessness, low self-efficacy, and reduced motivation to sustain behavioral change (Gomes & Pascual-Leone, 2009; Karyotaki et al., 2015). Although cognitive distortions are believed to affect both the development of gambling disorder and treatment motivation, this relationship has received limited empirical attention.

In line with the objectives of the present study, several hypotheses were formulated to examine the relationships among key psychological variables associated with gambling disorder. First, it was hypothesized that there would be a statistically significant relationship between depression severity and gambling severity, reflecting the potential interplay between affective symptoms and maladaptive behaviors. Additionally, the study proposed a significant association between depression severity and treatment motivation, including specific dimensions such as confidence in treatment. In light of previous research highlighting the role of cognitive distortions in the maintenance of gambling behavior, it was hypothesized that gambling-related cognitive distortions—such as gambling expectancies, interpretative bias, and illusion of control—would be significantly associated with gambling severity. Furthermore, the study aimed to explore the potential link between cognitive distortions and treatment motivation, given their possible impact on individuals' engagement with recovery. Finally, it was hypothesized that gambling participation variables, including the duration of gambling behavior and weekly gambling expenditures, would be significantly related to both gambling severity and gambling-related cognitions.

Although previous studies have separately examined the impact of cognitive distortions and depressive symptoms on gambling behavior, limited research has explored how these factors jointly influence treatment motivation in individuals with gambling disorder. Moreover, most existing studies focus on prevalence or severity, rather than psychological mechanisms affecting engagement in treatment. To address this gap, the present study aims to investigate the interrelationships among gambling-related cognitive distortions, depression severity, and treatment motivation in individuals diagnosed with gambling disorder. By identifying key psychological factors that influence readiness for treatment, this study seeks to contribute to the literature by offering a more integrated understanding of how cognitive and emotional variables may shape motivation for treatment. This, in turn, may inform the development of more targeted and effective therapeutic interventions for this population.

Material and Methods

This study was conducted using a cross-sectional, correlational research design aimed at examining the interrelationships among gambling-related cognitions, gambling severity, depression severity, and treatment motivation in individuals diagnosed with gambling disorder (GD). All participants were recruited from a university hospital psychiatry department. Participants were included in the study following a face-to-face structured clinical interview conducted by a trained clinician using the Structured Clinical Interview for DSM-5 (SCID-5-CV). This interview served to confirm the diagnosis of

GD and to evaluate psychiatric comorbidities. The SCID-5-CV process also functioned as the primary method of participant engagement and ensured that inclusion and exclusion criteria were rigorously applied. All clinical assessments and data collection were conducted in person, following ethical approval and informed consent.

Settings & Design

The study was approved by the ethics committee of Ege University (protocol number of ethics committee: 2021/34 Date: 2021). Sixty volunteer patients who presented to the psychiatry department of a university hospital were included in the study after providing written informed consent. Inclusion criteria were age between 18 and 65, self-reported or relative-reported gambling problems, willingness to participate after being informed about the study, and sufficient literacy to complete self-report measures. Exclusion criteria included being under 18 or over 65 and having a diagnosis of psychotic disorder, acute mania, dementia, intellectual disability, organic mental disorder, or severe neurological/medical conditions affecting cognitive functioning.

Measures

Case Report Form

A sociodemographic data form developed by the researcher was used to collect information on participants' age, gender, marital status, education, employment, medical and psychiatric history, and family history of psychiatric disorders, gambling, and substance use. The form also assessed participants' gambling behavior (e.g., frequency, amount spent), their intentions to quit, and the impact of gambling on their relationships, work, finances, and emotional well-being. Scores from other assessment tools were recorded in the case report form.

Structured Clinical Interview for DSM-5 (The Diagnostic and Statistical Manual of Mental Disorders-5)

The Structured Clinical Interview for DSM-5 Disorders - Clinician Version (SCID-5/CV) is a semi-structured diagnostic tool developed to facilitate the assessment of mental disorders in accordance with DSM-5 diagnostic criteria. Covering a wide range of psychiatric disorders, the SCID-5/CV has demonstrated high internal consistency across various studies. In the original study, Cronbach's alpha coefficients were generally reported to be above 0.80, indicating good reliability of the instrument (First et al., 2015). In the Turkish adaptation study, Elbir et al. (2019) reported Cronbach's alpha values ranged between 0.85 and 0.95, and interrater agreement (kappa) coefficients ranged between 0.65 and 1.00, supporting the instrument's high reliability (Elbir et al., 2019). In the present study, the SCID-5/CV was used to confirm GD diagnoses and to identify psychiatric comorbidities among participants.

South Oaks Gambling Screening Test Turkish Form

The South Oaks Gambling Screen (SOGS), developed by Lesieur and Blume (1987), is a widely used instrument designed to assess the severity of gambling behavior (Lesieur & Blume, 1987). The original scale consists of 20 items, and individuals scoring five or more points are classified as probable pathological gamblers. In the original study, the internal consistency coefficient of the scale was reported as Cronbach's alpha = 0.97, indicating excellent reliability. The Turkish validity and reliability study of the scale was conducted by Duvarcı and Varan (2001). In this study, the internal consistency coefficient of the Turkish version was found to be Cronbach's alpha = 0.8772 (Duvarcı & Varan, 2001). Additionally, it was suggested that a cut-off score of eight or higher would be more appropriate for classifying individuals as probable cases of gambling disorder in the Turkish context. These findings indicate that both the original and Turkish versions of the SOGS are reliable and valid tools for assessing the severity of gambling behavior.

