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Roser Granero PhD^{a b}, Eva Penelo PhD^a, Randy Stinchfield PhD^c, Fernando Fernández-Aranda PhD^{b d e}, Neus Aymamí MSc^d, Mónica Gómez-Peña MSc^d, Ana B. Fagundo PhD^d, Sarah Sauchelli MSc^d, Mohammed A. Islam MSc^{b d}, José M. Menchón PhD, MD^{d e f} & Susana Jiménez-Murcia PhD^{b d e}

^a Department of Psychobiology and Methodology of Health Science, Autonomous University of Barcelona, Barcelona, Spain

^b CIBER Physiopathology of Obesity and Nutrition (CIBEROBN), National Institute of Health Carlos III, Barcelona, Spain

^c Department of Psychiatry, University of Minnesota Medical School, Minneapolis, Minnesota, USA

^d Pathological Gambling Unit, Department of Psychiatry, Bellvitge University Hospital-IDIBELL, Barcelona, Spain

^e Department of Clinical Sciences, School of Medicine, University of Barcelona, Barcelona, Spain

^f CIBER Mental Health (CIBERSAM), National Institute of Health Carlos III, Barcelona, Spain

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CONTRIBUTION OF ILLEGAL ACTS TO PATHOLOGICAL GAMBLING DIAGNOSIS: DSM-5 IMPLICATIONS

Roser Granero, PhD^{1,2}, Eva Penelo, PhD¹, Randy Stinchfield, PhD³, Fernando Fernández-Aranda, PhD^{2,4,5}, Neus Aymamí, MSc⁴, Mónica Gómez-Peña, MSc⁴, Ana B. Fagundo, PhD⁴, Sarah Sauchelli, MSc⁴, Mohammed A. Islam, MSc^{2,4}, José M. Menchón, PhD, MD^{4,5,6}, Susana Jiménez-Murcia, PhD^{2,4,5}

¹Department of Psychobiology and Methodology of Health Science, Autonomous University of Barcelona, Barcelona, Spain

²CIBER Physiopathology of Obesity and Nutrition (CIBEROBN), National Institute of Health Carlos III, Barcelona, Spain

³Department of Psychiatry, University of Minnesota Medical School, Minneapolis, Minnesota, USA

⁴Pathological Gambling Unit, Department of Psychiatry, Bellvitge University Hospital-IDIBELL, Barcelona, Spain

⁵Department of Clinical Sciences, School of Medicine, University of Barcelona, Barcelona, Spain

⁶CIBER Mental Health (CIBERSAM), National Institute of Health Carlos III, Barcelona, Spain

The purposes of this study were to examine the specific contribution of illegal acts to the diagnostic criteria of pathological gambling, to assess the possibility of differential item functioning across patients' sex and age, and to explore the existence of different clinical phenotypes based on the presence of illegal acts. The sample consisted of 2,155 patients seeking treatment for pathological gambling at the University Hospital of Bellvitge in Barcelona, Spain. The illegal acts item did not show different item functioning, and younger patients presented higher latent means than middle-aged and older patients, whereas no differences were found across sex. This item also showed the lowest discrimination coefficient; its exclusion would maintain satisfactory internal consistency for the remaining 9 symptoms and was poorly related to psychopathology and the severity of the gambling behavior. The relevance of the illegal acts as a diagnostic criterion appears to be limited, and its elimination from the *Diagnostic and Statistical Manual for Mental Disorders*, 5th edition, seems justified. However, illegal acts have implications for both the clinical and legal domains and contribute to increase the patients' impairment.

KEYWORDS. DSM, illegal acts, measurement invariance, pathological gambling

INTRODUCTION

Pathological gambling was classified in the *Diagnostic and Statistical Manual for Mental Disorders*, 4th edition (DSM-IV-TR),¹ under Impulse-Control Disorders Not Elsewhere Classified. The DSM-5 Work Group ([formed by expert researchers from various areas of scientific knowledge, on substance-related disorders] [[\[RelatedDisorders.aspx\]\(#\)\]\) has renaming pathological gambling as disordered gambling and placed it under the modified category Addiction and Related Disorders, along with other substance- and alcohol-related addictions. The main rationale for this reclassification are the following: \(a\) the inappropriateness of the label Impulse Control Disorder because its definition is applicable to the description](http://www.dsm5.org/MeetUs/Pages/Substance-</p></div><div data-bbox=)

