Network analysis of DSM-5 criteria for gambling disorder: considering sex differences in a large clinical sample

Running title: Network analysis DSM-5 gambling disorder

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1 **ABSTRACT**

2 **Background:** The fifth version of the Diagnostic and Statistical Manual for Mental Disorders (DMS-5)

3 and its revised version (DSM-5-TR) propose severity levels for gambling disorder (GD) based on the

4 number of criteria met. However, this taxonomy presents some limitations. We aimed to assess the

5 centrality of each criterion and their relationship by conducting a network analysis while considering

6 sex differences. **Methods:** We performed a network analysis with the DSM-5 criteria for GD with data

7 from 4,203 treatment-seeking patients (3,836 men and 367 women) diagnosed with GD who sought for

8 treatment in a general tertiary hospital which has a unit specialized in behavioural addictions. **Results:**

9 The withdrawal criterion ("Restless or irritable when attempting to cut down or stop gambling") showed

10 the highest centrality values in both sexes. In men, the second most central criterion was the tolerance

11 criterion ("Needs to gamble with increasing amounts of money in order to achieve the desired

12 excitement"); while among women, the second was the chasing losses criterion ("After losing money

13 gambling, often returns another day to get even"). **Conclusions:** The most central criteria identified are

14 associated with compulsivity-driven behaviours of the addictive process. Taking into account the high

15 relevance and transitive capacity of withdrawal in both men and women, as well as tolerance in men

16 and chasing losses in women, the recognition and understanding of these symptoms are fundamental for

17 the accurate diagnosis and severity assessment of GD.

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1 **INTRODUCTION**

2   Gambling disorder (GD) is the only behavioural addiction (BA) included in the main section of

3 the DSM-5 [1] and the DSM-5-TR [2]. The fifth edition of the DSM introduced changes aimed to

4 improve the diagnostic accuracy of GD [3–5]. For instance, GD was relocated from the Impulse-Control

5 Disorders Not Classified Elsewhere category to the Substance-Related and Addictive Disorders

6 category, the illegal acts criterion was removed [6,7], and the threshold of the diagnosis was reduced

7 from five to four criteria [8–10]. However, while the International Classification of Diseases (ICD-11)

8 [11] difference between essential and additional features of GD, the DSM-5 give the same significance

9 to all the symptoms, taking into account only the number of fulfilled criteria. Furthermore, in contrast

10 to categorical approaches, other models such as The Research Domain Criteria (RDoC) from the

11 National Institute of Mental Health (NIMH) [12] and the Hierarchical Taxonomy of Psychopathology

12 (HiTOP) [13] propose dimensional frameworks for the study of psychopathology, including GD. The

13 DSM-5 integrated this dimensional approach, resulting in the inclusion of severity ratings for GD.

14 Replicating the severity classification for Substance Use Disorders (SUD), three severity categories

15 were proposed for GD, depending on the number of criteria met: mild (4 or 5 criteria), moderate (6 or

16 7) or severe (8 or 9) [1,2]. For SUD, the number of fulfilled criteria has proven to be a good severity

17 indicator [14]. However, for GD, this taxonomy showed some limitations regarding the lack of

18 significant differences between the moderate and severe categories in terms of psychopathology and

19 functional impact. Also, no differences have been observed in terms of treatment outcome between the

20 three categories of severity [15,16]. One possible reason for these limitations could be that each

21 diagnostic criterion may have a different level of significance to the disorder [8,17,18]. In this same

22 vein, an increase in the weight of the most central criteria could improve the accuracy of the severity

23 level diagnosis for GD [8,17]. Thus, it would be important to determine the core criteria that have a

24 stronger influence in GD severity, as proposed for other behavioural addictions [19–21]. However, there

25 is no clear agreement among researchers as to which would be the core criteria of GD. One recognized

26 model of addiction, the 'components' model, proposes six core features: salience, mood modification,

1   tolerance, withdrawal, conflict and relapse [22,23]. But, others argue that the addiction process, rather

2   than the symptoms, should be the primary focus, as it serves as the foundation for symptom development

3   and maintenance [20,24]. In this regard, the transition from impulsive-related behaviours (positive

4   reinforcement) to later compulsivity-driven behaviours (negative reinforcement) have been described as

5   one of the key mechanisms underlying addiction [25,26]. This crossover from goal-directed to

6   compulsive behaviour has also been described for BA [27–29]. These later compulsive motives may

7   eventually produce withdrawal syndrome/negative affect when the objective cannot be achieved [30].