Gambling-Related Cognition Scale

The Gambling-Related Cognitions Scale (GRCS), developed by Raylu and Oei (2004), assesses cognitive distortions related to gambling behavior. The scale includes five subscales: illusion of control, which refers to the false belief that one can control gambling outcomes through strategies or rituals; predictive control, which refers to the belief that one can predict gambling outcomes based on previous results; gambling expectancies, which reflect exaggerated expectations of positive outcomes from gambling; inability to stop gambling, which measures a perceived lack of control over gambling behavior; and interpretative bias, which refers to the tendency to attribute wins to personal skill and losses to external factors. Each subscale reflects different cognitive distortions that are known to increase gambling severity and maintain gambling behavior. It is a 7-point Likert-type scale comprising 23 items. In the original study, the internal consistency of the total scale was reported as Cronbach's alpha = 0.93, with subscale values ranging between 0.77 and 0.91, indicating high reliability. The Turkish validity and reliability study was conducted by Arcan and Karanci (2015), where the internal consistency coefficient for the total scale was found to be 0.84, and subscale values ranged between 0.52 and 0.78. These findings confirm that both the original and Turkish versions of the GRCS are valid and reliable tools for assessing gambling-related cognitive distortions.

Hamilton Depression Rating Scale

The Hamilton Depression Rating Scale (HAM-D-17) developed by Hamilton (1960) is an interview-based scale designed to systematically record observations related to depressive symptoms (Hamilton, 1960). The scale evaluates 17 items on a 5-point Likert-type scale, covering areas such as guilt, suicide, anxiety, sleep, and appetite. The highest possible total score is 53, with higher scores indicating greater severity

of depressive symptoms. In the original study, the internal consistency of the scale was reported as Cronbach's alpha = 0.75. The Turkish validity and reliability study conducted by Akdemir et al. (2001) reported a similar internal consistency coefficient of Cronbach's alpha = 0.75, with a test-retest reliability coefficient of r = 0.85 and interrater reliability coefficients ranging from 0.87 to 0.98, confirming the scale's strong psychometric properties (Akdemir et al. 2001). These findings demonstrate that both the original and Turkish versions of the HAM-D-17 are valid and reliable tools for assessing depression severity.

Treatment Motivation Questionnaire

The Treatment Motivation Questionnaire (TMQ), developed by Ryan et al. (1995), is a 26-item scale designed to assess individuals' motivation for engaging in treatment. The scale follows a 5-point Likert format ranging from Strongly Agree to Strongly Disagree. In the original study, the internal consistency of the total scale was reported as Cronbach's alpha = 0.91, indicating excellent reliability (Ryan et al., 1995). The Turkish validity and reliability study conducted by Evren et al. (2006) identified four factors: internal motivation, external motivation, help seeking, and confidence in treatment. In this adaptation study, the internal consistency coefficients were reported as 0.91 for internal motivation, 0.42 for external motivation, 0.83 for help seeking, and 0.72 for confidence in treatment, with the total scale achieving a Cronbach's alpha of 0.84 (Evren et al., 2006). These results demonstrate that both the original and Turkish versions of the TMQ are valid and reliable tools for assessing treatment motivation.

Statistical Analysis

The research data were evaluated using SPSS v25.0 (IBM SPSS Corp.; Armonk, NY, USA). The suitability of numerical variables for normal distribution was examined with the Shapiro-Wilk (n = 50) test. Numerical variables are given as mean, standard deviation, and median (min-max). Descriptive statistics, including the mean, standard deviation, median, and range, were calculated for all clinical scale scores. These statistics provided a general profile of the participants' levels of depressive symptoms, gambling severity, gambling-related cognitions, and treatment motivation, and served as the basis for the subsequent correlation and group comparison analyses. Comparison of two groups in terms of numerical variables was made with the independent two-sample t-test if normal distribution was achieved, and with the Mann-Whitney U test if non-normal distribution was observed. For comparisons of more than two groups in terms of numerical variables, one-way ANOVA was used when normal distribution was achieved, and Kruskal-Wallis test was used when there was a non-normal distribution. In case of significance, pairwise comparisons after the ANOVA test were made with the Tukey test, and pairwise comparisons after Kruskal-Wallis were made with Dunn test with Bonferroni correction. Categorical variables are given as numbers and percentages. The relationship between scale scores was examined with Spearman correlation analysis. Cluster analysis was conducted to identify distinct subgroups within the sample based on sociodemographic and clinical characteristics, gambling participation variables, and treatment motivation scores. Clusters were identified empirically using the two-step cluster component analysis method. Age of gambling onset, duration of gambling (years), weekly gambling activities (money invested, average hours spent, weekly frequency), gaming preferences (strategic/non-strategic), clinical characteristics (psychiatric comorbidity, severity of depression, alcohol/substance use, suicide history), sociodemographic characteristics (marital status, educational status, employment status), and treatment motivation scores (TMQ total score and subscale scores) were included in the analysis as markers. The presence of psychiatric comorbidity, substance use, preferred game type (strategic/non-strategic), and TMQ total scores were found to be the most important indicators. Comparison between empirical sets derived for the study variables (sociodemographic, clinical, and treatment motivation measures) was performed using X^2 tests for categorical factors and analysis of variance for quantitative measures. The significance level was accepted as 0.05 for all hypotheses.