Address correspondence to Susana Jiménez-Murcia, PhD, Department of Psychiatry and CIBEROBN, Bellvitge University Hospital, c/ Feixa Llarga s/n 08907, L'Hospitalet de Llobregat Barcelona, Spain. E-mail: sjimenez@bellvitgehospital.cat

of many psychological problems and does not specify the nature of the disorder; (b) behavioral addictions, such as the gambling disorder and other substance addictions, have many commonalities in their phenotypes and the treatment strategies used, which justifies their grouping; and (c) the high co-occurrence of substance use and pathological gambling.^{2,3}

The DSM-5 Work Group has also accepted the proposal of reducing the threshold for the diagnosis of pathological gambling from 5 to 4 criteria. This change is congruent with studies that have found a cutoff point of 4 criteria to increase the sensitivity in the identification of disordered individuals and the improvement of diagnostic accuracy.⁴⁻⁶ The endorsement of a 4 or more criteria-based threshold significantly improved the estimation of epidemiological indices, with an increase of 5% (from 20.5% to 25.5%) in the identified prevalence of pathological gambling within a clinical sample of French patients seeking treatment for addictive behavior.⁷ Finally, the DSM-5 Work Group has considered the recommended elimination of the symptom "illegal acts" as part of the pathological gambling disorder. This criterion is defined in the DSM-IV-TR as "forgery, fraud, theft, or embezzlement to finance gambling."¹ Although gambling preoccupations is the most useful symptom when discerning the less severe cases, the presence of illegal acts is strongly linked to greater severity and worse prognosis.⁸ Such findings, used as the main rationale for the exclusion of the criterion in the National Epidemiologic Survey on Alcohol and Related Conditions (<http://www.niaaa.nih.gov/>), suggest that the presence of illegal acts related to gambling does not in itself enable the necessary sensitivity to discriminate the disorder and is not sufficiently powerful enough to improve the diagnosis precision. In a recent study performed with different community and clinical samples, illegal acts were rarely found to occur in the absence of other diagnostic criteria; therefore, the elimination of this criterion from the DSM-5 was not deemed to have a major impact on diagnostic accuracy.¹⁰

National epidemiological studies in the United States^{11,12} and the United Kingdom¹³

demonstrated that illegal acts related to gambling usually occur in the presence of the other criteria and are seen in patients with the most severe clinical profiles.⁸ In a large sample of patients seeking help for gambling problems, gambling-related illegal acts were linked to specific clinical profiles, characterized by multiple forms of gambling, debts to acquaintances, suicidal attempts, and use/abuse of alcohol or drugs.¹⁴ In the same study, patients who had been arrested or incarcerated in the past because of their gambling behavior were found to obtain psychological measures more similar to the antisocial personality disorder than those who had been convicted for other types of illegal acts.¹⁴ This set of evidence suggests that gambling-related illegal behavior could be regarded as an additional element of the impairment caused by the disorder and that affects others, particularly the family and friends.

The presence of illegal acts as part of the diagnostic criteria has been attributed to the attempt to meet the requirements of the current legal system in developed countries, which demands the careful separation of the intrinsic elements of a psychological disorder from the behaviors that are specific consequences of the disease.¹⁵ The DSM-IV-TR criteria for pathological gambling suggest that illegal acts constitute another element of the underlying pathology, as is the case of other facets such as impulsivity or lack of control, and could thus be used to shorten the sentence. However, exclusion of the illegal acts criterion from the diagnostic criteria for pathological gambling is not a reason to ignore its legal relevance. There is a need to examine the legal consequences of gambling because the presence of illegal behavior is a powerful risk factor for more severe psychopathological outcomes, which implies that more intensive treatment is required.¹⁵ Following this line of argument, the accumulation of evidence of a potential broad spectrum comprising illegal acts and gambling and the exploration of the possible existence of specific subtypes of pathological gambling based on illegal acts via the assessment of large samples of patients diagnosed with pathological gambling has been promoted.¹⁶

The existing literature seems to propose that the illegal acts could be considered as the outcome of severe pathology rather than a criterion necessary for the diagnosis of the disorder. Nonetheless, despite the numerous publications on the topic, there is a lack of studies using broad clinical samples. The evaluation of the usefulness of this criterion for the diagnosis of pathological gambling may confirm the findings in the current literature. Therefore, the objectives of this study are to examine the specific contribution of illegal acts to the diagnostic criteria in a large sample of patients seeking help for pathological gambling, to explore the invariance of this contribution when the patients' sex and age are taken into consideration, and to compare clinical phenotypes of pathological gamblers with and without the presence of illegal acts.