8   Therefore, the GD criteria associated with the promotion of the addictive process through negative

9   reinforcement, such as withdrawal, may be directly related to the course and severity of the addictive

10   process [31]. Moreover, several studies suggested that withdrawal would be one of the symptoms most

11   closely related to the severity of GD [17,18,32–34].

12   In addition, when describing the more central features of GD severity, it is essential to consider

13   the differences between men and women [35–37]. Although studies about GD in women are scarce [38],

14   the literature reports that women present more of a preference than men for non-strategic gambling

15   forms (e.g., lottery or slot machines), have a lower socioeconomic status and higher psychopathology

16   related to comorbidities, such as affective disorders [5,35,36,39–42]. In general, women tend to use

17   gambling more as a way to regulate their emotional state [7,43–46], and men tend to use it more as a

18   thrilling activity [47]. In summary, these distinctions may constitute differences in terms of the weight

19   of each criterion between women and men.

20   With the objective of defining the weight and relationship of each criterion, network analysis

21   (NA) is an appropriate approach to determine the spatial/functional structures of psychological

22   constructs based on the relevance and relationships of their features [48,49]. In clinical research, NA

23   has already been used to determine the relevance of each symptom and their inter-connection for

24   different psychopathological conditions such as depression [50], posttraumatic stress disorder [51],

25   eating disorders [52,53] or addictive disorders [49,54,63,64,55–62].

1   In addictive disorders, NA has already yielded interesting results about the relevance and

2   relationship of the symptoms. Analysis of the centrality and connections of SUD symptoms across

3   different substance classes determined that the highest centrality for using a substance more than planned

4   had a strong interaction with tolerance [49]. In the specific case of alcohol use disorder, loss of control

5   [55] and physiological dependence (withdrawal) have been reported as the most central features [54].

6   Likewise, other research analysed the factors of multiple substances and behavioural addictions using

7   NA, finding unique features for each taxonomy [56].

8   Some studies also showed the utility of NA in determining the centrality of the symptoms in

9   different types of BA. For instance, the most central features of internet gaming disorder were conflict,

10   withdrawal, and tolerance [57], while for problematic smartphone use, these were loss of control and

11   continued excessive use [58], regarding problematic pornography use were salience, mood modification

12   and withdrawal [64], and for problematic social media they were problems in self-regulation and

13   preference for online communication [59]. However, in line with these differences found between SUD

14   and different types of BA [56], NA of potentially addictive behaviours also suggests that different

15   internet based behaviours should be considered as separate entities, with specific features for each

16   activity [60,62,63]. This evidence emphasises the necessity of analysing the centrality of the specific

17   symptoms related to each type of BA. On the basis of these results, GD should be analysed

18   independently from other types of BA. Furthermore, NA of problematic gambling in women showed

19   more association with gambling machines, while in men was more associated with sports betting, poker

20   and casino games [61], consistent with the higher preference for strategic gambling in men and non-

21   strategic gambling in women [65]. In this regard, to our knowledge, no study has used a NA approach

22   to examine the relevance and interconnections of each GD criteria of the DSM-5 in a large sample of

23   treatment-seeking patients with GD, considering differences between men and women.

24   **Aims and hypotheses**

25   The aim of this study was to use the NA approach to determine the centrality of each DSM-5

26   criterion for GD in a large clinical sample, with a special focus on sex differences. In this regard, criteria

1   that are directly related to the negative reinforcement process, such as withdrawal, could have more

2   relevance and influence in the co-occurrence of other symptoms. Moreover, bearing in mind the

3   differences that have been described between men and women diagnosed with GD, we hypothesise that

4   both sexes would present different key symptoms.