Results

The study sample consisted entirely of male participants with a mean age of 35.6 years (standard deviation [SD] = 8.1). Regarding marital status, the majority were either married or single, with a smaller portion being divorced. Most participants had completed university education and were employed at the time of the study. Monthly income levels varied, with a significant proportion earning above 3000 TRY. While the majority of participants reported no history of substance use, a considerable proportion reported current alcohol (73.30%) and tobacco use (73.30%). The frequency of smoking and alcohol consumption varied across the sample. Additionally, 21.70% of participants reported having a physical illness, and 50% reported a family history of psychiatric disorders. A family history of gambling behavior was reported by 36.70% of the participants. All demographic and clinical characteristics are included in Table 1.

Psychiatric comorbidities were assessed using the SCID-5. Of the total sample, 19 participants (31.70%) had no psychiatric comorbidity, 26 (43.30%) had one comorbidity, and 15 (25.00%) had more than one comorbidity. The most common comorbid diagnosis was major depressive disorder (MDD), observed in 21 participants (65.00% of those with comorbidity), and 21.70% reported a previous suicide attempt. The mean SOGS score among participants was 13.90 (SD = 2.74), indicating a sample characterized by high levels of gambling severity. In addition, structured clinical interviews conducted using the Structured Clinical Interview for DSM-5 disorders confirmed that all participants met the diagnostic criteria for GD, as defined by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Regarding psychiatric comorbidity, 19 participants (31.7%) had no additional psychiatric diagnosis, 26 participants (43.3%) had one comorbid diagnosis, and 15 participants (25.0%) had multiple comorbidities. The most frequently observed comorbid condition was MDD (n = 21),

Table 1. Demographic and clinical characteristics of participants (n = 60)

Variable	Category	n	%
Age	Mean (SD)		35.60 (8.10)
Marital status	Married	26	43.33
	Single	23	38.33
	Divorced	11	18.33
Education level	Primary School	2	3.33
	High School	20	33.33
	University	38	63.33
Employment status	Employed	47	78.33
	Unemployed	13	21.67
Monthly income (TRY)	No income	9	15.00
	<2000	4	6.67
	2000–3000	9	15.00
	3000–5000	20	33.33
	>5000	18	30.00
MDD diagnosis (current)	No	39	65.00
	Yes	21	35.00
Psychiatric comorbidity	No	19	31.67
	Yes	41	68.33
History of MDD	No	25	41.67
	Yes	35	58.33
Suicide attempt	No	47	78.33
	Yes	13	21.67
Substance use	Never	50	83.33
	Quit	4	6.67
	Still using	6	10.00
Alcohol use	Never	9	15.00
	Quit	7	11.67
	Still using	44	73.33
Frequency of alcohol use	Never	16	26.67
	Rare (<1/month)	18	30.00
	2–4 times/month	14	23.33
	2–3 times/week	3	5.00
	≥4 times/week	9	15.00
Smoking status	Never	14	23.33
	Quit	2	3.33
	Still using	44	73.33
Smoking frequency	No	16	26.67
	1–2/week	3	5.00
	<1 pack/day	5	8.33
	1 pack/day	25	41.67
	>2 packs/day	11	18.33
Physical illness	No	47	78.33
	Yes	13	21.67
Family history of psychiatric illness	No	30	50.00
	Yes	30	50.00
Family history of gambling	No	38	63.33
	Yes	22	36.67

Note: MDD = Major depressive disorder; SD = Standard deviation; TRY = Turkish Lira (Turkish currency).

followed by attention-deficit and hyperactivity disorder (*n* = 11), alcohol use disorder (*n* = 8), bipolar disorder (*n* = 7), substance use disorder (*n* = 6), and generalized anxiety disorder (*n* = 6). Less common comorbidities included psychotic disorder (*n* = 1), obsessive-compulsive disorder (*n* = 1), panic disorder (*n* = 1), and social anxiety disorder (*n* = 1). These findings underscore the high prevalence of psychiatric comorbidities in individuals seeking treatment for GD and emphasize the need for integrated clinical assessment and intervention strategies.

Detailed gambling behavior characteristics of the sample are presented in Table 2. The mean gambling duration was 28.60 hours per week (SD = 20.50), and participants reported gambling on an average of 5.71 days per week (SD = 1.73). The average weekly amount of money spent on gambling was 13,810.00 TRY (SD = 64.64), and the highest amount spent in a single gambling session was 5,038.60 TRY (SD = 179.33). The mean duration of the longest continuous gambling period was 9.45 years (SD = 5.72). Regarding gambling preferences, more than half of the participants (56.66%) primarily engaged in sports betting, followed by casino games (31.66%) and horse racing (11.66%). When asked about their current gambling attitude, 56.67% reported attempting to abstain from gambling, while 43.33% continued to gamble. These findings provide a detailed overview of the intensity and financial engagement associated with gambling behavior among the sample.

Participants were grouped according to their preferred gambling type: strategic games (e.g., sports betting, horse racing) and non-strategic games (e.g., slot machines, roulette). Of the total, 41 participants (68.30%) preferred strategic games, and 19 (31.70%) preferred non-strategic games. There were no significant differences in sociodemographic or clinical variables between the two groups. However, participants preferring strategic games gambled for a longer duration (years) (p = .005, Mann-Whitney U test), while those who preferred non-strategic games invested higher amounts of money at a single time (p = .025, Mann-Whitney U test).

Prior to conducting the main analyses, the distribution of the continuous variables was evaluated. Although the sample size was slightly over 50, the Shapiro-Wilk test was preferred due to its sensitivity in small to moderate samples. In addition, skewness and kurtosis values were examined for all continuous variables, and no substantial deviations from normality were observed. These results supported the assumption of approximate normality.