METHODS

Participants

A total of 2,155 pathological gambling patients (1,950 men) who consecutively attended assessment and outpatient treatment at a Pathological Gambling Unit in the psychiatric department of one general hospital in Barcelona, Spain, were diagnosed by psychologists and psychiatrists experienced in pathological gambling using the Diagnostic Questionnaire for Pathological Gambling according to DSM-IV criteria.⁵ Participants were consecutive referrals to the University Hospital of Bellvitge in Barcelona between May 2002 and April 2008. From an initial sample of 2,221, sixty-six individuals were excluded due to incomplete data that were required for the statistical analyses ($n = 66$).

Participants had a mean age of 42.2 years ($SD = 13.4$ years), a mean age of onset of 36.3 years ($SD = 13.2$ years), and a mean evolution of the problem of 5.6 years ($SD = 6.1$ years). The majority (90.5%) of participants were men, 59.3% were employed, 92.1% were born in Spain, and 51.3% were married or lived with their partner (35.0% were single and 13.6% divorced). Educational level was

distributed as follows: 67.7% primary or less, 37.1% secondary, and 5.2% university studies.

Measures

South Oaks Gambling Screen (SOGS)¹⁷

Spanish validation was performed by Echeburúa et al.¹⁸ This is a 20-item screening questionnaire that identifies probable pathological gambling. The Spanish validation of this questionnaire shows high reliability and validity. Test-retest reliability is .98 ($p < .001$) and internal consistency is 0.94 (Cronbach's alpha). Convergent validity with respect to DSM-III-R criteria for pathological gambling was estimated to be 0.92 ($p < .001$). The total score was used in this study.

Diagnostic Questionnaire for Pathological Gambling According to DSM-IV Criteria⁵

Spanish adaptation was performed by Jimenez-Murcia et al.⁴ This 19-item questionnaire assesses the DSM-IV diagnostic criteria for pathological gambling. Internal consistency is 0.81 for the general population, and 0.77 for the gambling treatment samples. Convergent validity with the SOGS scores was high: $r = 0.77$ for the general population and $r = 0.75$ for the gambling treatment groups.⁵

Symptom Check List-90 Items-Revised (SCL-90-R)¹⁹

The SCL-90-R was administered to evaluate a broad range of psychological problems and psychopathology symptoms. This test contains 90 items and aids the measurement of 9 primary symptom dimensions: Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. In addition, it includes 3 global indices: a global severity index (GSI), which measures overall psychological distress; a positive symptom distress index (PSDI), which measures the intensity of symptoms; and a positive symptom total (PST), which provides the total self-reported symptoms. The GSI can be used as a summary of the test. This scale has been validated in a Spanish population, obtaining an acceptable mean internal consistency of 0.75.²⁰

Temperament and Character Inventory-Revised (TCI-R)²¹ This is a 240-item questionnaire with a 5-point Likert scale format.

Similar to the original TCI version,²² this questionnaire is a reliable and valid measure of 7 personality dimensions: 4 of temperament (harm avoidance, novelty seeking, reward dependence, and persistence) and 3 of character (self-directedness, cooperativeness, and self-transcendence). The performance in the Spanish original version²³ and in the revised version²⁴ has been well-documented. Internal consistency of the different temperament and character dimensions in the Spanish adaptation ranged from 0.77 to 0.84.

Additional demographic, clinical, and socio-familiar variables related to gambling were measured using a semi-structured clinical interview described elsewhere.^{25,26}

Procedure

The assessment was conducted prospectively from baseline and entailed a single session (with a mean duration of 90 minutes) during which the above mentioned tests were administered by trained clinical psychologists (SJM, NA, MGP). Data were evaluated at intake.

The study was performed in accordance with the latest version of the Declaration of Helsinki. The Ethics Committee of the University Hospital of Bellvitge approved the study, and informed consent was obtained from all participants.

Statistical Analysis

Analyses were performed using SPSS version 20 software for Windows and MPlus6. Confirmatory factor analysis was conducted using weighted least squares means and variance, adjusted for the categorical data method of estimation with theta parameterization. A 10-symptom and 1-factor model was tested. Goodness of fit was assessed using the common fit indices:²⁷ The χ^2 , comparative fit index, and root mean square error of approximation.