5

6   **METHOD**

7   **Participants**

8   The sample was composed of 4,203 patients (3,836 men and 367 women) diagnosed with GD.

9   All of them sought treatment at the Behavioural Addictions Unit of the University Hospital of Bellvitge,

10   a public hospital in Spain certified as a tertiary care centre for the treatment of GD. The recruitment

11   process took place between January-2005 and March-2023. They were evaluated by experienced clinical

12   psychologists in two sessions prior to the start of treatment. During the first session, the clinical

13   psychologist conducted a semi-structured interview to confirm the diagnosis of GD and explored various

14   aspects of gambling behaviour and sociodemographic data, including age, age of onset of the GD,

15   duration of GD, marital status, highest academic level achieved, employment situation, personal income,

16   family income (social position was calculated by the Hollingshead's index [66]). During this first

17   session, they also signed the informed consent to participate in the study. During the second assessment

18   session, participants completed a battery of validated psychometric instruments, including the

19   Diagnostic Questionnaire for Pathological Gambling According to DSM Criteria [9,10]. All patients had

20   a diagnosis of GD according to DSM-5 criteria (≥4 criteria). This study was carried out in accordance

21   with the Declaration of Helsinki. The University Hospital of Bellvitge's Ethics Committee of Clinical

22   Research approved the study (Refs. 34/05, 307/06).

23

24   **DSM-5 criteria**

25   Diagnostic criteria for Gambling Disorder (Table 1) were assessed prior to the start of treatment

26   using the Spanish adaptation of the Diagnostic Questionnaire for Pathological Gambling [9,10]. This

1   instrument have showed satisfactory reliability and validity. It should be noted that with the release of

2   the DSM-5, pathological gambling was reclassified and renamed as gambling disorder. So, all patients'

3   diagnoses were re-evaluated and recodified *post hoc* according to DSM-5 criteria. This instrument is a

4   self-report measure composed of 19 items coded in a binary scale (Yes/No). The internal consistency

5   for this study was α=.761.

6   --- Insert Table 1 ---

7

8   **Statistical analysis**

9   Stata18 for Windows was used for the analysis of the sociodemographic data [67], with chi-

10   square analysis for categorical variables and t-test for quantitative measures. The Gephi 9.2 for Windows

11   program was used to obtain the network in this work [68] (available at http://gephi.org). This statistical

12   software has been specifically developed for exploring and visualising networks within diverse datasets,

13   and it allows a powerful spatialisation process and the computation of essential parameters of centrality,

14   linkage and density. In this work, each node represents a DSM-5 criterion for GD, and the edges of the

15   underlying relationship pattern. The centrality indices calculated for the nodes provide the measure of

16   the relevance of each criterion, while the linkage indices can be interpreted as the transitive capacity of

17   each node towards the co-occurrence of the other criteria. The analysis was not pre-registered and the

18   results should be considered exploratory.

19   Two separate networks were visualised in this study, collected from subsamples of men and

20   women. The weights of the edges (the effect size and the signal [indicating positive versus negative

21   relationships]) were calculated as the partial correlation coefficient between each of the two nodes,

22   adjusted to the rest of the nodes. This correlation matrix provided the specific degree of association

23   between two DSM-5 criteria, controlling the potential effect of the other DSM-5 criteria, which were

24   removed. The initial data structure for the network resulted in 9 nodes and 36 potential edges, some of

25   which had very low weights (partial correlations around 0). To simplify this initial complex structure,

26   as per usual in NA, only edges that reached significance (p<.05) were modelled.

1   The relevance and the linkage capacity of the nodes were measured through two centrality

2   indices [69]: a) eigenvector centrality, which provided the relative prominence of each node based on

3   the weighted sum of centrality measures of all nodes connected to a node; and b) closeness centrality,

4   which provided the relative connection capacity based on how close the node is to all the other nodes in

5   the graph (these values are calculated as the reciprocal of the sum of the length of the shortest paths

6   between the node and all other nodes in the graphon). High eigenvector centrality indicated that the

7   information contained in a specific node is highly valuable for the whole graph. High closeness centrality

8   indicated a short average distance between one node and all the other nodes (these nodes have a high

9   capacity to promote relevant changes in other areas of the network structure).

