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Early Detection of Gambling Among At-Risk Adolescents. Validation of EDGAR-A Scale

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Abstract

Despite the fact that minors have prohibited access to commercial gambling, and legislation trying to constrain gambling, an important proportion declares that they have bet either online, or by illegally entering gambling venues. This situation highlights the need to implement selective prevention programs that requires assessment tools to identify vulnerable groups. This paper aims to design and validate a scale of evaluation for the psycho-social characteristics that predict onset and maintenance of gambling behavior among adolescents. 2,716 students of Secondary Education, 15.12 years (± 1.03) answered a frequency, intensity and problematic gambling questionnaire and a scale to evaluate risk profiles. The resulting scale is compounded by 26 items classified in 4 sub-scales: Accessibility, Risk Perception, Normative Perception and Parental Attitudes. Internal consistency coefficients were: 0.668, 0.728, 0.746 and 0.818 respectively, and 0.811 for the total scale. Results offer a robust support on the structural validity and internal consistency of the Early Detection of Gambling among At-Risk Adolescents (EDGAR-A) Scale, a useful tool for the design and assessment of effective preventive interventions.

Keywords: gambling predictors, adolescents, scale validation, assessment

Introduction

Gambling has historically been present in our society, even in the lives of minors (Hayer and Griffiths, 2014). In recent years it has increased, becoming an important

problem with grave consequences both for individuals and society (Kessler et al., 2008). The Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013) recognizes, for the first time, gambling as an addictive disorder. It is estimated that between 0.4% and 3% of the population is affected by Gambling Disorder (Cox et al., 2004, Gill et al., 2006, Kessler et al., 2008, Wiebe & Cox, 2005).

Despite the fact that minors have prohibited access to commercial gambling, and legislation trying to constrain gambling, an important proportion declares that they have gambled either online, or by illegally entering gambling venues (Blinn-Pike et al., 2010; Gupta, et al., 2013). In Europe, 14% of 15–16 year old students have reported that they have gambled at some time, and 7% have done so frequently (2 or more times per month) during the last 12 months (ESPAD Group, 2016). Other studies estimate that between 0.2% and 12.3% of adolescents meet at-risk gambling criteria (Calado et al., 2017; Gonzalez-Roz et al., 2016; Miguez & Becoña, 2015).

Beyond teenage experimentation, of particular concern is the degree of loyalty once betting has started. The percentage of gamblers who start gambling as minors increases in the group of problematic gamblers. And as with other risky behaviors, such as drug use, age of onset is a good predictor of future problem behavior and addiction, retrospective studies have also associated the severity of the disorder with the age of onset (Burge et al., 2006; Ellickson et al., 2004; Jiménez-Murcia et al., 2010). In a sample of 7,121 gamblers, onset before 18 increased from 13.4% to 44.8%, from non-problem to pathological gamblers (Directorate General for the Regulation of Gambling, 2015).

This situation highlights the need to implement selective prevention programs adapted to the target population. This approach requires identifying the risk factors present in the target group. In the clinical setting, there are various screening and diagnostic instruments that provide severity index of gambling behavior. Edgren et al. (2016) find five instruments through a systematic review with studies on validity and reliability: SOGS-RA (Winters et al., 1993); DSM-IV-J / DSM-IV- (MR) -J (Fisher, 2000); MAGS (Shaffer & Labrie, 1994); CAGI (Tremblay et al., 2010); GABSA (Park & Jung, 2012). However, in the field of prevention, few tools exist to assess the risk of problem gambling.

The Stewart and Zack's (2008) Gambling Motives Questionnaire assesses enhancement and emotional coping, and the Gambling-related Cognitions Scale (GRC) (Raylu & Yian, 2004) screens for a range of cognitive bias, myths or distorted cognitions in gamblers. Neither scale evaluates predictors of gambling, rather the cognitive profiles of gamblers. The Jonsson-Abbott Scale (JAS) (Jonsson et al., 2017) seeks to identify early indicators, examine relationships between indicators and assesses their capacity to predict future problem progression. JAS has 11 items classified into three factors: (1) "Over Consumption," (2) "Gambling Fallacies," and (3) "Reinforcers."