First, factorial invariance across sex and age groups was evaluated with a multigroup approach following the common sequence.²⁸ For nested models comparisons, invariance should not be rejected if the decrease in comparative fit index was lower than 0.01.²⁹ Second, given the obtained results, the overall sample

was evaluated using a single-sample approach, after which the association between the DSM scale scores and age and sex was tested using a multiple-indicator multiple-cause (MIMIC)³⁰ structural equation model.³¹ Thus, a binary variable for sex and 2 dummy dichotomous variables for age group (with the younger group being used as the reference category) were added as single indicators to freely correlate to the latent variable (i.e., factor). Internal consistency of the derived scale was measured through the omega coefficient.³²

Third, the comparison of the clinical profiles between patients with and without the presence of illegal acts criterion was performed using chi-square tests for categorical outcomes and analysis of variance for quantitative criteria. Due to the large sample size and the high power of the statistical comparisons, the effect size was evaluated through Cohen's *d* coefficient, assuming a null size for $d < 0.20$, small size for $0.20 < d < 0.50$, medium size for $0.50 < d < 0.80$, and large size for $d > 0.80$. Finally, the relative contribution of each DSM-IV-TR diagnostic criteria for pathological gambling on the level of psychopathology and the severity of pathological gambling was measured with multiple linear regressions, simultaneously entering the complete diagnostic criteria list.

RESULTS

Factor Structure and Internal Consistency (Confirmatory Factor Analysis)

Regarding participants' sex (Table 1, top) and age groups (Table 1, center), model-fit was satisfactory for single-sample models and configural invariance was also supported (comparative fit index, ≥ 0.900 ; root mean square error of approximation, ≤ 0.056). Complete measurement and structural invariance were found; all parameters were equal across men and women and across all 3 age groups.

Given that strict measurement invariance (equal factor loadings, item thresholds, and uniquenesses) across sex and age was achieved, a final confirmatory factor analysis was conducted over all participants (Table 1, bottom).

TABLE 1. Goodness-of-Fit Indices for the Different Models

Model	Goodness-of-fit indices			Nested models comparison	
	χ^2 (df)	CFI	RMSEA	Comparison	Δ CFI
By sex					
M1: Females ($n = 205$)	51.79 (35)	.920	.048		
M2: Males ($n = 1950$)	211.01 (35)	.928	.051		
M3: Equal form	247.39 (70)	.928	.048		
M4: Strong invariance	261.30 (78)	.926	.047	M4 vs M3	-.002
M5: Strict invariance	279.78 (88)	.923	.045	M5 vs M4	-.003
M6: M5 + equal factor variances	235.94 (89)	.941	.039	M6 vs M5	.018
By age group					
M7: Young ($n = 815$)	112.46 (35)	.917	.052		
M8: Middle ($n = 929$)	136.45 (35)	.900	.056		
M9: Old ($n = 403$)	48.06 (35)	.974	.030		
M10: Equal form	294.72 (105)	.922	.050		
M11: Strong invariance	330.66 (121)	.914	.049	M11 vs M10	-.008
M12: Strict invariance	372.42 (141)	.905	.048	M12 vs M11	-.009
M13: M12 + equal factor variances	333.63 (143)	.922	.043	M13 vs M12	.017
M14: CFA overall sample ($N = 2155$)	240.11 (35)	.923	.052		
M15: MIMIC (age and sex) ($N = 2147$)	305.56 (62)	.911	.044		

CFI = comparative fit index; RMSEA = root mean square error of approximation; CFA = confirmatory factor analysis; MIMIC = multiple-indicator multiple-cause.

The inclusion of sex and age as external binary indicators (MIMIC, M15) showed that middle (middle vs. younger: $d = -0.15$, $\beta = -.07$, $P = .017$) and especially older participants (older vs. younger: $d = -0.60$, $\beta = -.23$, $P < .001$) scored significantly lower than younger participants, but there were no statistically significant differences by sex ($d = 0.19$, $\beta = .05$, $P = .053$). These mean differences based on latent construct (total score) are reflected in each of the individual items, including item A08. Figure 1 presents the main parameters for the final model. All factor loadings were statistically significant ($P < .001$) and ≥ 0.40 (standardized

parameters). The illegal acts criterion (item A08) achieved the lowest factor loading (0.40), but it was nonetheless statistically significant.

Internal consistency for the 10 DSM-IV-TR diagnostic criteria model was satisfactory ($\omega = .832$). The illegal acts criterion was the item that less contributed to the internal consistency of the scale score, and its exclusion only modified the omega coefficient to $\omega = .829$.