10   In addition to the centrality measures, other indices interpreted in the study were: a) the

11   (average) path length, calculated as the mean of the shortest paths between all pairs of nodes (this value

12   represents a measure of the efficiency of information transport in the network); and b) the diameter,

13   calculated as the greatest distance between the two furthest nodes (representing the maximum

14   eccentricity of any vertex in the graph) [70]. The density of the graph was also estimated as the number

15   of connections divided by the number of possible connections, which provides a measure of how close

16   the network is to being complete (a complete graph includes all possible edges and achieves a density

17   measure equal to 1).

18

19   **RESULTS**

20   **Sociodemographic data**

21   Table 2 presents the distribution and differences in sociodemographic features between the

22   subsamples of women and men. The sample of men were younger than women (41.41 (SD=12.81) vs.

23   50.18 (SD=13.45) years old). Same for the age of GD onset (29.22 (SD=12.29) years for men, 37.48

24   (SD=11.63) for women). Both groups showed no differences in the duration of the GD. Mean personal

25   and family income were higher in the sample of men (1248.02 and 2122.30 euros, respectively) than in

26   women (898.39 and 1691.16). There were differences in the distribution of marital status, employment,

1   and social position between men and women groups. Women had higher rates of divorce,

2   unemployment, and lower social position. No differences were observed in their education level.

3   --- Insert Table 2 ---

4

5   **DSM-5 criteria distribution**

6   Table 3 displays the prevalence of each DSM-5 criterion within women and men subsamples,

7   as well as the proportion comparisons. The most frequent criterion was A7 ("lies related to gambling

8   activity") (95.1% of women reported this behaviour and 94.3% of men; $p = .536$). The least frequent

9   criterion was A1 "gambling with an increasing amount of money" (63.2% of women reported this

10   behaviour and 62.5% of men; $p = .798$). Differences between sexes were found for A3 "lack of control"

11   (more frequent among men), A5 "gamble as a way of escaping" (more frequent among women") and

12   A8 "social impact" (more frequent among men).

13   --- Insert Table 3 ---

14   Table S1 (supplementary material) contains the prevalence of the DSM-5 criteria stratified

15   (separately) by sex and by the GD severity group.

16

17   **Network analysis**

18   The first panel of Figure 1 displays the visualization of the network obtained among the women

19   subsample, and the left panel of Figure 2 displays the bar charts with the nodes ordered according to the

20   eigenvector and the closeness centrality. The network for women achieved a density equal to 0.417

21   (around 42% of the potential edges were modelled), an average path length equal to 1.639 and a diameter

22   equal to 3.0. According to the eigenvector centrality indices, the node with the highest relevance in the

23   network was A2 "withdrawal" (this specific DSM-5 criterion was identified as the behaviour with the

24   greatest influence in the graphon, with an eigenvector centrality equal to 1). According to the closeness

25   centrality, the highest linkage capacity was achieved by A2 "withdrawal" and A6 "chasing one's losses"

1   (the activation of these specific DSM-5 criteria, which achieved a closeness coefficient equal to 0.73,

2   had the greatest impact on the other nodes).

3   --- Insert Figure 1 ---

4   --- Insert Figure 2 ---

5   The network obtained among the subsample of men (the right panel of Figure 1) achieved a

6   density equal to 0.583 (resulting in 58.3% of the potential edges modelled), an average path length equal

7   to 1.417 and a diameter equal to 2.0. The centrality indices (the right panel of Figure 2), indicated that

8   A2 "withdrawal" was the DSM-5 criterion with the highest relevance and linkage capacity (both

9   eigenvector and closeness centrality indexes achieved a value equal to 1).

10

11   Table S2 (supplementary material) contains the complete results obtained in the NA among

12   women and men subsamples.

13

14   **DISCUSSION**

15   This study explored the network structure of the GD criteria defined by the DSM-5 taxonomy

16   in a large sample of treatment-seeking patients with GD, considering differences between men and

17   women. The NA results reported that withdrawal criterion ("Restless or irritable when attempting to cut

18   down or stop gambling") had the highest centrality values, regardless of sex. This result confirms our

19   initial hypothesis about withdrawal being closely related to the course and severity of the addictive

20   process [31], and fits with previous literature that emphasised the relevance of withdrawal to the severity

21   of the GD [17,18,32–34]. This might indicate that the gambling addiction process could be driven by

22   compulsive motives with the aim of avoiding the discomfort associated with not gambling (negative

23   reinforcement) [27–29], and suggest that, if the patient reports withdrawal, they may be more likely to

24   also present with other GD criteria and, following the definition of the DSM-5, present greater severity

25   of the disorder.

