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Validation of the Gambling Disorder Screening Questionnaire, a self-administered diagnostic questionnaire for gambling disorder based on the DSM-5 criteria

Validazione del Gambling Disorder Screening Questionnaire, un questionario diagnostico autosomministrato per il gioco d'azzardo patologico basato sui criteri del DSM-5

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SUMMARY. Aims. The DSM-5 has modified the diagnostic criteria for gambling disorder, compared to the fourth edition of the manual; new diagnostic instruments are therefore needed. This study evaluated the psychometric characteristics of the Gambling Disorder Screening Questionnaire (GDSQ), a self-report questionnaire based on the DSM-IV and DSM-5 criteria for Gambling Disorder, measuring its validity, internal consistency, and submitting the questionnaire to a principal components analysis. **Method.** 71 patients from a gambling disorder outpatient clinic and 70 controls were evaluated with the GDSQ, the South Oaks Gambling Screen (SOGS), and a psychiatric interview. **Results.** The test showed a good sensibility, specificity, internal consistency, concurrent validity with the SOGS. The exclusion of the "illegal acts" item, and the lowering of the cut-off score to four positive items, as suggested by the DSM-5 criteria, improved the test sensibility and internal consistency. **Discussion and conclusions.** The GDSQ can be considered a useful screening test for Gambling Disorder. Furthermore, this study confirms the improved diagnostic accuracy of the criteria listed in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, compared to the previous edition.

KEY WORDS: diagnostic criteria, Diagnostic and Statistical Manual of Mental Disorders, gambling disorder, diagnostic questionnaires, screening tests.

RIASSUNTO. Scopo. Il DSM-5 presenta delle modifiche nei criteri diagnostici per il gioco d'azzardo patologico, rispetto alla precedente edizione del manuale; è pertanto necessario sviluppare nuovi strumenti diagnostici. Questo studio ha valutato le caratteristiche psicometriche del Gambling Disorder Screening Questionnaire (GDSQ), un questionario sviluppato per l'autosomministrazione, basato sui criteri diagnostici del DSM-IV e del DSM-5 per il gioco d'azzardo patologico, misurandone la validità e la consistenza interna e sottoponendo il questionario all'analisi delle componenti principali. **Metodi.** 71 pazienti reclutati da un ambulatorio dedicato al gioco d'azzardo patologico e 70 controlli sono stati valutati con il GDSQ, con il South Oaks Gambling Screen (SOGS) e con valutazione psichiatrica. **Risultati.** Il test ha mostrato una buona sensibilità, specificità, consistenza interna, correlazione con il SOGS. L'esclusione del criterio degli atti illeciti e l'abbassamento del punteggio di cut-off a quattro criteri positivi, come suggerito dal DSM-5, migliora la sensibilità e consistenza interna del test. **Discussione e conclusioni.** Il GDSQ può essere considerato un utile test di screening per il gioco d'azzardo patologico. Inoltre, questo studio conferma il miglioramento nell'accuratezza diagnostica dei criteri elencati nella quinta edizione del Manuale Diagnostico e Statistico dei Disturbi Mentali rispetto alla precedente edizione.

PAROLE CHIAVE: criteri diagnostici, Manuale Diagnostico e Statistico dei Disturbi Mentali, gioco d'azzardo patologico, questionari diagnostici, test di screening.

INTRODUCTION

Gambling Disorder has been defined by the fifth edition of the Diagnostic and Statistical Manual of Mental Disorder (DSM-5)[1] in the diagnostic criterion A as a persistent and recurrent problematic gambling behaviour leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following, in a 12 month period:

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1. needs to gamble with increasing amounts of money in order to achieve the desired excitement;
2. is restless or irritable when attempting to cut down or stop gambling;
3. has made repeated unsuccessful efforts to control, cut back or stop gambling;
4. is often preoccupied with gambling (e.g. having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble);
5. often gambles when feeling distressed (e.g. helpless, guilty, anxious, depressed);
6. after losing money gambling, often returns another day to get even ("chasing" one's losses);
7. lies to conceal the extent of involvement with gambling;
8. has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling;
9. relies on others to provide money to relieve desperate financial situations caused by gambling.