Prevalence of Illegal Acts

The first column of Table 2 contains the prevalence of the DSM-IV-TR diagnostic criteria. The least prevalent criterion was the A8 "Illegal acts"

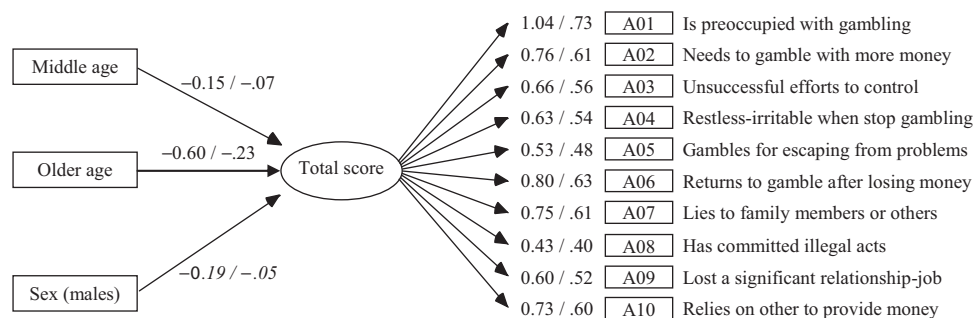


FIGURE 1. Final multiple-indicator multiple-cause model (M15) including unstandardized/standardized solution with factor loadings and path for factor mean on age groups (0: younger age) and sex (0: females). Item error variances and thresholds are omitted. In italicized font: parameters not statistically significant ($P > .05$).

TABLE 2. Comparison Between Patients With and Without Illegal Acts on Clinical Variables

Measure	Prevalences or means			Comparison for IA	
	Total (n = 2,155)	Without IA (n = 1,656)	With IA (n = 498)	P	Cohen's d
DSM-A1: Preoccupations with gambling, %	70.00	65.92	83.53	<.001	0.414
DSM-A2: Needs of gamble with more money, %	55.29	51.45	68.07	<.001	0.344
DSM-A3: Unsuccessful efforts to control, %	89.51	88.83	91.77	.061	0.099
DSM-A4: Restless-irritable when stop gambling, %	61.23	59.30	67.67	.001	0.175
DSM-A5: Gambles for escaping of problems, %	68.80	66.67	75.90	<.001	0.205
DSM-A6: Returns to gamble after losing money, %	78.17	75.95	85.54	<.001	0.245
DSM-A7: Lies to family members or others, %	92.15	90.58	97.39	<.001	0.289
DSM-A8: Illegal acts, %	23.12	0	100.00	—	—
DSM-A9: Lost a significant relationship/job, %	83.70	81.10	92.37	<.001	0.337
DSM-A10: Relies on other to provide money, %	73.85	69.91	86.95	<.001	0.423
DSM-A: Total criteria, mean	6.96	6.50	8.49	<.001	1.107**
Number of addictive gamblers, mean	1.3	1.2	1.3	.019	0.115
Suicidal ideation related to gambling, %	21.51	21.69	20.90	.752	0.019
Suicidal behaviors related to gambling, %	8.04	7.07	11.18	.004	0.143
Mental disorders (present), %	33.42	31.71	38.90	.004	0.151
History of mental disorders (past), %	42.96	41.16	48.72	.004	0.153
History of mental disorders (family), %	60.18	57.89	67.60	<.001	0.202
Smoker (yes), %	73.30	71.77	78.27	.006	0.151
Maximum bets (euros), mean	900.4	771.0	1330.1	<.001	0.186
Mean bets (euros), mean	176.4	142.4	296.5	.002	1.151**
Cumulate debts (euros), mean	9764.5	9059.2	12075.8	.079	0.105
No. of previous consultations for gambling, mean	0.83	0.71	1.20	.020	0.122
SCL-90: Somatization	0.93	0.87	1.09	<.001	0.260
SCL-90: Obsessive/compulsive	1.10	1.03	1.34	<.001	0.383
SCL-90: Interpersonal sensitivity	1.00	0.93	1.22	<.001	0.354
SCL-90: Depressive	1.43	1.35	1.70	<.001	0.385
SCL-90: Anxiety	0.98	0.91	1.20	<.001	0.363
SCL-90: Hostility	0.88	0.80	1.14	<.001	0.404
SCL-90: Phobic anxiety	0.48	0.44	0.58	<.001	0.205
SCL-90: Paranoid ideation	0.87	0.81	1.03	<.001	0.283
SCL-90: Psychotic	0.86	0.79	1.08	<.001	0.378
SCL-90: GSI score	1.02	0.95	1.23	<.001	0.402
SCL-90: PST score	45.5	43.6	51.5	<.001	0.367
SCL-90: PSDI score	1.86	1.81	2.02	<.001	0.358
TCI-R: Novelty seeking	108.9	106.9	115.5	<.001	0.608**
TCI-R: Harm avoidance	101.2	101.0	102.1	.229	0.065
TCI-R: Reward dependence	99.9	100.4	98.4	.015	0.134
TCI-R: Persistence	110.1	110.7	108.1	.022	0.125
TCI-R: Self-directedness	127.5	129.7	120.7	<.001	0.423
TCI-R: Cooperativeness	132.4	133.9	127.4	<.001	0.369
TCI-R: Self-transcendence	64.7	64.8	64.5	.774	0.016

IA = illegal acts; DSM = *Diagnostic and Statistical Manual for Mental Disorders*; SCL-90 = Symptom Check List-90; GSI = Global Severity Index; PST = positive symptom total; PSDI = positive symptom distress index; TCI-R = Temperament and Character Inventory-Revised. *Medium effect size ($0.5 \leq d \leq 0.8$). **Large effect size ($d \geq 0.80$).