A key objective in prevention research is to identify the risk factors that intervene in the gambling behavior of adolescents. In consequence, developing effective measures

for early detection in non-clinical populations is a high priority for prevention. Usually, individual differences (i.e., impulsivity, sensation seeking, internalizing symptoms) have been consistently associated with gambling and considered as predictors of at-risk gambling (Estevez et al., 2015; Reardon et al., 2019; Secades-Villa et al., 2016). Thus, a wide array of assessment tools is available for these personality traits. However, psychological mechanisms by which these variables might moderate gambling behaviour are still not clear (Kraplin et al., 2014; MacClaren et al., 2011; Tani et al., 2020). Furthermore, these variables are non-specific factors of gambling, but predictive of multiple risk behaviors. This could be suggesting that this relationship can be influenced by other factors. For these reasons, multidimensional research focuses on searching for contextual and personal factors that are accessible and modifiable by preventive interventions in school, family or community settings (Dahlberg & Krug, 2002; Keen et al., 2017; Ladouceur et al., 2013). From a psycho-social perspective, literature has highlighted the role of risk perception, normative perception, accessibility, and the influence of the family, in explaining the onset and maintenance of gambling behavior. In this sense, a large number of studies support that risk attitudes and social representations are related to risk gambling behavior (Binde, 2009; DelFabbro & Thrupp, 2003, Glanz et al., 2008) and it is well documented that risk perception modulates decision-making about the performance of risky behavior and the intention to perform it (Ajzen, 2011). Thus, a social representation of gambling as a legal, accessible and normalized activity, approved by peers and reference persons, could be perceived by minors as a risk-free behavior. In this sense, dispose of scales to evaluate risk perceptions and attitudes towards gambling behavior in adolescents could contribute to the early detection of potential at-risk gambling, although gambling-related harm should be confirmed objectively.

Risk Perception is the belief that gambling presents negative consequences. A high perception of risk shows a significantly negative effect on the intention of gambling (Li et al., 2010). Spurrier and colleagues (2015) elaborate an explanatory model of gambling abuse based on the perception of risk as a central factor and its interaction with other psycho-social factors.

Normative Perception is defined as the belief about how frequent gambling is among youngsters of the same age. The perception of how frequently an attitude or behavior is shared by the majority of the members of the reference group is a good predictor, not only of gambling, but also of other risk behaviors (Donati et al., 2013; Johnson, 2012, Lewis et al., 2011; Page et al., 2008).

Another factor that has received the attention of researchers has been *Accessibility*. The hypothesis in this case is that accessibility increases the prevalence of gambling has been confirmed by the results of the meta-analysis conducted by Shaffer and colleagues (1999). The authors concluded that an increase in opportunities is associated with an increase in the prevalence of gambling. Other studies also conclude an association between the proximity of casinos and gambling venues and the prevalence of at-risk gambling (Moore et al., 2011, Shaffer et al., 2004). LaBrie

and colleagues (2007) conducted a study in which self-exclusion was considered an indicator of problematic gambling. They found that in regions with more casinos, the number of self-exclusions increased. More recently, because of the widespread use of new technologies and the increase in the supply of gambling and betting, accessibility has increased and, with it, gambling problems among the adolescent population (King et al., 2010; McBride & Derevensky, 2009; Ólason et al., 2011).

The family stands out for its particular influence on the acquisition of new behaviors and the formation of the attitudes of minors (Maccoby, 1992, Maccoby & Martin, 1983). Family influence is strongest in early adolescence and gradually gives way to peer pressure as adolescents grow older. Research on the attitude and permissiveness of parents towards gambling indicates that poor parental supervision is associated with the emergence and consolidation of gambling behavior in children (Chalmers & Willoughby, 2006; Lee et al., 2014; Molinaro et al., 2014; Vachon et al., 2004; Wanner et al., 2006).

In the absence of tools that identify the presence of risk and assess the effectiveness of preventive interventions, it would be desirable to have a flexible and simple tool that is able to select those young people who show a greater probability of developing at-risk behavior. The objective of this paper is to design and validate a scale of evaluation for the psycho-social characteristics that predict the initiation and maintenance of gambling behavior among adolescents. The scale has been constructed to evaluate four determinants of risk (Accessibility: AC; Risk Perception: RP; Normative Perception: NP; and Parental Attitudes: PA) in order to be a useful tool for the design and assessment of effective preventive interventions.