Descriptive statistics for the clinical scales used in the study are presented in Table 3. The mean score for depressive symptoms measured by the Hamilton Depression Rating Scale Score (HDRS) was 9.42 (SD = 6.74), while the mean score for gambling severity assessed with the SOGS was 13.93 (SD = 2.74). The total score for gambling-related cognitions (GRCS-T) had a mean of 72.53 (SD = 26.86), with subscale scores ranging from 5.60 to 18.72. The treatment motivation total score (TMQ-T) was 102.05 (SD = 9.69), with the highest subscale mean observed in intrinsic motivation (Treatment

Table 2. Gambling characteristics of participants (n = 60)

Variable	Category / Mean (SD)	n (%) / Value
Gambling attitude	Trying not to gamble	34 (56.67)
	Continues to gamble	26 (43.33)
Most preferred game type	Sports betting	34 (56.66)
	Casino games	19 (31.66)
	Horse racing	7 (11.66)
Gambling duration (hours/week)	Mean (SD)	28.60 (20.50)
Weekly gambling expenditure (TRY)	Mean (SD)	13,810.00 (64.64)
Longest gambling period (years)	Mean (SD)	9.45 (5.72)
Gambling frequency (days/week)	Mean (SD)	5.71 (1.73)
Maximum amount spent at one time (TRY)	Mean (SD)	5038.60 (179.33)

Note: SD = Standard deviation; TRY = Turkish Lira (Turkish currency).

Table 3. Descriptive statistics for clinical scales

Scale	Mean (SD)	Median (Range)
HDRS	9.42 (6.74)	7.50 (1–25)
SOGS	13.93 (2.74)	14.00 (8–19)
GRCS-T	72.53 (26.86)	75.00 (23–127)
GRCS-1	18.72 (8.57)	19.00 (5–35)
GRCS-2	5.60 (3.52)	3.50 (3–18)
GRCS-3	13.32 (6.30)	13.50 (4–26)
GRCS-4	17.18 (6.99)	18.00 (4–28)
GRCS-5	14.57 (6.98)	14.50 (5–31)
TMQ-T	102.05 (9.69)	102.50 (82–126)
TMQ-IM	48.87 (4.55)	49.00 (41–55)
TMQ-EM	11.05 (2.93)	11.00 (5–17)
TMQ-HS	22.33 (3.95)	22.00 (13–34)
TMQ-CT	19.62 (3.92)	20.00 (13–30)

Note: GRCS-1 = Inability to Stop Gambling Score; GRCS-2 = Illusion of Control Score; GRCS-3 = Gambling Expectations Score; GRCS-4 = İnterpretative Bias Score; GRCS-5 = Predictive Control Score; GRCS-T = Gambling-Related Cognition Scale Total Score; HDRS = Hamilton Rating Scale Score; SD = Standard deviation; SOGS = South Oaks Gambling Screening Test Score; TMQ-CT = Confidence in Treatment Score; TMQ-EM = External Motivation Score; TMQ-HS = Help Seeking Score; TMQ-IM = Internal Motivation Score; TMQ-T = Treatment Motivation Questionnaire Total Score.

Motivation Questionnaire-internal motivation [TMQ-IM] = 48.87, SD = 4.55), and the lowest in external motivation (TMQ-EM = 11.05, SD = 2.93). These results indicate that, on average, participants demonstrated moderate levels of depressive symptoms and gambling severity, high cognitive distortions related to gambling, and strong intrinsic motivation for treatment.

Pearson correlation coefficients were calculated to examine the relationships between depression severity, gambling severity, gambling-related cognitions, and treatment motivation dimensions. The results revealed a statistically significant positive correlation between depression severity (HDRS) and gambling severity (SOGS) (r = .28, p = .030). Depression severity was also positively associated with general gambling-related cognitions (GRCS-1; r = .32, p = .013), indicating that individuals with higher depressive symptoms tend to report stronger gambling-related cognitive distortions. Furthermore, a significant positive correlation was observed between gambling severity (SOGS) and two subdimensions of gambling-related cognitions: interpretative bias (GRCS-3; r = .30, p = .019) and predictive control (GRCS-4; r = .27, p = .037). These findings suggest that specific cognitive distortions are closely related to increased gambling severity. In terms of treatment motivation, a negative correlation was found between confidence in treatment (TMQ-CT) and depression severity (HDRS; r = -.27, p = .037), indicating that individuals with higher levels of depressive symptoms tend to have lower confidence in their ability to succeed in treatment. Additionally, external motivation (TMQ-EM) was positively associated with gambling severity (SOGS; r = .27, p = .040), suggesting that externally driven motives may play a role in gambling behavior. No other significant correlations were observed among the remaining subscales. These results are summarized in Table 4.

Correlation analyses revealed that increases in gambling-related cognitive distortions were significantly associated with increases in both the duration of gambling behavior and the amount of money spent weekly on gambling. Specifically, higher total GRCS scores were positively correlated with the number of years spent gambling (r = .26, p = .049) and the amount of weekly gambling expenditure (r = .28, p = .031). These findings indicate that cognitive distortions may contribute to the escalation of gambling engagement over time.

In addition, participants without psychiatric comorbidity (n = 19) showed significantly higher levels of treatment motivation compared to those with at least one psychiatric diagnosis (n = 26). Although mean and standard deviation values for TMQ total scores were not specified, the difference between the two groups was found to be statistically significant (Mann-Whitney U test, p = .049). These results suggest that psychiatric comorbidity may negatively impact individuals' motivation to engage in treatment for gambling disorder.