1   Regarding our second hypothesis, the rest of the hierarchy extracted from the NA reported

2   differences between sexes. Women and men differ in their second core node. In the sample of men

3   diagnosed with GD, the tolerance symptom ("Needs to gamble with increasing amounts of money in

4   order to achieve the desired excitement") is the second most relevant and transitive criterion of the

5   network. Whereas, in the sample of women diagnosed with GD, the chasing losses criterion ("After

6   losing money gambling, often returns another day to get even" ("chasing" one's losses) is the second

7   most central criterion. These findings fit with previous longitudinal data having related tolerance and

8   chasing losses with a more severe progression of GD [71]. It might be possible that the relevance of

9   chasing losses in women would be affected by their socioeconomic status [72]. In our sample, women

10   had a lower social position with higher unemployment rates and lower economic income. These factors

11   may produce a stigma that emphasises the relevance of trying to recover money through gambling due

12   to the higher impact of incurring economic losses [72]. As well, it should be noted that tolerance and

13   chasing one's losses have been seen to be closely related, as the latter could be a different form of

14   expression of tolerance [30], perhaps a more planned one.

15   Previous literature already reported that the DSM-5 severity classification for GD presents

16   important limitations regarding psychopathology, functional impact, and treatment outcome [15,16].

17   Moreover, these results show that most patients who seek treatment for GD usually present moderate or

18   severe forms of the disorder. According to the DSM-5, each criterion would exert the same influence on

19   the severity of the disorder, as in SUD [14]. However, the results presented in this study are in line with

20   previous research that support the different significance of each GD criterion [8,17,18]. In light of these

21   results, more weight should be given to those symptoms that concur with the physiological hallmarks of

22   SUD, withdrawal and tolerance [32]. Both symptoms would be directly involved in the development of

23   the addictive process and, therefore, in the course and severity of the GD [20].

24   This study provides empirical evidence of the importance of withdrawal and tolerance in GD

25   severity [34]. The conceptualization of withdrawal and tolerance as core features of GD severity would

26   comply with the addiction models that highlight the importance of the 'components' [22,23], as these

1 criteria are considered core features of the addiction. And also with the proposals that focus on the

2 process of addiction [20,24], as these criteria may be directly related to the transition from goal-directed

3 behaviours to compulsivity-driven behaviours [27–29]. However, although negative reinforcement

4 processes have been historically associated with development and maintenance of an addiction disorder

5 [73], both withdrawal and tolerance have been criticized in GD and other BA due to the lack of empirical

6 support [24,74–76]. These findings also reaffirm the need for further research that acknowledges the

7 precise description of withdrawal and tolerance symptoms in GD, and their differences with those

8 observed in SUD. For instance, withdrawal symptoms in GD do not have to be analogous to those

9 present in SUD. Most studies that acknowledge the importance of withdrawal in GD, have obtained this

10 symptomatology by self-report from the participants [17,18,32,33]. Moreover, regarding tolerance, the

11 necessity to gamble with increased amounts of money to achieve the same excitement could be

12 associated with the accumulated debts or erroneous perceptions about gambling [30]. Therefore, more

13 research about withdrawal and tolerance in GD would help to precisely define these processes in GD

14 and clarify their strong influence towards the severity of the disorder. Additionally, these results give

15 rise to consider the relevance of other features that are not yet GD criteria, such as craving, which is

16 associated with GD severity [77].

17   These results emphasise an important aspect of GD, suggesting that patients who report

18 restlessness or irritability when attempting to reduce or stop gambling may signify more severe cases of

19 GD. Withdrawal symptoms may indicate the need for personalized treatments tailored to address severe

20 GD in clinical practice. Recognizing these symptoms as markers of severity underscores the importance

21 of distinguishing varying degrees of GD and implementing targeted interventions for more effective

22 support. In this line, the dimensional approach already proposed by models such as RDoC [12] and

23 HiTOP [13] could be a promising avenue for studying the clinical features of GD [78]. Just as the DSM-

24 5 revised its diagnostic criteria for GD to improve diagnostic accuracy, future editions of the diagnostic

25 manual should consider the relevance of each criterion to determine the severity of GD.

