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Abstract: Gambling has been considered a male pastime with research focused on exploring risk factors for gambling without considering gender differences. Despite gambling has greatly increased among women in recent years, few studies have explored gender differences in adolescent gamblers. This study analyzed gender differences in risk factors and gambling-related patterns. The sample comprised 1,756 adolescents aged 14 to 17 years. Chi-square and t-tests were performed to examine differences between male and female gamblers (n = 699). Multiple regressions were conducted to explore predictors of gambling severity by gender. Male gamblers reported more gambling activity within the last year and showed a more severe gambling pattern. Impulsivity, last year prevalence of bingo, and other casino games were associated with higher gambling severity in both genders. Enhancement and coping motives were related to gambling severity only in males, while mixed-mode gambling was related to gambling severity in females. Our findings extend the research on gender differences among adolescent gamblers by showing that gender specific risk factors exist and should be regarded by health providers when designing treatment strategies.

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December 19th, 2017

Livia Veselka
Associate Editor
Personality and Individual Differences

Dear Dr. Veselka,

We wish to submit the revised version of the manuscript: “Gender differences among adolescent problem gamblers” (Ms. Ref. No.: PAID-D-17-00601) for publication in the journal of Personality and Individual Differences. We are very grateful for all the suggestions made, and have modified the manuscript accordingly. We have addressed all the comments made by Reviewer #3, and all the changes are highlighted in yellow. We feel that these modifications have considerably improved the manuscript and contributed to increasing its potential impact.

As in the initial submission, the authors confirm that this work is original and has not been published elsewhere nor is it currently under consideration for publication elsewhere. All authors have been personally and actively involved in substantive work leading to the report, and will hold themselves jointly and individually responsible for its content. Lastly, all authors declare that they do not have any financial relationship with the funding sources that sponsored the present study.

I testify to the accuracy of the above on behalf of all the authors.

The manuscript has 5,000 words (including title page, abstract, text, tables, declaration of interest and references).

We look forward to hearing from you regarding this revised version. Please address all correspondence concerning this manuscript to me at weidbergsara.uo@uniovi.es

Sincerely,

Sara Weidberg, Ph.D.

Reviewer #3:

Below we provide the description of the amendments we made in the manuscript. We would like the Reviewer to consider the word limit of PAID. We have modified the manuscript while considering the 5,000-word limit requirement.

(1) Introduction still lacks of theoretical background - conceptual model is not clear enough. I see that you have tried to provide information about difference between sexes, but it still does not say much about prevalence of gambling problems within the specific groups. Moreover, you claimed that males expose stronger tendencies for risk-taking, thus what was the reason measure risk-taking in females, not to use a method to measure affective tendencies since that differs females from males?

Following the Reviewer's suggestion we have included information on gambling problem rates by gender (see page 2, lines 3-5). As the literature points out, problem gambling among male adolescents is between two and three times as prevalent as in females (Desai, Maciejewski, Pantalon, & Potenza, 2005; Edgren, Castren, Jokela, & Salonen, 2016; Ellebogen, Derevensky, & Gupta, 2007; Hardoon, Gupta, & Derevensky, 2004).

After careful consideration of the Reviewer's suggestion, we believe that the information contained in the first paragraph of the introduction section reflects the current model of gambling addiction. As we highlighted, the biopsychosocial model is the one currently adopted when accounting for gambling problems. We have now proposed possible mechanisms accounting for gambling problems within the specific groups following the biopsychosocial perspective. Accordingly, we have reorganized the potential factors underlying gender differences by grouping them into the following categories: psychological, biological and socio-environmental variables. We believe that these changes contribute to providing a solid foundation in explaining the differences in problem gambling prevalence by gender, and the possible mechanisms accounting for such differences.

As the Reviewer said, we indicated that testosterone levels can heighten risk-taking decisions (Stanton, Lienen, & Schultheiss, 2011). To be clearer, we reworded the end of the paragraph to suggest that this relationship is shown in both sexes but has been shown to be higher among adolescent females than males (Sapienza et al., 2009) (see page 3, see lines 5-8).

Regarding the measurement of affective tendencies: we agree that this is potentially interesting. However, it was out of the scope of the present study, which is focused on exploring gambling prevalences and assessing personality variables related to a potential transdiagnostic marker (i.e. impulsivity).

(2) The selection of methods was not justified. How choice of GMQ fits your conceptual model?