(n = 498 reported it; prevalence = 23.1%, 95% CI = 21.3%÷24.9%) and the most prevalent was the A7 "Lies to family members or others" (n = 1,985; prev. = 92.2%, 95% CI = 91.0%÷93.3%). The percentage of participants with 3 or less diagnostic criteria was 7.1% (95% CI = 6.0%÷8.2%), with 4 criteria was 5.3% (95% CI = 4.4%÷6.3%), and

with 5 or more criteria was 87.6% (95% CI = 86.2%÷90.0%). Only 5 participants (1.0%) who reported the presence of illegal acts obtained a total score of 2 or 3 in the list of DSM-IV-TR diagnostic criteria. Another 5 (1.0%) participants achieved a total score of 4, and the remaining 488 (98%) obtained a score equal to or greater than 5.

Comparison Between Patients Who Did and Did Not Perform Illegal Acts

Patients who performed illegal acts were more frequently unemployed (44.9% vs. 39.4%; $p = .030$) and single or widow (44.0% vs. 32.3%; $p < .001$) when compared with patients who did not perform illegal acts, whereas no differences were found for the percentage of immigrants ($P = .765$) and socioeconomic status ($P = .094$). As mentioned previously, 23% of the sample reported having committed 1 or more illegal behaviors due to gambling problems: 31% committed forgery, 24% committed embezzlement, 77% committed theft, and 7% committed robbery.

Comparison between patients who performed and who did not perform illegal acts showed statistically significant differences in almost all of the psychopathological outcomes (Table 2) except for DSM-A3 (unsuccessful efforts to control), the presence of suicidal ideation, and cumulative debts. However, apart from the sum of DSM-IV-TR criteria and mean bets (higher means for participants who reported illegal acts), many differences achieved only small effect size. Statistically significant differences also emerged when comparing TCI-R mean scores, with the exception of the harm avoidance and self-transcendence scales. The size of the differences was small (except for the novelty seeking scale, a high mean score was observed for participants with illegal acts).

Regarding SOGS scores (Table 3), the percentage of patients playing different gambling games was statistically equal for participants with and without illegal acts, with the exception of cards, casino, and bingo (greater prevalence between those patients who reported illegal acts). All of the SOGS items and the SOGS total scores also provided statistically greater prevalence in the cohort of illegal activity commissioners, with the exception of the SOGS-9 (feeling guilty) and SOGS-16j (money from credit account casino). The effect sizes were low, except for the SOGS-14 (borrowing money, not paying back), SOGS-15 (skipping work due to gambling), and SOGS-total score.

Contribution of Illegal Acts on Pathological Gambling Severity (SOGS) and Psychopathology (SCL-90-R)

Results of multiple regressions shown in Table 4 indicate that all of the DSM-IV-TR diagnostic criteria for pathological gambling significantly contributed to the SOGS total score, and the most relevant criterion was the A10 (relies on others to provide money), followed by the A6 (playing after losing), A9 (lost relationships), and A8 (illegal acts). The lowest contribution to severity was the A5 (gamble for escaping from problems).

Criteria A1 (preoccupations with gambling), A2 (needs for gambling with more money), A4 (restless-irritable), and A5 (gamble for escaping from problems), obtained significant and high contributions for all the SCL-90-R scales, whereas the A3 (unsuccessful control), A6 (gambling after losing), and A7 (lies) did not achieve significant contributions for any scale. The A8 (illegal acts) also contributed significantly in all SCL-90-R scores (except for phobic anxiety), but the size of contributions tended to be lower than those of the A1, A2, A4, and A5 criteria. Criteria A9 (lost relationships) and A10 (relies on others to provide money) only contributed significantly in some SCL-90-R scales but had reduced relevance than the A8 (illegal acts).