1   This study is not exempt from limitations. Firstly, the cross-sectional design does not allow for

2   the temporal sequence to be demonstrated in the hierarchy which was extracted from these results.

3   Longitudinal data would be necessary to test if the presence of one criterion would predict the future

4   development of additional symptomatology. Secondly, although sex differences were considered, not

5   all existing gambling profiles were assessed, to which the significance of the criteria may vary (e.g.

6   gambling preference, age, impulsivity traits). Thirdly, the absence of control over possible

7   complementary pharmacological treatment. And lastly, the sample was non-probabilistic and

8   intentional, since data were collected from patients with GD who sought treatment. This makes it

9   difficult to draw conclusions about the whole population with GD.

10   The study also has several strengths. First, the use of network methodology to describe the

11   structure of interrelations between the DSM-5 criteria for GD. This analytical approach has rapidly

12   grown in psychopathology during the last decades with promising results. It greatly expands the capacity

13   to easily visualise the dynamics of the mental symptoms through a topological explanatory strategy.

14   Network theory underlies the conceptualization of complex psychiatric conditions as the

15   phenomenological manifestation of relatively stable network structures of interacting symptoms. Graph

16   theory provides the tools to mathematically quantify the dynamics of the complex systems by their

17   topological properties (i.e., centrality, path length, density). Furthermore, the external validity of these

18   results and their generalization to clinical practice are supported by the use of a large clinical sample of

19   patients formally diagnosed with GD and by the networks obtained for both men and women.

20

21   **CONCLUSIONS**

22   Defining the relevance and transitional capacity of each criterion may have important

23   implications in the specification of GD severity. Also, defining specific profiles for men and women

24   may help in adapting the criteria to obtain a more precise diagnosis of the disorder. Overall, these results

25   show that certain criteria bear more significance in the severity of GD and, thus, provide additional

26   evidence concerning the limitations of the severity classification for GD proposed in the DSM-5 and the

1   DSM-5-TR. Considering the higher weight of withdrawal in both men and women, as well as tolerance

2   in men and chasing losses in women, such criteria may be helpful in being able to identify the most

3   severe cases of GD. In conclusion, the recognition and understanding of these symptoms are

4   fundamental for the accurate diagnosis of GD, emphasizing their pivotal role in guiding effective

5   treatment strategies and improving patient outcomes.

6

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Conflict of interest

Data aviability

The datasets generated during and/or analysed during the current study are not publicly available due to ethical restrictions in order to protect the confidentiality of the participants, but are available from the corresponding author on reasonable request.

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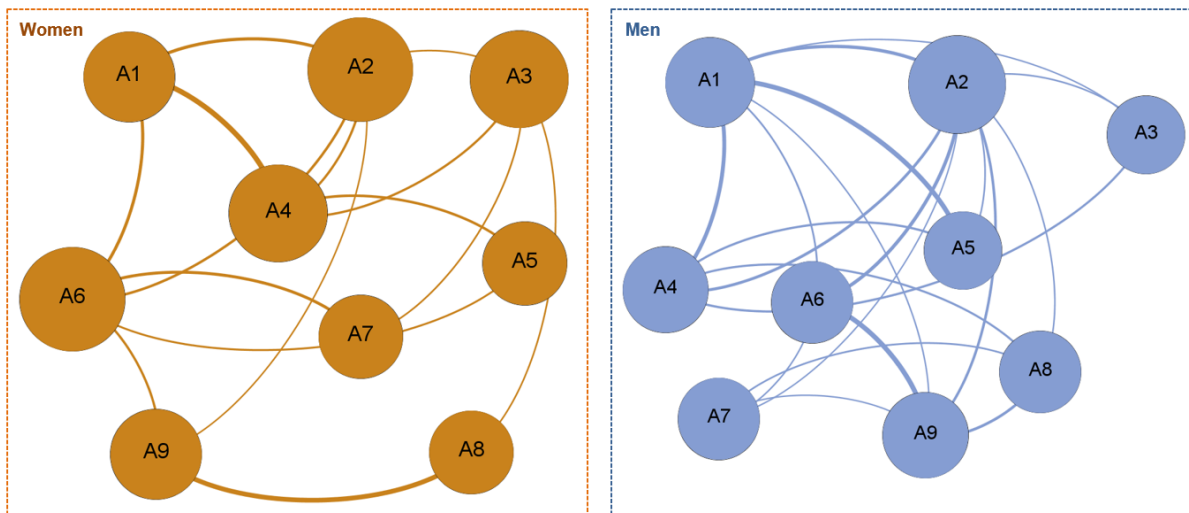
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12