Gambling motives are considered an important psychological factor accounting for gambling etiology. Research among adults has shown that specific gambling motives (coping, enhancement and social reasons) are significant when it comes to explain gambling problems in adults (Stewart & Zack, 2008). Nevertheless, whether motivations for gambling in adolescents differ by gender has been largely unexplored. Including the GMQ in the present study sheds light on this issue. Considering the relevance of this variable, our study findings provide valuable information on which gambling motives should be considered by gender when designing treatment and preventive strategies.

(3) I have asked for power analysis, but it was not provided in a sufficient way. Did you use G*Power or STATA to ensure what should be the desired sample size?

Detailed information regarding power analysis is now provided in the participants subsection (see page 4, lines 8-13). We specified that we used the package software (G*Power) as well as the minimum sample size required to achieve enough statistical power in the statistical analyses. As we indicated in this section, we obtained an adequate power for a minimum sample size of 250 participants. Since we included a larger sample size, this ensured us more than enough power for the statistical analyses we carried out.

(4) The manuscript does not comply with all APA style rules. For example, abbreviations are misused, order of methods presented does not reflect any pattern, e.g., existing in analysis. It is not clear how some constructs were measured, e.g., gambling severity (I have to guess). Moreover, you have doubled presentation of some results (what is a Table, should not be in text). I think it needs solid proof-reading before next round of reviews.

In accordance with this suggestion, we have carefully verified that the whole manuscript complies with APA6th style. After consulting the publication manual, those abbreviations mentioned less than three times in the text have been removed. In these cases, we have written the whole term each time that we mentioned it (see page 107 of the publication manual). We have deleted abbreviations from the abstract and the second level of headings. We have also checked that other aspects of the manuscript (headings, margins, text cites, reference list, tables....) follow APA style. We noted that we misused some abbreviations such as 'Imp subscore' or 'GMQ motives'. Following the Reviewer's recommendations, we carefully revised the use of the abovementioned abbreviations and wrote them appropriately.

We have also revised the content and the order of the information included in the methods section and checked that it provides enough information to understand the study procedure and the information presented in the results section. Inclusion criteria are now presented in the 'Participants' subsection (see page 3, last paragraph) rather than in the 'Procedure' subsection to improve the presentation of the information. As the reviewer says, it was not clear how gambling severity was measured, so we clarified it and explicitly said that gambling severity was measured using the South Oaks Gambling Screen – Revised for Adolescents (see page 7, second paragraph).

We agree with the Reviewer that some statistical information was duplicated. We have now deleted such duplicated information so that statistical information in text is not presented again in the tables.

(5) You have used age as inclusion criteria, although it was not mentioned (nine 18-years-old were excluded). How many participants were excluded because of providing random answers? How this assessment was done?

We apologize for not including age in the inclusion criteria. We have now stated that one of the inclusion criteria was being aged < 18 (see the 'Participants' subsection, page 3). Information on the number of participants excluded as a result of providing random answers was already included in the previous version of the manuscript. In accordance with the instructions provided by the authors of the Oviedo Infrequency Scale, 43 surveys with more than three erroneous responses were discarded from subsequent analyses (see the participants subsection, page 4, lines 3-5).

(6) The ROC analyzes are not conclusive since they do not tell much about what variables were included (I could not find it in the text): what ROC curves were compared? It does not make much sense to report specificity and sensitivity without comparing ROCs for specific variables within groups. A reader would like to know which variables better separate, for example, females with gambling problems from females without gambling problems. That would have practical meaning, since practitioners could focus more on specific behavior of females knowing if this behavior may be related to gambling problems in this group of adolescents. Additionally, the way how ROC analyzes were described on page 9 does not correspond with the way how analyzes were reported on page 12. Content on page 9 suggests that females and males were compared depending on the level of gambling problems, but it was done other way around.

We completely agree with the Reviewer that it is more informative to report specificity and sensitivity for each significant predictor instead of providing just two global ROC analyses for each of the regression models. We have included a detailed description on how the ROC analyses were conducted (See page 8, last paragraph) and added a new table (See table 4, page 12). As the Reviewer may read, following the Youden Index criterion (Perkins & Schisterman, 2005), the best predictors that maximize the area under the ROC curve in female and male gamblers are Imp score and enhancement motives, respectively. This improvement led us to describe the ROC analyses in the 'Data Analyses' section in accordance with the way analyses were reported in the 'Results' section.