Table 5 presents the comparisons of sociodemographic and clinical characteristics between the two clusters identified through the two-step cluster analysis. Chi-square tests were used to assess group differences in categorical variables. Cluster 1 had a significantly higher rate of employment (p

Table 4. Correlations between depression severity, severity of gambling-related cognitive distortions, gambling severity, and treatment motivation of participants (n = 60)

		HDRS	SOGS	GRCS-T	GRCS-1	GRCS-2	GRCS-3	GRCS-4	GRCS-5
TMQ-T	*r*	−0.104	0.048	0.025	−0.064	0.057	0.088	0.124	0.036
	p	.428	.717	.851	.627	.663	.503	.347	.784
TMQ-IM	*r*	−0.018	−0.012	0.003	−0.053	−0.012	0.068	0.077	−0.050
	p	.891	.927	.984	.685	.930	.607	.560	.702
TMQ-EM	*r*	0.117	0.266*	−0.095	−0.039	<0.001	−0.076	−0.093	−0.164
	p	.375	.040	.470	.769	.999	.563	.478	.211
TMQ-HS	*r*	−0.198	0.106	0.027	−0.039	0.159	0.063	0.138	0.099
	p	.129	.420	.839	.768	.224	.634	.293	.452
TMQ-CT	*r*	−0.270*	−0.205	0.023	−0.126	-0.014	0.066	0.133	0.093
	p	.037	.115	.862	.336	.913	.615	.310	.480
HDRS	*r*		0.280*	0.244	0.319*	0.102	0.188	0.147	0.163
	p		.030	.060	.013	.437	.150	.263	.215
SOGS	*r*	0.280*		0.230	0.145	0.201	0.303*	0.270*	0.148
	p	.030		.077	.268	.124	.019	.037	.258

Note: GRCS-1 = Inability to Stop Gambling Score; GRCS-2 = Illusion of Control Score; GRCS-3 = Gambling Expectations Score; GRCS-4 = İnterpretative Bias Score; GRCS-5 = Predictive Control Score; GRCS-T = Gambling-Related Cognition Scale Total Score; HDRS = Hamilton Rating Scale Score; SOGS = South Oaks Gambling Screening Test Score; TMQ-CT = Confidence in Treatment Score; TMQ-EM = External Motivation Score; TMQ-HS = Help Seeking Score; TMQ-IM = Internal Motivation Score; TMQ-T = Treatment Motivation Questionnaire Total Score; *p < 0.05.

Table 5. Summarizes the sociodemographic and clinical comparison between clusters (n = 60)

Variable	Category	Total, n (%)	Cluster 1, n (%)	Cluster 2, n (%)	p
Marital status	Married	26 (43.30)	18 (47.40)	8 (36.40)	.360
	Single	23 (38.30)	12 (31.60)	11 (50.00)	
	Divorced	11 (18.30)	8 (21.10)	3 (13.60)	
Educational background	Primary education	2 (3.30)	0 (0.00)	2 (9.10)	.137
	High school	20 (33.30)	12 (31.60)	8 (36.40)	
	University	38 (63.30)	26 (68.40)	12 (54.50)	
Employement status	Employed	47 (78.30)	33 (86.80)	14 (63.60)	.036*
	Unemployed	13 (21.70)	5 (13.20)	8 (36.40)	
Psychiatric comorbidity	None	19 (31.70)	19 (50.00)	0 (0.00)	<.001**
	One diagnosis	26 (43.30)	16 (42.10)	10 (45.50)	
	More than one	15 (25.00)	3 (7.90)	12 (54.50)	
History of major depression	No	25 (41.70)	19 (50.00)	6 (27.30)	.085
	Yes	35 (58.30)	19 (50.00)	16 (72.70)	
Suicide attempt history	No	47 (78.30)	33 (86.80)	14 (63.60)	.036*
	Yes	13 (21.70)	5 (13.20)	8 (36.40)	
Substance use	Never used	50 (83.30)	38 (100.00)	12 (54.50)	<.001**
	Quit	4 (6.70)	0 (0.00)	4 (18.20)	
	Still using	6 (10.00)	0 (0.00)	6 (27.30)	
Alcohol use	Never used	9 (15.00)	8 (21.10)	1 (4.50)	.064
	Quit	7 (11.70)	6 (15.80)	1 (4.50)	
	Still using	44 (73.30)	24 (63.20)	20 (90.90)	
Smoking	Never used	14 (23.30)	14 (36.80)	0 (0.00)	.002**
	Quit	2 (3.30)	2 (5.30)	0 (0.00)	
	Still using	44 (73.30)	22 (57.90)	22 (100.00)	
Family history of psychiatric illness	No	30 (50.00)	20 (52.60)	10 (45.50)	.592
	Yes	30 (50.00)	18 (47.40)	12 (54.50)	
Game preference	Strategic games	41 (68.30)	33 (86.80)	8 (36.40)	<.001**
	Non-strategic games	19 (31.70)	5 (13.20)	14 (63.60)	

Test types: Chi-square tests used for categorical comparisons; p-values reflect significance levels.
*p < .05 is statistically significant.
**p < .01 is highly significant.

= .036), no psychiatric comorbidity (p < .001), no history of substance use (p < .001), and no current smoking (p = .002), compared to Cluster 2. Additionally, Cluster 1 participants were more likely to prefer strategic gambling activities such as sports betting or horse racing, whereas Cluster 2 predominantly preferred non-strategic games like slots or roulette (p < .001).