Method

Participants

A total of 2,808 Secondary Education and Baccalaureate (BA) students completed a battery of tests. The inclusion criteria were to be a student of 3rd or 4th of Secondary Education or 1st of BA, to be 13–17 years old, and to have their authorization of the parents or tutors. Once the data was processed, 92 cases were identified that included incoherent (39) or incomplete (53) responses, and were therefore eliminated. The final sample consisted of 2,716 adolescents of 15.12 years ($\pm$ 1.03) with 49.9% girls, distributed between 13 municipalities and 15 educational centers selected at random. Regarding the gambling type, the most prevalent is sports betting in venues or online.

Variables and Instruments

Frequency

An ad-hoc questionnaire made up of 15 items adapted from the European ESPAD survey which measures gambling frequency (number of times) in three-time

Table 1
Percentage of ever gambled during the last 30 days distributed by gender (male/female) and age

Age	*n*	Sports bet online	Sports bet	Slot machine	Poker or casino online	Roulette
13–14	772	9.6 / 1.7	6.3 / 2.4	3.0 / 2.1	2.5 / 1.2	0.6 / 0.7
15	837	7.9 / 3.0	12.0 / 3.6	5.0 / 2.0	4.1 / 1.0	3.2 / 1.5
16	849	9.6 / 1.8	21.1 / 2.6	4.6 / 0.9	6.3 / 1.3	4.6 / 0.9
17–18	245	12.8 / 3.1	28.2 / 9.4	5.1 / 3.1	11.1 / 5.5	15.4 / 3.9

indicators: during (a) your life; (b) the last 12 months; (c) the last 30 days. It includes 5 gambling modes: (1) online sports betting; (2) sports betting in salons, bars or both; (3) slot machines in salons and/or bars; (4) poker or online casino games; and (5) roulettes in salons. Scores were classified into three gambling categories: (I) *no gambling*: never gambled or placed a bet during their lifetime; (II) *low*: less than 5 times during their lifetime or less than 4 times during the last 12 months to online sports betting or slot machines; (III) *high*: frequencies higher than "Low."

Intensity

A second ad-hoc questionnaire of 5 items adapted from the European ESPAD survey which measures the quantity in euros gambled in the last 30 days in each of the 5 game modes. The SOGS item, "What is the highest sum of money you have wagered in the last 12 months?" was added.

Procedure

To design the scale, we followed the following phases: (1) review of the leading and principal scales and questionnaires that focus on gambling and associated problems, (2) determination of the theoretical dimensions of the scale and development of a bank of items for each dimension, (3) review of the item bank by a panel of 6 independent expert judges that evaluated the understanding and content to do with the relevance and sufficiency of the items in assessment of the dimensions in order to ensure evidence of content validity, (4) conducting a pilot study with 20 adolescents to check the level of understanding, the time of application and possible redaction errors that could lead to confusion or misunderstanding, with no difficulties identified for self-administration; (5) administration of the final questionnaire and (6) analysis of psychometric characteristics and validation of the questionnaire.

All procedures performed in this study were under the ethical standards of the institutional research committee (OEP-UMH Protocol: DPS.DLI.02.16) and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. After authorization was obtained from the competent authority in education, the sample was recruited from 15 high schools in the South-East of Spain. The educational centres were randomly selected, with a ratio of two centres per town,

and within each centre, all classrooms from each educational level were selected. The valid cases, excluding questionnaires with random pattern or desirability, were up to 85%. Informed consent was obtained from the parents and guardians. Participants were informed of the purpose of the study and answered voluntarily. No exclusion criteria were used. The questionnaire took 25–30 minutes, and it was collectively and anonymously answered, under the supervision of the research team.