(7) SOGS-RA application suggests that there were three groups of participants. How that reflects in ROC analyzes?

Although SOGS-RA classifies participants in three groups (non-problem, at-risk and problem gamblers), we decided to merge them in two categories due to the low sample size of at-risk and problem gamblers. This approach has been adopted by a number of previous studies (Castrén, Grainger, Lahti, Alho, & Salonen, 2015; Donati,

Chiesi, & Primi, 2013; Edgren et al., 2016; Lehmann, Akre, Berchtold, Flatz, & Suris, 2016; Secades-Villa, Martínez-Loredo, Grande-Gosende, & Fernández-Hermida, 2016) and ensured us enough sample size to achieve power in the statistical analyses. When conducting statistical analyses, we decided to follow this classification; thus ROC curve analyses clearly reflect this approach.

(8) Practical implications seems to be superficial and weakly related to what was showed in research. How your research (the information) may impact practice?

As is evident in the manuscript, we did provide guidance on how practitioners could help to reduce gender-specific risk factors for gambling related problems. Again, please be aware of the 5,000-word limit requirement established by PAID. After reviewing the gambling literature, we noted that we had not considered preventive strategies based on reducing both social and self-stigma; we have now done so in the 'Conclusion' section (see page 15, lines 15-20). Considering that mixed-mode gambling predicts gambling problems in females, and due to this pattern of gambling representing a more problematic behavior, addressing social and perceived gambling stigma might prevent individuals from developing gambling-related problems through the reduction of gambling stereotyping, and increase the number that seek treatment. (Hing, Nuske, Gainsbury, & Russell, 2016).

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Gender differences among adolescent gamblers

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Highlights

- We assessed gender differences in risk factors and gambling patterns in adolescents.
- Male reported more gambling and show a more severe gambling pattern than females.
- We found common and specific predictors of gambling severity by gender.
- Risk factors by gender should be considered when designing intervention strategies.

Abstract

Gambling has been considered a male pastime with research focused on exploring risk factors for gambling without considering gender differences. Despite gambling has greatly increased among women in recent years, few studies have explored gender differences in adolescent gamblers. This study analyzed gender differences in risk factors and gambling-related patterns. The sample comprised 1,756 adolescents aged 14 to 17 years. Chi-square and *t*-tests were performed to examine differences between male and female gamblers ($n = 699$). Multiple regressions were conducted to explore predictors of gambling severity by gender. Male gamblers reported more gambling activity within the last year and showed a more severe gambling pattern. **Impulsivity**, last year prevalence of bingo, and other casino games were associated with higher gambling severity in both genders. Enhancement and coping **motives** were related to gambling severity only in males, while mixed-mode gambling was related to gambling severity in females. Our findings extend the research on gender differences among adolescent gamblers by showing that gender specific risk factors exist and should be regarded by health providers when designing treatment strategies.

Keywords: Gambling **severity**; Adolescents; Gender; Risk Factors

1. Introduction

Problem gambling is defined as a recurrent behavior characterized by loss of control and excessive preoccupation with gambling, that leads to a significant impairment in occupational and social life areas (American Psychiatric Association, 2013). The prevalence of problem gambling among adolescent males is more than two times higher than in females (Edgren, Castren, Jokela, & Salonen, 2016). Due to the range of sociodemographic (e.g., low educational level), biological (e.g., low serotonin levels) and psychosocial (e.g., high impulsivity) variables proposed as risk factors for gambling initiation (Blaszczynski & Nower, 2002; Castrén et al., 2013; Pérez Fuentes, Molero Jurado, Carrión Martínez, Mercader Rubio, & Gázquez, 2016; Topf, Yip, & Potenza, 2009), current models of addiction conceptualize gambling within a biopsychosocial perspective (Griffiths, 2005). Accordingly, the differential impact of these variables might explain gender differences in problem gambling rates.

Despite the increasing number of studies exploring gambling prevalence among adolescents (Calado, Alexandre, & Griffiths, 2017), gender differences have been largely unexplored, and results have yielded mixed results. Kaminer, Burleson, and Jadamec (2002) found that although males experience more gambling problems, females display a younger age of gambling onset. While Stinchfield (2000) found that more males reported gambling on the lottery and in casinos than females, Desai, Maciejewski, Pantalon, and Potenza (2005) showed no differences in the prevalence of casino and non-casino games by gender.