Criterion B clarifies that the gambling behaviour must not be better explained by a manic episode.

The fourth edition of the manual (DSM-IV)[2] required five out of ten items to identify pathological gambling, considering the nine listed above plus one more, then listed as item 8: "has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling". Reilly and Smith[3] offer an overview on how the diagnostic criteria have been re-defined in the DSM-5.

In recent years, a growing literature has aimed to estimate the prevalence of Pathological Gambling across different settings and populations.

The most widely used diagnostic instrument has so far been the South Oaks Gambling Screen (SOGS)[4], a 20-item self-report questionnaire developed to identify probable pathological gamblers, defined according to DSM-III[5] criteria for pathological gambling. The SOGS has been widely used as a diagnostic instrument in epidemiological research, even if the diagnostic criteria for pathological gambling were modified in the fourth[2] and in the fifth edition of the DSM[1]. A growing literature suggests that the SOGS tends to overestimate the prevalence of this condition; Ladouceur et al.[6] suggested that respondents might misunderstand or misinterpret the SOGS items. Epidemiological studies conducted with other instruments, based on DSM-IV criteria for pathological gambling, estimated a lower prevalence for this condition compared to SOGS-based surveys[7,8]. A number of questionnaires and interviews based on the DSM-IV criteria for pathological gambling have been developed in recent years[9-15].

The National Opinion Research Center DSM-IV Screen for Gambling Problems[13,16], the Gambling Behavior Interview[12], the Diagnostic Interview for Gambling Severity[9] and Structured Clinical Interview for Pathological Gambling[11] are structured interviews requiring a trained individual guiding the process.

Unfortunately, data collected with different instruments and in different settings are not always comparable[17,18].

Following a paradigm already used by Stinchfield et al.[12] in the Gambling Behavior Interview, we developed the Gambling Disorder Screening Questionnaire (GDSQ), a self-report questionnaire based on the DSM-IV criteria for pathological gambling, made of ten questions obtained paraphrasing the ten points of the criterion A of the DSM-IV[2]. We started from the diagnostic criteria listed in the DSM-IV because they included all the DSM-5 criteria; this procedure was used in order to check the effect of the exclusion of item 8 on the diagnostic accuracy of the test. Each question has two response options, affirmative or negative. Criterion B, the differential diagnosis of gambling as a symptom of a manic episode, was not included in the test. Our aim was to assess the psychometric characteristics of such instrument, measuring its validity, internal consistency, and to submit the questionnaire to a principal components analysis. Such analysis would help us to draw some considerations on the validity of the underlying diagnostic criteria for pathological gambling.

METHODS

Participants

Patients

Seventy-one patients consecutively acceding to our outpatient facility for gambling disorder were enrolled. 58 patients were male, 13 female. Their mean age was 47.56 years old, with a standard deviation of 14.07. All patients underwent a psychiatric evaluation, confirming the diagnosis of gambling disorder, and were administered the Modified International Neuropsychiatric Interview and the Addiction Severity Index, modified for Gambling Disorder.

Controls

Seventy participants, 56 males and 14 females, were recruited from a general practitioner's ambulatory in the same urban area. The mean age was 46.64, with a standard deviation of 14.57.

Materials

Gambling Disorder Self-Report Screening Questionnaire

The test is made of ten questions obtained paraphrasing the ten items of the DSM-IV Criterion A for Pathological Gambling. This is a self-report questionnaire; respondents are required to give dichotomous answers, yes or no, to each question. The sum of all affirmative answers gives the total score. The questionnaire is reported in the Box.

South Oaks Gambling Screen[4]

The SOGS is a 20-items self-report questionnaire; designed to evaluate the presence of a pathological gambling behaviour. The first two items are scored on a Likert scale and converted to a binary scale; the next seventeen items are scored as binary answers, while the last is scored as "yes, current", "yes, in the past", or "no". The first, second and twentieth answer are converted on a binary scale, then all the responses are summed in a total score. All affirmative answers are summed up to calculate the total score; a cut-off score of 5 is used to identify probable pathological gamblers. A cut off score of 2 identifies other, less problematic, at risk gamblers.