1   **FIGURE CAPTIONS**

2

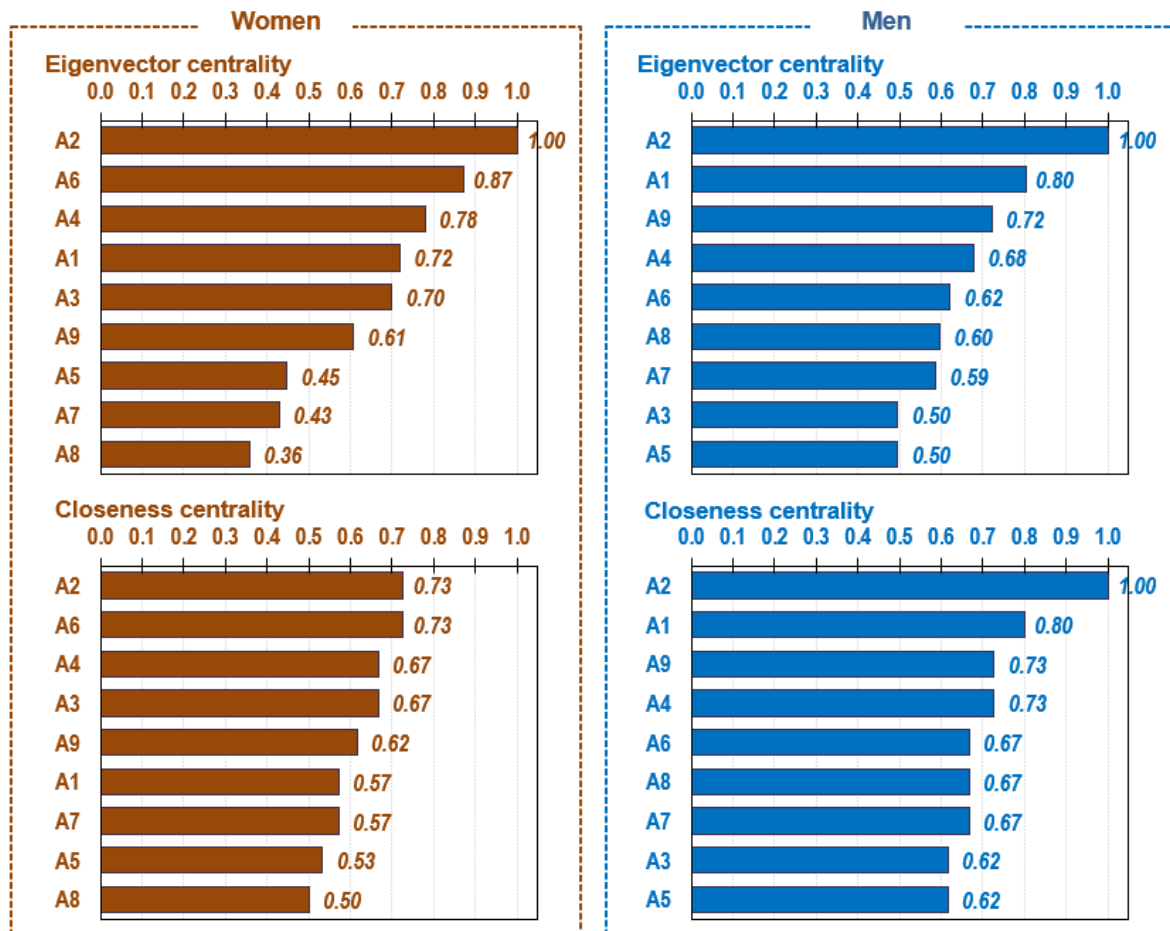3   *Figure 1.* Visualization of the networks among women (left) and men (right) subsamples

4   *Note.* Edge thickness represents the relative edge weight strength. Node size represents the relative

5   weight in the network. All the edges obtained a positive signal.