Potential factors underlying gender differences in gambling exist. Focusing on psychological factors, research on adult gamblers highlights that motives for gambling differ by gender. Females typically report gambling for managing dysphoria/depression, while males engage in gambling as a way of attaining self-enhancement (Petry, Stinson, & Grant, 2005; Stewart & Zack, 2008). Mixed results exist regarding impulsivity among problem

gamblers, with some studies finding a stronger association in males (González-Ortega, Echeburúa, Corral, Polo-López, & Alberich, 2013) and others in females (Nigro, Cosenza, & Ciccarelli, 2017). From the social environment perspective, perception of economic profitability, and peer and parental gambling behavior differentially affect gambling by gender (Donati, Chiesi, & Primi, 2013). Lastly, testosterone levels have been shown to increase risk-taking decisions (Stanton, Liening, & Schultheiss, 2011), especially in females (Sapienza, Zingales, & Maestripieri, 2009). It is possible that this testosterone sensitivity leads to different gambling involvement in both sexes.

Other socio-environmental factors such as the educational level or the mode of gambling access (i.e., land-based, online, mixed-mode) have been largely unexplored in adolescents. As mixed-mode gambling is associated with the presence of gambling related problems (González-Roz, Fernández-Hermida, Weidberg, Martínez-Loredo, & Secades-Villa, 2016), it is important to consider the impact of specific modes of access separately by gender.

This paper explores gender differences among adolescent gamblers. The specific objectives were: 1) to estimate gender differences in gambling prevalence among adolescents; 2) to explore gender differences in gambling patterns; and 3) to identify risk factors for gambling separately by gender.

2. Material and Methods

2.1. Participants

Participants were adolescents aged 14-17 years ($M = 15.22$, $SD = 0.74$). The initial sample size was made up of 1,810 participants from 22 Spanish secondary schools in Asturias and Alicante (Spain). Recruitment was done between October 2015 and May 2016. Inclusion criteria were: 1) being aged < 18 years; 2) having no sensory impairment; 3) not

presenting difficulties in understanding the Spanish language; and 4) not being diagnosed with an intellectual disability. Two participants were discarded due to intellectual disabilities and 9 because they were 18 years old. In accordance with the instructions of the Oviedo Infrequency Scale (Fonseca-Pedrero, Paíno, Lemos-Giráldez, & Muñiz, 2008), 43 surveys with more than three erroneous responses were discarded from subsequent analyses. Thus, 1,756 participants (53.6% males) comprised the final sample. Of them, 39.8% (n = 699, 437 males and 262 females) had gambled within the last year (see Table 1 for descriptive statistics). Power analyses were computed using GPower* and the guidelines posed by Mayr, Erdfelder, Buchner, and Faul (2007). A minimum sample size of 250 participants indicated an adequate statistical power for bivariate (98% power for Chi-Squared and 100% for t-tests, $\alpha = .05$, two-sided) and regression analyses (83% power to detect an odd ratio of 1.6, two-tails). The inclusion of a sample size larger than the one previously indicated guaranteed sufficient power.

Table 1
Sociodemographic characteristics of the final sample (N = 1,756, left panel) and subsample of gamblers (n = 699, right panel)

	Females (n = 814)		Males (n = 942)		χ^2	p	Cramer's V	Female gamblers (n = 262)		Male gamblers (n = 437)		χ^2	p	Cramer's V
	n	%	n	%				n	%	n	%			
Family Structure					.092	.955	.007					.060	.970	.009
Living with none of their parents	14 _a	1.7	18 _a	1.9				6 _a	2.3	9 _a	2.1			
Monoparental family	212 _a	26	246 _a	26.1				67 _a	25.6	110 _a	25.5			
Living with both parents	588 _a	72.3	678 _a	72				189 _a	72.1	318 _a	72.8			
Family with gambling problems	19 _a	2.3	22 _a	2.3	<.001	1.000	<.001	6 _a	2.3	14 _a	3.2	.223	.637	.027
Most frequent academic mark [†]					30.654	<.001	.137					12.959	.005	.142
Failing grade (from F to D+)	96 _a	12.8	142 _a	16.1				32 _a	13.2	68 _a	16.8			
Good (from C- to C+)	250 _b	33.2	382 _a	43.2				78 _b	32.2	173 _a	42.7			
Notable (from B- to B+)	302 _b	40.2	283 _a	32				97 _b	40.1	128 _a	31.6			
Outstanding (A and A+)	104 _b	13.8	77 _a	8.7				35 _b	14.5	36 _a	8.9			
Weekly allowance					7.722	.021	.066					3.229	.199	.068
0€-20€	744 _b	91.4	824 _a	87.5				229 _a	87.4	363 _a	83.1			
21€-40€	56 _a	6.9	88 _a	9.3				23 _a	8.8	58 _a	13.3			
41€	14 _a	1.7	30 _a	3.2				10 _a	3.8	16 _a	3.7			