Statistical analyses

Study 1

For a first empirical decision of item selection, the internal consistency (item-total correlation without the analyzed item) was calculated. After the selection of items, the factorial structure of the EDGAR-A was investigated employing an exploratory factorial analysis (EFA) applying the technique of Parallel Analysis with the FACTOR 10.3.1 program (Ferrando & Lorenzo-Seva, 2017; Lloret et al., 2017). Parallel analysis is a method for determining the number of components or factors to retain from factor analysis, supported by a correlation matrix randomly generated (Horn, 1965). Parallel analysis eigenvalues and a random score matrix dataset of same rank and type of variable dataset are compared. After successive iterations, eigenvalues larger than random eigenvalues are taking account to extract factors (Ferrando & Lorenzo-Seva, 2017).

Study 2

To determine levels of accuracy, we calculated a Received Operating Characteristic Curve (ROC) based on area under the curve (AUC) indicator. AUC is a statistic that provides an estimate of the overall discriminative accuracy of EDGAR-A relative to established "cases" and "non-cases" provided by an external reference (i.e., gambling frequency). AUC values vary from 0 to 1, with values $>.70$ thru .80 reporting acceptable discrimination, and values $>.80$ thru .90 reporting excellent discrimination (Hosmer et al., 2013). To determine if differences do reside in the scores of each subscale between the three categories of game frequency, the Student's *t*-test was used to calculate the contrasts of the means in the groups of non-players, low and high frequency players. Effect size was calculated with Cohen's *d*. The statistical package SPSS version 22 was used for the statistical analyzes.

Results

Study 1. Item analysis

Initially, the EDGAR-A scale was composed of 34 items. Three of them were eliminated after item analysis because they had exceptionally low homogeneity indices. With the final 31 items, the factorial structure of the questionnaire was examined applying factor analysis based on the unweighted least squares procedure (ULS), estimating the number of factors with Parallel Analysis and Weighted Varimax Rotation (in a previous analysis Oblique Rotation was used with Oblimin and it was found that the factors are orthogonal). With the results of the EFA, there

Table 2
Factorial structure of the EDGAR-A scale

Scale Items	*n*	AC	RP	NP	PA
1. I would know where to go if I wanted to gamble.	2654	.596			
2. It would be easy to gamble even though I am under age.	2660	.616			
4. I know websites where I could gamble.	2621	.672			
6. I could play betting games from home.	2639	.677			
8. Current legislation penalizes gambling in under-18-year-olds.	2659		.377		
10. Minors can NOT enter a casino or betting room.	2658		.357		
11. The majority of people are in favor of betting games.	2647	.303			
12. The law should be more strict with minors who gamble money	2655		.562		
13. It is accepted that people of my age play betting games.	2651	.385			
15. The majority of young people of my age have played betting games.	2654			.647	
16. Betting games are very frequent among people of my age.	2660			.788	
17. The majority of young people of my age have NEVER gambled.	2655			.559	
18. It is normal to see people of my age gambling in betting rooms or bars.	2657			.490	
19. Gambling is harmful.	2670		.756		
20. I think gambling is inoffensive.	2673		.475		
21. I think gambling is dangerous.	2673		.693		
22. Gaming is more fun when you bet.	2670	.321			
23. The majority of young people who bet end up in debt.	2666		.481		
26. Some young people lose control over their gambling.	2671		.564		
27. My parents prevent me from the risks of betting games.	2674				.445
28. My parents would be angry if they found out I was gambling/betting.	2672				.757
29. My parents accept that I make sport bets.	2665				.369
30. If my dad caught me betting he would be quite angry.	2665				.831
31. If my mom caught me betting, she would be quite angry.	2672				.840
32. My parents consider gambling harmful.	2641				.678
34. My parents prefer to stay away from gambling/betting.	2676				.519

AC: Accessibility; NP: Normative Perception; PA: Parental attitude; RP: Risk Perception

was a second elimination of items since five of them had a factorial loading lower than .30 or did not load on any of the four resulting factors. Therefore, the EDGAR-A scale was left with 26 items out of the original 34. Table 2 contains the results of the EFA of the EDGAR-A scale. There were 5 factors whose initial eigenvalue was larger than 1. It was decided not to retain the fifth factor because its eigenvalue percentage (95%) was larger than the initial eigenvalue itself. Thus, the factorial model with four orthogonal factors is optimal for its factorization as indicated by the KMO index = .843 and explains 50% of the variance. The goodness-of-fit statistic of

the model GFI = .99 shows a good fit and RMSR = .038 (Ferrando & Lorenzo-Seva, 2017; Lloret et al., 2017). The four factors are:

(1) *Accessibility* (AC) or facility to access gambling sites, formed by 6 items that explain 6.4% of the variance;

(2) *Perception of Risk* (RP) which consists of the belief that gambling has negative consequences. In order to obtain a positive correlation between the four factors, RP has been reverse keyed. Therefore, a higher score means a lower Perception of Risk. The RP factor is formed by 8 items that explain 7.9% of the variance;

(3) *Normative Perception* (NP) which is the belief about how frequent betting is among young people of similar age, formed by 4 items that explain 13.39% of the variance; and

(4) *Parental Attitude* (PA) that refers to the perception of tolerance of the parents with the minor's game behavior, formed by 7 items that explain 22.41% of the variance.

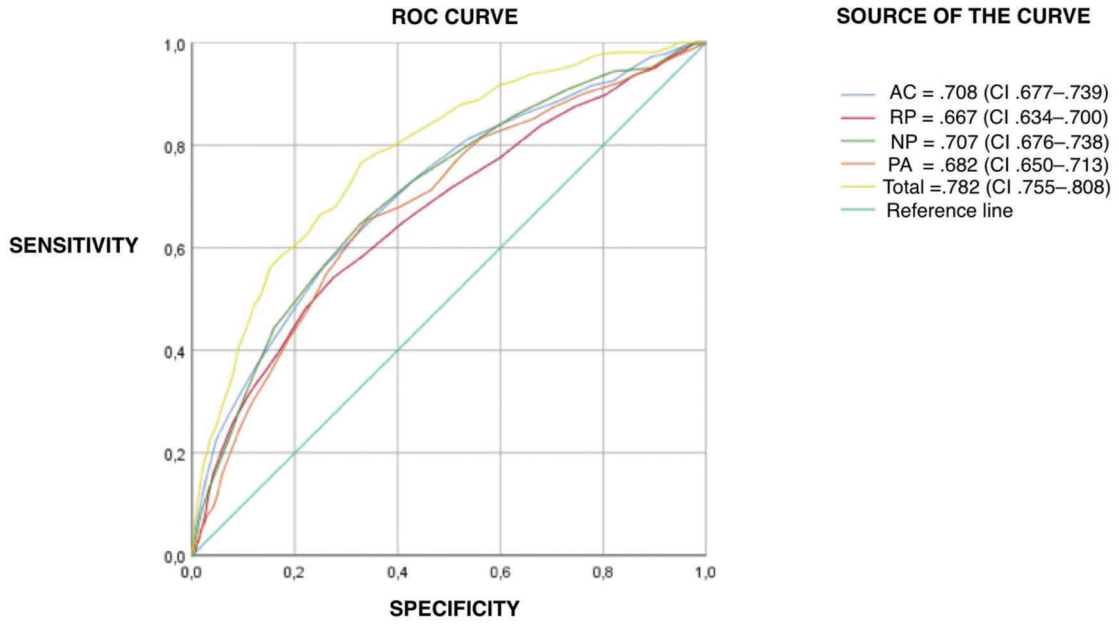
In the sample used in this study, the internal consistency coefficients were: .811 for the total scale, .668 for the subscale AC, .728 for the subscale RP, .746 for the subscale NP and .818 for the subscale PA.

Study 2. Validity to predict gambling behavior

To check the validity of the EDGAR-A scale in its ability to discriminate adolescents according to their frequency of gambling, ROC curve analysis was made (Figure 1). For each subscale, AUC values were: AC = .708 (CI .677–.739); NP = .707 (CI .676–.738); RP = .667 (CI .634–.700); PA = .682 (CI .650–.713). The AUC for the total score of EDGAR-A was .782 (CI .755–.808), showing an acceptable capacity for classifying adolescents who gamble with high frequency. In all cases, *p*-value significance was .000.