6

7

1 **Figure 2.** Relevance of centrality and linkage of the nodes among women (left) and men (right)

2 subsamples.

3

4

1   **Table 1.** DSM-5 and DSM-5-TR diagnostic criteria for gambling disorder

A1. Needs to gamble with increasing amounts of money in order to achieve the desired excitement.
A2. Is restless or irritable when attempting to cut down or stop gambling.
A3. Has made repeated unsuccessful efforts to control, cut back, or stop gambling.
A4. 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).
A5. Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed).
A6. After losing money gambling, often returns another day to get even ("chasing" one's losses).
A7. Lies to conceal the extent of involvement with gambling.
A8. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling.
A9. Relies on others to provide money to relieve desperate financial situations caused by gambling.

2   Note: Severity: Mild (4 or 5 criteria), Moderate (6 or 7 criteria) and Severe (8 or 9 criteria). Extracted from DSM-5 (APA,

3   2013) and DSM-5-TR (APA, 2022).

4

5

1   **Table 2** Sociodemographic data of the sample

		Women		Men			
		N=367		N=3,836			
		Mean	SD	Mean	SD	p	η^2
Age (yrs)		50.18	12.81	41.41	13.45	**<.001***	.033
Age of onset of GD (yrs)		37.48	12.29	29.22	11.63	**<.001***	.038
Duration of GD (yrs)		6.08	6.11	6.15	6.10	.846	.001
Income (euros)	Personal	898.39	742.10	1248.02	976.35	**<.001***	.011
	Family	1691.16	1288.49	2122.30	1499.75	**<.001***	.007
		n	%	n	%	p	V
Marital status	Single	157	42.8%	1609	41.9%	**<.001***	.067
	Married - Couple	135	36.8%	1727	45.0%		
	Divorced - separated	75	20.4%	500	13.0%		
Education	Primary	227	61.9%	2209	57.6%	.210	.027
	Secondary	115	31.3%	1379	35.9%		
	University	25	6.8%	248	6.5%		
Employment	Unemployed	196	53.4%	1595	41.6%	**<.001***	.068
	Employed	171	46.6%	2241	58.4%		
Social position index	High	3	.8%	61	1.6%	**<.001***	.099
	Mean-high	11	3.0%	190	5.0%		
	Mean	42	11.4%	396	10.3%		
	Mean-low	71	19.3%	1280	33.4%		
	Low	240	65.4%	1909	49.8%		

2   *Note.*GD: Gambling Disorder. SD: standard deviation. V: Cramer's V coefficient. η^2: Eta-squared coefficient.

3

4

1   **Table 3.** Distribution of the DSM-5 criteria for GD in the study

	Women N=367		Men N=3,836			
	n	*%*	*n*	*%*	*p*	*V*
A1. Gambling with increasing amount-money ("tolerance")	232	63.2%	2,399	62.5%	.798	.004
A2. Withdrawal	273	74.4%	2,938	76.6%	.342	.015
A3. Lack of control	324	88.3%	3,539	92.3%	**.008***	.041
A4. Preoccupied	248	67.6%	2,426	63.2%	.099	.025
A5. Gamble as a way of escaping	328	89.4%	2,667	69.5%	**.001***	.124
A6. After losing returns ("chasing" one's losses)	301	82.0%	3,225	84.1%	.306	.016
A7. Lies related to gambling	349	95.1%	3,618	94.3%	.536	.010
A8. Social impact	299	81.5%	3,295	85.9%	**.021***	.035
A9. Relies on others to provide money	271	73.8%	2,953	77.0%	.174	.021
	Mean	*SD*	*Mean*	*SD*	*p*	η^2
DSM-5 Total number of criteria	7.18	1.62	7.10	1.60	.381	.001

2   *Note.* SD: standard deviation. V: Cramer's V coefficient. η^2: Eta-squared coefficient. Comparison between the

3   prevalences based on chi-square tests, and comparison between means based on T-test.

4

5