Note. Subscripts indicate between-group differences. Groups with the same subscript did not differ significantly from each other.

[†]n = 1,636 (left panel) and 647 (right panel) participants due to technical problems in the data collection.

2.2. Procedure

Schools were selected following a random stratified and incidental procedure and the study was approved by the Ethics Committee of the Spanish Education Ministry.

Students completed an anonymous questionnaire using electronic tablets (Samsung Galaxy Tab2 10.1 tablet). Trained supervisors checked that they were doing the task appropriately.

2.3. Measures

Data regarding age, sex and family structure (i.e., living with no parents or with one or two parents) were collected. Participants were asked about their most frequent academic mark obtained in the last semester. This variable took the following values: outstanding (A and A+), notable (from B- to B+), good (from C- to C+) and failing (from F to D+). We also asked for the amount of weekly allowance. This variable took the following values: 0€-20€ (\$22.4); 21€-40€ (\$23.5-\$44.8); ≥ 41 € (\$45.9). The presence of participants' problematic gambling relatives was also assessed.

The Oviedo Infrequency Scale (Fonseca-Pedrero et al., 2008) was used for detecting random responses.

An ad-hoc survey assessed gambling engagement. We collected data on: mode of access, gambling activities engaged in within the last year, time and money spent per gambling occasion, age at gambling onset, last year's gambling involvement (defined as the number of games that participants engaged in over the last semester) and number of games in their first year of gambling. Gambling venues such as exclusively land based, online, or mixed-modes of access, and a set of gambling activities were evaluated. Given the low prevalence of online gambling ($n = 17$), this mode of access was not included in subsequent

analyses. A land-based venue was defined as gambling in the last year through a terrestrial mode of access, exclusively. Mixed-mode access was defined as gambling in both land-based and online contexts (that is, gambling both online and offline in the same activity).

Specifically, last year prevalence of bingo, poker, other casino games (OCGs), sports betting, lottery, scratch-tickets and electronic gambling machines (EGMs) was measured as a function of the above gambling modes.

The Gambling Motives Questionnaire (GMQ; Dechant & Ellery, 2011) ($\alpha = .88$) was used. As there was no Spanish adaptation, this version was translated back into English by a professional translator. It includes three dimensions; enhancement (to increase positive emotions) ($\alpha = .85$), coping (to decrease negative emotions) ($\alpha = .87$), and social (to increase affiliation) motives ($\alpha = .79$).

The Spanish adaptation (Becoña, 1997) of the South Oaks Gambling Screen – Revised for Adolescents (Winters, Stinchfield, & Fulkerson, 1993) was used to assess gambling severity within the last year. Gambling was defined as any game which involves betting on money. The scores provide three categories: non-problem gambler (score of 0 or 1), at-risk gambler (score of 2 or 3) and problem gambler (score of 4 or more). Internal consistency assessed by Cronbach's alpha (α) was .66.

A Spanish adaption of the Impulsive Sensation-Seeking Scale ($\alpha = .82$) was used to assess preference for change and uncertainty (Fernández-Artamendi, Martínez-Loredo, Fernández-Hermida, & Carballo-Crespo, 2016), and the tendency to act without thinking or planning. This scale provides a general score and two subscores: impulsivity (Imp) ($\alpha = .77$) and impulsive sensation-seeking (SS) ($\alpha = .74$).

A delay discounting task was presented to assess impulsive choice. Participants decided on different choices, ranging from €1,000 after a fixed delay, versus various amounts

of money given immediately. This procedure showed good reliability in our sample ($\alpha = .89$). Delay discounting was calculated using $\log k$ and the area under the curve.

2.4. Data Analyses

Bivariate analyses were performed to explore gender differences in risk factors for last year gambling and gambling patterns. Cramer's V and Cohen's d were calculated.