DISCUSSION

Twenty-three percent of the total sample has committed illegal acts associated with a gambling problem. This is congruent with other studies reporting a prevalence ranging from 14% and 30%,^{15,33} although it is believed to be even greater in patients with highly severe gambling behavior.⁹ Furthermore, the criterion illegal acts was the least present in the sample, which is concordant with the literature.^{7,9} It is also a criterion that does not emerge in an isolated manner, but rather always with several other criteria.¹⁰ For these reasons, several studies propose that the exclusion of such criterion would have little effect on the recorded rates of pathological gambling, considering that illegal

TABLE 3. Comparison Between Patients With and Without Illegal Acts on SOGS Scores

SOGS Measure	Prevalences		Comparison for IA	
	Without IA (n = 1,656)	With IA (n = 498)	<i>p</i>	Cohen's <i>d</i>
1a- Playing cards, %	37.68	45.55	.002	0.160
1b- Playing horse races, %	3.42	3.26	.866	0.009
1c- Playing sports, %	1.43	2.04	.349	0.046
1d- Playing numbers-lotteries, %	87.85	88.10	.878	0.008
1e- Playing casino, %	20.42	30.89	<.001	0.241
1f- Playing bingo, %	52.15	58.54	.013	0.129
1g- Stock market, %	5.45	5.12	.778	0.015
1h- Playing slot machines, %	92.59	91.50	.426	0.040
1i- Other bets, %	9.01	18.78	<.001	0.285
2- Amount money spent: ≥ 300 euros, %	51.37	65.05	<.001	0.280
3- Family antecedents of gambling, %	21.25	26.88	.010	0.132
4- Going back to win back lost money, %	92.48	95.98	.006	0.150
5- Claimed winning when loosing, %	37.56	51.71	<.001	0.288
6- Problem recognition, %	95.12	98.19	.003	0.171
7- Gambling more than planned, %	91.59	97.18	<.001	0.245
8- Being criticized, %	68.16	78.79	<.001	0.243
9- Feeling guilty, %	96.16	96.38	.820	0.012
10- Unable to stop gambling, %	88.94	92.76	.014	0.133
11- Hiding signs of gambling, %	67.01	84.21	<.001	0.409
12- Discussions with family/friends, %	77.89	86.44	<.001	0.225
13- Discussions and fights, %	67.36	73.73	.009	0.140
14- Borrowing money, not paying back, %	40.49	69.01	<.001	0.598*
15- Skipping work due to gambling, %	40.45	66.40	<.001	0.539*
16a- Money from home, %	55.75	75.55	<.001	0.426
16b- Money from couple, %	21.36	43.66	<.001	0.490
16c- Money from family, %	39.91	54.71	<.001	0.300
16d- Money from banks, %	47.69	61.99	<.001	0.290
16e- Credit cards, %	53.69	62.79	.001	0.185
16f- Money from money lender, %	10.75	16.08	.004	0.157
16g- Money from financial papers, %	2.85	5.41	.015	0.129
16h- Money from property sales, %	6.93	20.94	<.001	0.413
16i- Money from falsified checks, %	0.23	4.40	<.001	0.280
16j- Money from credit account casino, %	1.31	2.61	.075	0.094
SOGS: total score, mean (SD)	9.55 (3.08)	11.85 (3.09)	<.001	0.747**

IA = illegal acts; SOGS = South Oaks Gambling Screen. *Medium effect size ($0.5 \leq d \leq 0.8$). **Large effect size ($d \geq 0.80$).

acts are generally present in the context of 5 or more DSM-IV-TR criteria.^{8,9}

The results in this study suggest that this is not universal because 2% of the sample did not exhibit 5 or more criteria; however, all studies agree on the existence of a clear association between pathological gambling severity and the presence of illegal behavior.^{15,16,34,35} Moreover, the data show that illegal acts provide the lowest contribution to the reliability of the pathological gambling diagnosis in patients seeking help for pathological gambling, and this is invariant to the patients' sex and age. Nonetheless, the presence of this behavior may be relevant from a clinical perspective as a way to assess the psy-

chopathology related to the disorder and the severity of the gambling conduct.

The factor analysis on the DSM-IV-TR diagnostic criteria for pathological gambling showed the criterion illegal acts to achieve a significant loading, although the lowest and its contribution on the global internal consistence was irrelevant. These results agree with other studies concluding that illegal acts are not pertinent for the internal validity of the pathological gambling diagnosis.^{7,8,34,36} The invariance of the internal structure by sex and age is a new argument to justify the exclusion of illegal acts as criterion.