Table 6 summarizes the comparisons of gambling-related behaviors and clinical scale scores between the two clusters. For continuous variables, Mann-Whitney U tests were applied where appropriate. Cluster 1 participants reported significantly more frequent gambling (days per week; p = .033), lower depression severity (HDRS; p = .023), and higher treatment motivation (TMQ total; p < .001), particularly in internal motivation (p = .011), help seeking (p = .032), and confidence in treatment (p = .006).

Taken together, these findings indicate that Cluster 1 represents individuals with lower psychiatric burden, more adaptive motivational profiles, and a stronger orientation toward recovery. In contrast, Cluster 2 comprises individuals with higher psychological distress, greater clinical risk factors (e.g., comorbidities, substance use, depressive symptoms), and reduced motivation for treatment, suggesting the need for more intensive, supportive, and motivational interventions for this subgroup.

Discussion

Epidemiological research has demonstrated that individuals diagnosed with GD are more likely to exhibit co-occurring psychiatric conditions, and conversely, the prevalence of pathological gambling is elevated among individuals with existing psychiatric disorders (Cowlishaw et al., 2016). In a recent meta-analysis, lifetime psychiatric comorbidity was reported in 75% of individuals with GD (Dowling et al., 2015). The psychiatric comorbidity rate detected in this study is compatible with the literature in this respect. In terms of the frequency of comorbidities, it was observed that the diagnosis of MDD had the highest rate (35%, n = 21). When depressive episodes were examined in more detail, the majority of people with a history of MDD (n = 29, 82.8%) stated that depression was related to gambling behavior and its consequences. A comprehensive epidemiological study (Petry et al., 2005) reported the incidence of mood disorders in cases diagnosed with GD as 49.6%. This rate is similar to the current study's findings.

When gambling participation is examined, the average time devoted to gambling in this study (28.6 hours per week) appears to be substantially higher than what has been reported in previous studies, which found an average of approximately 10 hours per week (Arcan & Karanci, 2015). This discrepancy likely reflects the clinical nature of the sample, as participants were treatment-seeking individuals with more severe gambling problems. The high frequency of gambling (an average of 5.7 days per week) and the elevated financial investment—both weekly and in single sessions—further support the severity of gambling behavior in this group. Considering that 60% of participants reported a monthly income of less than 5000 TL, the data suggest that many individuals may be experiencing significant financial strain, potentially driven by efforts to recover gambling losses or sustain gambling behavior despite limited resources.

While 68.3% of participants in this sample reported a preference for strategic games and 31.7% for non-strategic games, this distribution is meaningful in light of cognitive

Table 6. Comparison of data on gambling activities and scale scores between clusters (n = 60)

Variable	Cluster 1 (C1)	Cluster 2 (C2)	Total Sample	p
Age (years)	36.40	34.00	35.60	.205
Age at gambling onset (years)	25.90	26.30	26.10	.833
Weekly gambling duration (hours)	30.10	26.00	28.60	.272
Weekly money spent (TRY)	6,102.60	27,122.72	13,810.00	.647
Frequency of gambling (days/week)	6.00	5.10	5.70	.033*
Total duration of gambling (years)	10.50	7.50	9.40	.720
Max amount spent at one time (TRY)	38,802.60	70,395.40	50,386.60	.104
Number of games played in lifetime	3.10	3.10	3.10	.931
HDRS (depression score)	7.90	11.90	9.40	.023*
SOGS (gambling severity)	13.90	13.90	13.90	.959
GRCS-Total (cognitive distortions)	74.20	69.50	72.50	.509
TMQ total	105.40	96.20	102.00	<.001**
TMQ-IM	50.00	46.80	48.80	.011*
TMQ-EM	11.40	10.40	11.00	.161
TMQ-HS	23.10	20.90	22.30	.032*
TMQ-CT	20.60	17.80	19.60	.006**

Note: CT = Confidence in treatment; EM = External motivation; GRCS = Gambling-Related Cognition Scale; HDRS = Hamilton Depression Rating Scale; HS = Help seeking; IM = Internal motivation; SOGS = South Oaks Gambling Screening; TMQ = Treatment Motivation Questionnaire; TRY = Turkish Lira.
*p < .05 is statistically significant.
**p < .01 is highly significant.

processing differences highlighted in the literature. Individuals who prefer strategic games are thought to exhibit an analytical cognitive style, characterized by slower, more deliberate information processing and a tendency to invest time in understanding skill-based game mechanics (Mouneyrac et al., 2018). The pattern observed in this sample—where strategic game players were more likely to start with lower monetary investment and develop problematic gambling behavior over time—may reflect a gradual reinforcement process rooted in perceived control and skill illusion. This suggests that while the trajectory of gambling problems among strategic game users may be more prolonged, it may also be shaped by deeper cognitive distortions that sustain engagement.

These findings highlight the clinical significance of distinguishing between strategic and non-strategic gambling preferences. As observed in this study, individuals who prefer non-strategic games may require tailored interventions that address impulsivity and maladaptive coping mechanisms. Conversely, strategies targeting cognitive distortions such as the illusion of control may be more beneficial for individuals who prefer strategic games. This differentiation can guide clinicians in designing personalized treatment plans based on gambling preferences.

In this study, a positive association was observed between the severity of depression and the severity of gambling behavior. Although this finding is consistent with previous research, it is important to note that causality cannot be established due to the cross-sectional nature of the study. Greater gambling-related problems may contribute to the development of depressive symptoms, while individuals experiencing more severe depression may engage in gambling to cope with emotional distress or feelings of hopelessness (Rogier et al., 2019). Moreover, depressive symptomatology can interfere with efforts to regulate gambling behavior, reduce perceived self-efficacy for quitting, and address the financial and interpersonal consequences of gambling. These observations highlight the importance of providing effective psychopharmacological treatment for depression in individuals with gambling problems.