Two multiple regressions explored which variables (risk factors and gambling patterns) predicted gambling severity by gender. Given the low sample size of at-risk and problem gamblers, both categories were merged following previous studies (Desai & Potenza, 2008; Potenza et al., 2011).

Variables reaching significance at $p < .10$ in bivariate analyses were assessed for multicollinearity. Predictors of at-risk/problem gambling for males and females entered into the model were: 1) most frequent academic mark; 2) enhancement motive; 3) coping motive; 4) social motive; 5) last year prevalence of OCGs; 6) bingo; 7) poker; 8) sports-betting; 9) scratch-tickets; 10) mode of access; 11) Imp subscale; 12) SS subscale. Tolerance values were greater than .67 and variance inflation factors (VIF) were also below the rule of 10, indicating absence of multicollinearity (Menard, 1995; Neter, Wasserman, & Kutner, 1989).

Receiver Operating Characteristic (ROC) analyses were performed to compare the specificity and sensitivity of each significant predictor of at-risk/problem gambling within groups (i.e., male and female gamblers). Gambling severity was defined as the state variable (0 = non-problem gambler, 1 = at-risk/problem gambler). Contrast variables were those showing significance in the multiple regression models by gender. The Youden Index approach (Perkins & Schisterman, 2005) was used to establish the optimal cut-off in terms of sensitivity and specificity: $(Y): Y = \text{sensitivity} + \text{specificity} - 1$. All analyses were conducted using IBM SPSS Version 22.0.

3. Results

3.1. Gender Differences in Problem Gambling Prevalence

Among those reporting gambling in the previous year, 14.4% (101 out of 699 gamblers) were considered at-risk/problem gamblers. Past year prevalence of at-risk/problem gambling was 11.16% for males, which was more than triple the rate for females (3.29%), ($\chi^2(1) = 10,180, p = .001, V = .125$).

3.2. Gender Differences in Risk Factors for Gambling

Differences between male and female gamblers in the following risk factors were found: most frequent academic mark (see Table 1), the Imp ($t(645) = 1.972, p = 0.049, d = .16$) and SS subscales ($t(645) = -2.963, p = .003, d = .25$). Males showed better academic marks and a lower Imp score. Females scored higher in SS. The next risk factors showed no significant differences by gender: weekly allowance (see Table 1), presence of relatives with problematic gambling (see Table 1), family structure (see Table 1), the score of Impulsive Sensation-Seeking scale ($t(645) = -0.605, p = .546$), logk ($t(645) = 0.031, p = .976$), and the area under the curve ($t(645) = -1.305, p = .192$).

Table 2 shows regressions indicating variables associated with gambling severity by gender. Variables associated with being either an at-risk/problem male or female gambler were: Imp score, last year prevalence of bingo, and OCGs. Specific predictors for males were: enhancement and coping motives. Mixed-mode gambling was related to gambling severity in females.

Table 2
Predictors of gambling severity by gender

	Female gamblers (<i>n</i> = 262)		Male gamblers (<i>n</i> = 437)	
	β	95% CI	β	95% CI
SS	-	-	-0.099	-0.109-0.001
Imp	0.145*	0.013-0.104	0.126*	0.016-0.145
Enhancement motive	-	-	0.204**	0.037-0.119
Coping motive	0.389	0.116-0.211	0.314**	0.112-0.224
Last year prevalence of bingo	0.128*	0.040-0.711	0.149*	0.290-1.162
Last year prevalence of OCGs	0.133*	.225-2.971	0.145*	0.448-1.930
Mode of access (land-based vs. mixed mode)	0.139*	0.060-0.555	-	-

Note. CI = confidence interval; SS = Sensation seeking score in the Impulsive Sensation-Seeking Scale; Imp = Impulsivity score in the Impulsive Sensation-Seeking Scale; OCGs = other casino games.