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Procedure

Self-report questionnaires were administered with paper and pencil in an outpatient clinic for gambling disorder and in a general practitioner's ambulatory in the same urban area. All the participants underwent a clinical evaluation in our outpatient clinic for gambling disorder, including a psychiatric interview aimed to confirm or exclude the diagnosis of gambling disorder. All participants signed an informed written consent before taking part to the study, which was approved by the ethical committee of our institution.

Data analysis

We have first measured the frequency of positive answers to each item. Afterward, the internal consistency of the 10 items questionnaire was assessed through the Cronbach's Alpha for the whole scale and for each of the scales obtained eliminating one item at time from the test.

Lastly, we conducted a principal component analysis, selecting the items proving the most accurate psychometric characteristics.

We calculated the sensibility, specificity of the test –using the clinical evaluation as reference standard and the SOGS as comparator- both in 10 items version, with a cut-off score of five positive answers, and in the 9 items versions, with a cut-off of four positive answers, in order to compare the definitions from the last two editions of the DSM. The analyses were lead with the Stata 12 software.

Concurrent validity was calculated with a linear regression analysis between the test scores and the scores from the South Oaks Gambling Screen.

RESULTS

Table 1 shows the mean value and the standard deviation for each item, while the mean value for the whole scale is 3.43, with a standard deviation of 3.55. Table 2 shows in the first column the correlation coefficient between each of the ten DSM-IV-TR items and the total scale score, while in the second column shows the value of the Cronbach's Alpha of the scale obtained excluding each of the item. Table 3 shows the initial and extracted commonality value for each item, while the table 4 shoes the eigenvalue of each component, with the percentage of the variance explained and the cumulated percentage. Table 5 presents the matrix of components, with the correlation between each item and the first component.

The principal component analysis displayed just one component explaining 58.9% of the variance of the totality of the items. Only this component showed an eigenvalue >1, with a value of 5.890. The second component has a value of only 0.984.

The test showed a Sensibility of 98,6% and a specificity of 100%, while the version including all the DSM-IV criteria, requiring five positive items out of ten, showed a sensibility of 93,0% and a specificity of 100%. The SOGS offered a 100% sensibility and a 97.1% specificity.

Table 1. Descriptive statistics for each item.

	Mean	Standard Deviation	Total number
Item 1	0.30	0.459	141
Item 2	0.27	0.445	141
Item 3	0.42	0.495	141
Item 4	0.35	0.480	141
Item 5	0.42	0.495	141
Item 6	0.51	0.502	141
Item 7	0.45	0.499	141
Item 8	0.11	0.309	141
Item 9	0.28	0.449	141
Item 10	0.33	0.471	141

Table 2.

	Item-scale correlation coefficient	Cronbach's Alpha if the item is excluded
Item 1	0.616	0.919
Item 2	0.647	0.917
Item 3	0.776	0.910
Item 4	0.741	0.912
Item 5	0.781	0.909
Item 6	0.872	0.904
Item 7	0.841	0.906
Item 8	0.428	0.926
Item 9	0.622	0.918
Item 10	0.677	0.915

Table 3. Commonality.

	Initial	Extraction
Item 1	1.000	.473
Item 2	1.000	.506
Item 3	1.000	.692
Item 4	1.000	.639
Item 5	1.000	.699
Item 6	1.000	.825
Item 7	1.000	.780
Item 8	1.000	.243
Item 9	1.000	.479
Item 10	1.000	.554

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Table 4. Explanation of the total variance.

Component	Eigenvalue	Variance %	Cumulate %
1	5.890	58.900	58.900
2	.984	9.841	68.742
3	.704	7.041	75.782
4	.579	5.790	81.573
5	.525	5.255	86.827
6	.398	3.976	90.803
7	.318	3.182	93.985
8	.277	2.774	96.759
9	.189	1.888	98.646
10	.135	1.354	100.000

Table 5. Matrix of components.