When psychiatric comorbidity and gambling severity were compared, no comorbidity was found to have a significant relationship with gambling severity. However, the fact that most of the participants had psychiatric comorbidities and that they were seen at higher rates than the general population supports the relationship between gambling and psychiatric comorbidity.

Gambling-related cognitive distortions are among the most extensively examined psychological mechanisms in the context of gambling behavior. In this study, distortions such as illusion of control and predictive control were linked to increased gambling severity, highlighting their central role in the development and maintenance of problematic gambling. These findings align with previous research suggesting that individuals who believe they can control or predict gambling outcomes are more likely to engage in persistent and excessive gambling (Cowie et al., 2017; Cunningham et al., 2014). The psychological mechanism behind this may involve a false sense of control that reinforces gambling behavior even in the face of repeated losses. This distorted thinking not only intensifies gambling frequency and severity (Emond & Marmurek, 2010), but may also be particularly pronounced among those who prefer strategic games, where skill-based illusions are more prevalent (Toneatto, 1999). The relevance of these cognitive patterns extends beyond immediate behavior, offering a window into the individual's broader belief systems about gambling, its role in their life, and their perceived inability to stop, which can inform tailored therapeutic interventions.

In this study, a positive relationship was observed between the cognitive distortions of gambling expectations and interpretative bias. This finding implies that individuals who associate gambling with pleasure, perceive it as beneficial in their lives, and maintain motivation by recalling previous wins—even in the face of losses—are more likely to engage in persistent gambling behavior. Furthermore, individuals who exhibited stronger gambling-related cognitions also reported gambling over longer periods and investing greater amounts of money, suggesting that these distortions may contribute to the intensification of gambling engagement over time. In a recent large-scale multinational study (Mestre-Bach et al., 2021), it was reported that gambling-related cognitions generally increased gambling severity. However, while no differences were observed in gambling severity or game preference among the Spanish population, in the U.S. population, gambling severity was found to be higher among strategic players and those with higher predictive control scores. These contrasting findings may point to cultural differences in how gambling-related cognitions manifest and influence behavior, emphasizing the need to consider sociocultural context when developing cognitive interventions for gambling disorder.

As a result, the increase in the participants' thoughts about gambling was associated with greater gambling participation; greater gambling participation, measured by the amount of money spent on gambling and the time spent gambling, was also linked to higher gambling severity in the sample, as measured by the SOGS. This finding is thought to be important as it reveals that gambling-related thoughts with relatively abstract content become more problematic in individuals' lives as concrete gambling participation increases. What it means in practice is that correcting gambling-related thoughts whose validity and functionality will be questioned in the therapy environment would limit gambling behavior.

Regardless of the severity of gambling, a positive association was observed between depression levels and difficulties in stopping gambling behavior. This finding is consistent with previous studies. For example, Ciccarelli et al. (2017) found that pathological gamblers had significantly higher depression scores than healthy controls, and that depression was a significant predictor of gambling severity, suggesting that depressive symptoms play a critical role in maintaining gambling behaviors. Similarly, Lee and Hong (2018) also reported a strong association between depressive symptoms

and difficulty in regulating gambling urges (Ciccarelli et al., 2017; Lee & Hong, 2018).

The relationship can be interpreted in two directions: individuals with depression may perceive their self-efficacy to quit gambling as low and hesitate to take action due to symptoms such as low self-esteem, feelings of worthlessness and inadequacy, hopelessness, and psychomotor retardation. This, in turn, may further exacerbate depressive symptoms as gambling continues and financial difficulties increase, potentially leading to a sense of helplessness and even suicidal ideation. Therefore, during clinical interviews with depressed individuals, cognitions related to the inability to stop gambling should be carefully explored and addressed.

Furthermore, individuals without psychiatric comorbidities demonstrated higher treatment motivation levels compared to those with psychiatric comorbidities. This suggests that the presence of additional psychiatric diagnoses may hinder individuals' readiness or perceived capacity to engage in recovery efforts for gambling disorder. Consistent with this interpretation, prior studies have shown that psychiatric comorbidity is associated with reduced help-seeking behaviors and an increased likelihood of early treatment dropout (Cowlishaw et al., 2016; Melville et al., 2007). These findings emphasize the importance of addressing co-occurring mental health issues to enhance treatment motivation and improve engagement in clinical settings.

Depression severity, as assessed by the Hamilton Depression Rating Scale, was negatively associated with confidence in treatment. This finding, consistent with previous research (Dąbrowska et al., 2017; Melville et al., 2007), suggests that individuals with elevated depressive symptoms may experience hopelessness and low self-efficacy, leading to a belief that their condition cannot be improved and that treatment would be ineffective in addressing their gambling-related problems

Furthermore, individuals with more severe gambling behaviors tended to report higher levels of extrinsic motivation. This trend suggests that their engagement in treatment may be primarily driven by external pressures—such as financial difficulties or interpersonal conflicts—rather than an intrinsic desire for behavioral change. Such individuals may seek treatment to avoid further loss of social or familial support, rather than to address the underlying psychological factors contributing to their gambling behavior. This interpretation aligns with prior research indicating that extrinsic motivators often serve as key drivers for treatment initiation among individuals experiencing substantial gambling-related consequences (Evans & Delfabbro, 2005). Understanding the source of treatment motivation is essential for designing more personalized and effective therapeutic interventions.