* $p < .05$; ** $p \leq .001$

3.3. Gender Differences in Gambling Patterns

Males engaged in a greater number of gambling activities over the last year than females ($t(697) = 2.063, p = .039, d = .16$) and spent more time gambling per occasion ($t(697) = 2.097, p = .036, d = .16$). Age at gambling onset ($t(697) = 0.682, p = 0.495$), number of games within their first year of gambling ($t(697) = 1.118, p = .264$), and money spent per gambling occasion ($t(697) = 1.274, p = .203$) showed no statistically significant differences between genders. Males reported gambling more for enhancement ($t(639) = 4.553, p < .001, d = .34$), coping ($t(613) = 2.719, p = .007, d = .20$) and social reasons ($t(613) = 2.175, p = .030, d = .17$). Male gamblers were more likely to bet in land-based (exclusively) ($\chi^2(1) = 13.685, p < .001, V = .15$) and mixed-mode ($\chi^2(1) = 9.736, p = .002, V = .13$) venues. Last year prevalence of OCGs, bingo, poker, sports-betting, and scratch-tickets was higher for males than for females. Gambling activities by mode of access and gender is shown in Table 3.

Table 3
Types of activity by gambling mode (N = 699)

	Female gamblers (n = 262)		Male gamblers (n = 437)		χ^2	p	Cramer's V
	N	%	N	%			
Bingo [†]	94	49	98	51	14.210	≤.001**	.146
Land-based bingo	92	49.5	94	50.5	14.834	≤.001**	.149
Mixed-mode bingo	1	33.3	2	66.7	.000	.999	.006
Poker [†]	18	11.6	137	88.4	55.469	≤.001**	.285
Land-based poker	15	11.2	119	88.8	47.512	≤.001**	.264
Mixed-mode poker	2	11.8	15	88.2	3.857	.050	.084
OCGs [†]	5	13.5	32	86.5	8.528	.003*	.117
Land-based OCGs	4	12.9	27	87.1	7.301	.007*	.109
Mixed-mode OCGs	1	16.7	5	83.3	0.402	.526	.040
Lottery [†]	118	39.2	183	60.8	0.545	.460	.031
Land-based lottery	113	40.8	164	59.2	1.920	.166	.055
Mixed-mode lottery	5	29.4	12	70.6	0.196	.658	.026
Sports betting [†]	72	25.8	207	74.2	26.190	≤.001**	.197
Land-based sports betting	66	29.2	160	70.8	9.253	.002*	.118
Mixed-mode sports betting	3	11.1	24	88.9	7.205	.007*	.109
Scratch-tickets [†]	115	44.4	144	55.6	7.944	.005	.110
Land-based scratch-tickets	110	44.7	136	55.3	8.006	.005	.110
Mixed-mode scratch-tickets	3	33.3	6	66.7	.000	.999	.010
EGMs [†]	43	44.3	54	55.7	1.927	.165	.057
Land-based EGMs	42	45.2	51	54.8	2.335	.127	.062
Mixed-mode EGMs	1	33.3	2	66.7	.000	.999	.006

Note. OCGs = other casino games; EGMs = electronic gambling machines; [†] gambling activity regardless mode of access.

* $p < .05$; ** $p \leq .001$

3.4. Receiver Operating Characteristic Analyses

For female gamblers, the Imp score and last year prevalence of bingo maximized the area under the ROC curve. For male gamblers, the best predictors were enhancement and coping motives (see Table 4).

Table 4

Receiver Operating Characteristic (ROC) analyses of gambling severity predictors by gender

	Female gamblers (n = 262)				Male gamblers (n = 437)			
	Cutoff Point ^a	Area under the ROC curve	Sensitivity (%)	Specificity (%)	Cutoff Point ^a	Area under the ROC curve	Sensitivity (%)	Specificity (%)
Imp	5	0.698	60.0	70.7	4	0.594	65.2	51.6
Enhancement motive	-	-	-	-	6	0.705	60.3	72.1
Coping motive	-	-	-	-	2	0.680	55.1	75.2
Last year prevalence of bingo	-	0.613	56.5	66.1	-	0.582	35.9	80.5
Last year prevalence of OCGs	-	0.561	13.0	99.2	-	0.565	17.9	95.0
Mode of access (land-based vs. mixed mode)	-	0.570	17.4	96.5	-	-	-	-

Note. Imp = Impulsivity score in Impulsive Sensation-Seeking Scale; OCGs = other casino games.

^aData only provided for continuous measures

4. Discussion

This study advances knowledge regarding gender differences in adolescent gambling. We highlight three findings: 1) the prevalence of at-risk/problem gambling was higher for males; 2) males showed a more severe gambling pattern profile; and 3) both genders shared impulsivity, last year prevalence of bingo, and OCGs as variables associated with higher gambling severity. Enhancement and coping motives were related to gambling severity among males, while mixed-mode gambling was related to gambling severity in females.