The results also highlight that illegal acts contribute significantly to the patients' general

TABLE 4. Relative Contribution of Pathological Gambling Diagnostic Criteria to Psychopathology and Severity

Criteria	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
SOGS total score	.142 (<.001)	.107 (<.001)	.071 (<.001)	.078 (<.001)	.040 (.015)	.194 (<.001)	.062 (<.001)	.160 (<.001)	.164 (<.001)	.277 (<.001)
SCL-90: Somatization	.086 (<.001)	.061 (.010)	-.009 (.701)	.113 (<.001)	.132 (<.001)	.023 (.330)	-.007 (.767)	.050 (.026)	.027 (.242)	.068 (.004)
SCL-90: Obsessive/compulsive	.137 (<.001)	.117 (<.001)	.004 (.859)	.160 (<.001)	.135 (<.001)	.008 (.730)	-.003 (.896)	.085 (<.001)	.037 (.100)	.043 (.057)
SCL-90: Interpersonal sensitivity	.089 (<.001)	.118 (<.001)	-.007 (.760)	.129 (<.001)	.144 (<.001)	.026 (.272)	-.019 (.396)	.075* (.001)	.075 (.001)	.046 (.047)
SCL-90: Depressive	.120 (<.001)	.084 (<.001)	.019 (.383)	.134 (<.001)	.148 (<.001)	.031 (.175)	.009 (.678)	.078 (<.001)	.075 (.001)	.076 (.001)
SCL-90: Anxiety	.121 (<.001)	.082 (<.001)	.008 (.719)	.176 (<.001)	.139 (<.001)	.027 (.247)	.012 (.601)	.075 (.001)	.038 (.087)	.062 (.007)
SCL-90: Hostility	.129 (<.001)	.089 (<.001)	-.015 (.512)	.140 (<.001)	.118 (<.001)	.026 (.266)	.004 (.867)	.105 (<.001)	.072 (.001)	.015 (.520)
SCL-90: Phobic anxiety	.100 (<.001)	.094 (<.001)	-.008 (.715)	.113 (<.001)	.106 (<.001)	.009 (.712)	-.002 (.916)	.027 (.223)	.030 (.197)	.036 (.132)
SCL-90: Paranoid Ideation	.078 (.001)	.104 (<.001)	-.005 (.814)	.104 (<.001)	.160 (<.001)	-.006 (.787)	-.034 (.138)	.059 (.008)	.047 (.040)	.053 (.024)
SCL-90: Psychotic	.126 (.001)	.124 (.001)	.001 (.956)	.133 (.001)	.106 (.001)	.041 (.075)	.001 (.957)	.080 (.001)	.081 (.001)	.054 (.019)
SCL-90: GSI score	.130 (.001)	.107 (.001)	.003 (.897)	.160 (.001)	.133 (.001)	.029 (.204)	.000 (.995)	.084 (.001)	.064 (.004)	.061 (.006)
SCL-90: PST score	.148 (.001)	.112 (.001)	.029 (.174)	.148 (.001)	.152 (.001)	.033 (.141)	.004 (.840)	.059 (.005)	.066 (.002)	.066 (.003)
SCL-90: PSDI score	.102 (.001)	.085 (.001)	-.018 (.426)	.146 (.001)	.118 (.001)	.021 (.363)	.009 (.700)	.091 (.001)	.042 (.067)	.004 (.868)

Columns from A1 to A10 show parameters and p-values for the 10 symptoms as multiple predictors for each criterion or dependent variable (rows), obtained in multiple linear regression models.

SOGS = South Oaks Gambling Screen; SCL-90 = Symptom Check List-90; GSI = Global Severity Index; PST = positive symptom total; PSDI = positive symptom distress index. Beta-coefficients in multiple regressions. Bolded data indicate a significant coefficient.

A1 = preoccupations with gambling; A2 = needs for gambling with more money; A3 = unsuccessful control; A4 = restless-irritable; A5 = gambles for escaping from problems; A6 = gambling after losing; A7 = lies; A8 = illegal acts; A9 = lost relationships; A10 = relies on others to provide money.

psychopathology and the severity of the pathological gambling. This is consistent with other studies^{8,14,37,38} and emphasizes the strong association between illegal behavior and other problems, such as ideation or suicide intention, severe financial difficulties, alcohol and substance abuse, and a comorbidity with other mental disorders.¹⁴ These results provide further support to the claim that the criterion illegal acts could be considered as a consequence of psychopathological severity rather than a criterion necessary to establish a diagnosis of the disorder.

Limitations

This study has been conducted with a sample of individuals who sought professional treatment, of which the majority presented severe gambling problems. This implies that the results cannot be generalized to other gambling populations. However, the data were obtained from a large sample of adult pathological gamblers consecutively seeking treatment for gambling-related problems, which included both men and women and a broad age range. Therefore, the results can be generalized to populations of gamblers of either gender and of different ages.

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