Various studies in the literature have aimed to conceptualize the clinical heterogeneity of GD through subtyping approaches. Identifying distinct clinical subgroups is critical for enhancing the personalization and effectiveness of therapeutic interventions (Milosevic & Ledgerwood, 2010). Previous cluster analyses in GD populations have focused on gambling behaviors such as time and money spent (Heiskanen & Toikka, 2016), preferred gambling activities (Challet-Bouju et al., 2015), and emotional motivations underlying gambling behavior (Stewart et al., 2008). These diverse clustering strategies underscore the multifaceted nature of GD and highlight the need for multidimensional assessment. Building upon this foundation, this study integrates sociodemographic, clinical, behavioral, and motivational variables to derive meaningful subtypes, potentially informing more tailored treatment strategies

In this study, the first cluster was defined by a relatively lower presence of psychopathology and higher levels of treatment motivation. This group also exhibited more favorable clinical and behavioral indicators, including higher employment rates, lower depression scores, less nicotine and substance use, fewer suicide attempts, and a preference for strategic games. These characteristics suggest that individuals in this cluster may possess more adaptive coping strategies and better overall functionality. In contrast, the second cluster was marked by greater clinical burden—higher rates of psychiatric comorbidity, substance use, and depressive symptoms—and reduced treatment motivation. Although no significant differences were observed between the clusters regarding age of gambling onset or levels of gambling activity, the preference for non-strategic games among individuals in the second cluster may reflect underlying impulsivity and the use of gambling as a maladaptive coping mechanism.

This pattern is consistent with previous research indicating that factors such as psychiatric comorbidity, substance use, and unemployment are associated with poor treatment engagement and higher dropout rates (Melville et al., 2007). Moreover, non-strategic games like slots and roulette have been linked to higher addictive potential and impulsivity (Toneatto, 1999), which may further complicate the clinical picture. While some studies have found no direct relationship between gambling severity and treatment motivation (Aragay et al., 2015; Leblond et al., 2003), the current study's findings suggest that the interplay between psychological distress and gambling preferences could influence one's readiness for change. These results underline the importance of evaluating individual risk profiles in clinical settings and adapting treatment strategies accordingly to enhance outcomes for individuals with GD.

The cluster analysis findings support the hypothesis that gambling-related variables such as gambling expenditure, duration of past gambling years, and gambling preferences are associated with gambling severity and cognitive distortions. The identification of two distinct subgroups highlights the clinical relevance of these variables, reinforcing the need for tailored intervention strategies based on individual risk profiles. Individuals with higher psychological distress and reduced motivation may require more intensive therapeutic interventions, while those in the first cluster may benefit more from motivational enhancement strategies.

Depression severity, gambling-related cognitions, and treatment motivation are important factors in the treatment of GD. Patients applying for treatment should be evaluated in terms of their treatment motivation levels and comorbid psychopathologies. Moreover, gambling-related cognitive distortions should be systematically assessed and addressed during therapy, especially by exploring their personal meaning and validity in a therapeutic context.

Limitations and Directions for Future Research

This study has several limitations. First, the sample consisted solely of treatment-seeking individuals diagnosed with GD, which limits the generalizability of the findings to non-treatment-seeking populations. The sample also excluded professional gamblers, whose gambling behavior patterns may differ significantly from those driven by emotional escape or anxiety. Furthermore, the sample consisted entirely of male participants, preventing any gender-based comparisons in gambling behavior. The relatively small sample size and cross-sectional design further limit the scope of inference. Additionally, the TMQ used in the study was originally developed for individuals with alcohol or substance use problems and is based on self-report, which may reduce its reliability in a GD population.

Despite these limitations, the study has several noteworthy strengths. It was conducted in a tertiary care addiction unit, with participants clinically diagnosed using a gold-standard structured interview (SCID-5-CV). The clinician-rated Hamilton Depression Scale was used instead of a self-report tool, providing a more objective assessment of depressive symptoms. Importantly, the study included information from family members, which enhanced data reliability—particularly in detecting concealed or minimized gambling behaviors. The sample's exclusive focus on individuals seeking treatment for gambling problems allowed for a detailed exploration of clinical profiles, including gambling-related cognitive distortions, depression, and treatment motivation, making it one of the few in Türkiye to do so comprehensively. These features increase the clinical utility and ecological validity of the findings.

For future research, it is recommended to conduct longitudinal studies with larger and more diverse samples, including female participants and non-treatment-seeking individuals, to better understand the progression and treatment outcomes of GD. In addition, studies using structural equation modeling or mediation/moderation analyses may help clarify the mechanisms underlying the relationships among variables. Incorporating mixed-method approaches that include both qualitative and quantitative data could provide a more comprehensive understanding of individual experiences and treatment processes. Finally, cross-cultural studies examining gambling-related cognitions and motivations within the framework of cultural values and norms may further enrich the literature.

Author contributions

Conception: İ.P., H.C., O.P.; Design: İ.P., H.C.; Data acquisition: İ.P., H.C.; Data analysis: İ.P., H.C.; Data interpretation: İ.P., H.C., O.P.; Drafting of the manuscript: İ.P., H.C., O.P.; Critical revision of the manuscript: İ.P., H.C., O.P. All authors reviewed the results, approved the final version of the manuscript, and agreed to be accountable for all aspects of this study.

Ethical approval

This study was approved by the Ethics Committee of Ege University (Date: May 17, 2021, Decision/Protocol No: 2021/34). Informed consent was obtained from all participants involved in this study.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare that this study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The authors declare that no generative AI or AI-assisted technologies were used in the writing or preparation of this study.

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