Item	Component 1
Item 6	0.908
Item 7	0.883
Item 5	0.836
Item 3	0.832
Item 4	0.799
Item 10	0.745
Item 2	0.712
Item 9	0.692
Item 1	0.688
Item 8	0.493

Both versions of the test show a good concurrent validity with the SOGS: the nine items version has a correlation coefficient of 0.47, $p<0.001$, 95% confidence interval between 0.44 and 0.50; the 10 items version has a coefficient of 0.49, $p<0.001$, 95% confidence interval between 0.46 and 0.52.

DISCUSSIONS AND CONCLUSIONS

This self report questionnaire can be considered as a useful screening diagnostic test for gambling disorder, with a good sensibility, specificity and internal consistency. Compared to the South Oaks Gambling Screen, the GDSQ offers a lower sensibility, but a higher specificity. Our test has the peculiarity of beeing derived from the current diagnostic definition and can be considered useful for screening purposes, as confirmed by the concurrent validity with the SOGS.

The highest mean value was obtained by Item 6, while the lowest one by the item listed as the 8th in the DSM-IV ("illegal acts"); the "illegal acts" item had the lowest correlation coefficient with the scale, and the exclusion of this item improved the Cronbach's alpha of the residual scale. Again, Item 8 had the lowest correlation with the first component, which could be called "Gambling Disorder". Item 8 showed the lowest commonality value, and Item 6 the highest. The matrix of components displays the highest value for Item 6, the lowest for Item 8. Excluding Item 8 and lowering the cut-off score from five to four positive items increased the test sensibility in this sample, without reducing its specificity.

These data confirm the improved diagnostic accuracy of the DSM 5 criteria, compared to those listed in the previous edition of the manual, and are in line with previous research by Denis and coworkers[19] and by Petry and coworkers[20,21], supporting the exclusion of the "illegal acts" criterion, and the lowering of the cut-off score, from five to four positive items.

The principal component analysis displayed that the scale is unidimensional, suggestiong that all the items are expression of the same factor.

Our study has one main limitation due to the small number of participants: the 100% sensibility for the SOGS is not in line with previous studies[4,22] and the 100% specificity for the GDSQ will probably not be replicated by studies involving larger samples from general population. We must consider that our cases were recruited from an outpatient clinic focused on the treatment of gambling disorder, so a sampling bias could have influenced the results.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013[23]. Informed consent was obtained from all patients for being included in the study.

Conflict of interest: the authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Compliance with ethical standards: all procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments (World Medical Association 2013).

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Box

Codice paziente: _____ Data: _____

Istruzioni: si prega di rispondere con sincerità alle seguenti domande apponendo una crocetta sulla casella che si ritiene più corretta.

1. Si ritiene eccessivamente assorbito dal gioco d'azzardo (per esempio, è continuamente intento a rivivere esperienze trascorse di gioco, a valutare o pianificare la prossima impresa di gioco, a escogitare i modi per procurarsi denaro con cui giocare)?	Sì	No
2. Ha bisogno di giocare somme di denaro sempre maggiori per raggiungere lo stato di eccitazione desiderato?	Sì	No
3. Ha ripetutamente tentato di ridurre, controllare o interrompere il gioco d'azzardo, ma senza successo?	Sì	No
4. È irrequieto o irritabile quando tenta di ridurre o interrompere il gioco d'azzardo?	Sì	No
5. Gioca d'azzardo per sfuggire a problemi o per alleviare un umore disforico (per esempio, gioca per mettere da parte sensi di colpa o ansia o depressione)?	Sì	No
6. Dopo aver perso al gioco, spesso torna un altro giorno per giocare ancora (rincorrendo le proprie perdite)?	Sì	No
7. Mente ai membri della propria famiglia, al terapeuta, o ad altri per occultare l'entità del proprio coinvolgimento nel gioco d'azzardo?	Sì	No
8. Ha commesso azioni illegali come falsificazione, frode, furto o appropriazione indebita per finanziare il gioco d'azzardo?	Sì	No
9. Ha messo a repentaglio o perso una relazione significativa, il lavoro, oppure opportunità scolastiche o di carriera per il gioco d'azzardo?	Sì	No
10. Fa affidamento sugli altri per reperire il denaro per alleviare una situazione economica disperata causata dal gioco (prestiti o altro)?	Sì	No

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