The percentage of males with at-risk/problem gambling is more than three times higher than in females, which is consistent with research conducted with adolescents (Ellebogen, Derevensky, & Gupta, 2007). As masculinity is demonstrated in social contexts, gambling might enable males to showcase it by performing acts of skill and fearlessness in social situations (Wong, Zane, Saw, & Chang, 2013). Gambling provides men the appropriate occasion to prove their bravery and betting skills while performing their traditional gender role.

Gender differences were found in gambling patterns. Similar to previous findings, men's gambling preferences differ from women's (Merkouris et al., 2016), with much of this research indicating that males prefer strategic gambling activities (Phillips & Wilson, 2009).

In accordance with previous studies, high impulsivity (Secades-Villa, Martínez-Loredo, Grande-Gosende, & Fernández-Hermida, 2016) and specific gambling activities, such as bingo and OCGs (Hing, Russell, Tolchard, & Nower, 2016; Moubarac, Shead, & Derevensky, 2010) were associated with higher gambling severity for both genders. As impulsive individuals tend to act without forethought regarding

negative consequences, they may be more likely to involve in gambling due to their sensitivity to immediate rewards (Nower, Derevensky, & Gupta, 2004). On the other hand, social perceptions of bingo as an innocuous activity leads to a more accepting attitude, hence increasing this behavior. OCGs predicted gambling problems. In Spain, gambling law (Law 13, 2011) establishes that individuals under 18 can neither bet on any activity nor enter casinos or gambling halls. This fact reflects that they are transgressing prohibitions.

Interestingly, we found specific risk factors for gambling by gender. Predictors of gambling severity in males were enhancement and coping motives. Both predictors showed adequate accuracy for the detection of at-risk/problem gambling among males, as shown by sensitivity and specificity indices. Males gamble for reasons other than social motives, such as to increase positive emotions (Stewart & Zack, 2008) or to seek sensory stimuli (Grant & Kim, 2002). Mixed-mode access was related with gambling severity in females. This gender-specific risk factor provided poor sensitivity but high specificity for the detection of at-risk/problem gambling. However, it is important to consider the categorical nature of this variable. In many screening/diagnostic situations, a decision based on a binary outcome can be difficult and impractical, because only two sensitivity and specificity indices are yielded (Park, Goo, & Jo, 2004). As mixed-mode gamblers present higher gambling severity (Gainsbury, Russell, Blaszczynski, & Hing, 2015), monitoring female bettors would prevent them from progressing into more severe gambling behavior.

Despite the ex-post-facto design limitations, strengths exist. The sample size was larger than the one recommended in power analyses. Assessment tools also covered a wide range of psychosocial constructs, thus contributing to a comprehensive understanding of gambling behavior. Lastly, the use of the Infrequency Scale ensured

quality data. Future efforts need to consider the use of behavioral tasks such as the Gambling Purchase Task (Weinstock, Mulhauser, Oremus, & D'Agostino, 2016). This tool demonstrates good discriminant validity while reducing face validity and social desirability.

5. Conclusions

This study highlights the importance of considering sociodemographic and personality factors by gender when designing preventive and treatment programs. As gambling prevention has been scarcely developed in Spain, it is expected that this study will promote the implementation of gender-sensitive prevention efforts. Health professionals should consider emotion-focused strategies when dealing with male adolescents (e.g., problem solving) (Moyal, Henik, & Anholt, 2013). The fact that mixed-mode gambling predicted gambling problems in females indicates that underage adolescents have little difficulty in accessing gambling venues. Besides providing parents with information about control measures to avoid internet misuse (e.g., security passwords, parental control), strengthening regulatory measures in the gambling industry is a pressing need. Also, preventive campaigns to reduce public stigma and stereotyping (e.g., enhancing community contact with female problem gamblers) are highly advocated (Hing, Nuske, Gainsbury, & Russell, 2016). Online interventions offer a further, anonymous, support that would encourage females to seek help and treatment for gambling problems by reducing self-perceived stigma (Gainsbury & Blaszczynski, 2011). Lastly, regulations such as imposing fines on gaming operators that breach gambling law (e.g., allowing minors to participate in gambling activity), or better electronic verification of player identity (i.e., identification by electronic signature) might preclude the development of gambling problems.

Conflict of interest

The authors report no conflicts of interest.

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