Besides, the scores of each subscale were compared in the groups with different frequencies (Table 3). The results indicate that the scores in each of the risk scales are significantly lower in the group with the lowest frequency of gambling. In particular, between the adolescents who do not gamble and "High-frequency gamblers" the effect sizes are medium-high. Total and subscale scores discriminate well according to "gambling-frequency," especially between "Non-gamblers" and "High-frequency gamblers" with high size-effect. The discriminative ability of the EDGAR scale is maintained in all four age groups (13–14, 15, 16 and 17–18). Although in the most adult group, the scale loses its discriminative ability between the lower frequency groups "Non-gamblers" and "Low Frequency." The interpretation of the Cohen d in these groups (Iraurgi, 2009), indicates that the percentage of non-players whose score in each scale is lower than the average of gamblers with high frequency is 70% for AC, 80% for NP, 79% for RP and 77% for PA. Likewise, table 4 shows

Figure 1
ROC curve. EDGAR-A total scale and subscales to classify minors scoring "high-frequency" of gambling (n = 392).



significant correlations among each subscale and other variables, such as gambling intensity within 12 months and gambling intention (Table 4).

Discussion

The aim of the present work is the design and validation of a risk scale for the onset and maintenance of gambling in adolescents. For this, two studies were developed: the first one analyzed psychometric properties and the second calculated the capacity and ability of the scale to discriminate between young people with different levels of gambling. The resulting scale is a valid and reliable instrument for the evaluation of four risk factors: *Accessibility* (AC), *Risk Perception* (RP), *Normative Perception* (NP), and *Parental Attitude* (PA). Besides, higher scores of each subscale are clearly related to higher gambling frequency. Thus, AUC values indicate that the EDGAR-A subscales have an acceptable capacity to classify high-frequency gamblers. Considering that gambling behaviour responds to a multiplicity of bio-psycho-social causes, AUC values $>.70$ are considered acceptable. As a complex behavior, gambling explanation requires a wide array of predictors. The four psycho-social factors assessed in EDGAR-A are joined by macro-social factors such as media pressure (Clemens et al., 2016), and individual factors such as impulsivity or sensation-seeking (Estevez et al., 2015; Kräplin et al., 2014), among others. This large concurrence of risk factors means that the effect of each one on gambling behavior is moderate. The results provide evidence of the validity of the scales in detecting the risk of increasing gambling and, consequently, their usefulness in

Table 3
EDGAR-A factors. Score differences according to gambling frequency

Factors	Gambling Frequency	*N*	Mean	*SD*	*t*	*p*	*d*	*p* by age group			
								13–14	15	16	17–18
Not Gambling/Low Freq.											
Accessibility	Not Gambling	1726	2.36	.890	-4.390	.000	.23	.001	.000	.006	.364
	Low	464	2.52	.853							
Normative Perception	Not Gambling	1778	2.00	.775	-8.495	.000	.44	.001	.000	.000	.904
	Low	477	2.34	.781							
Risk Perception	Not Gambling	1796	1.25	.651	-5.781	.000	.30	.014	.001	.022	.041
	Low	484	1.45	.677							
Parental Attitude	Not Gambling	1740	1.92	.834	-7.260	.000	.38	.001	.000	.001	.072
	Low	469	2.24	.879							
EDGAR Total	Not Gambling	1570	1.51	.443	-9.910	.000	.53*	.000	.000	.000	.023
		Low	421	1.75	.456						
Low/High Freq.											
Accessibility	Low	464	2.52	.853	-5.098	.000	.36	.002	.407	.000	.019
	High	366	2.83	.875							
Normative Perception	Low	477	2.34	.781	-6.251	.000	.43	.001	.118	.000	.021
	High	374	2.68	.805							
Risk Perception	Low	484	1.45	.677	-7.588	.000	.52*	.085	.004	.000	.011
	High	381	1.80	.667							
Parental Attitude	Low	469	2.24	.879	-5.081	.000	.36	.006	.100	.003	.032
	High	358	2.56	.924							
EDGAR Total	Low	421	1.75	.456	-9.152	.000	.67*	.000	.003	.000	.000
	High	324	2.06	.460							
Not Gambling/High Freq.											
Accessibility	Not Gambling	1726	2.32	.890	-9.988	.000	.57*	.000	.000	.000	.000
	High	366	2.83	.875							
Normative Perception	Not Gambling	1778	2.00	.775	-15.356	.000	.87**	.000	.000	.000	.007
	High	374	2.68	.805							
Risk Perception	Not Gambling	1796	1.25	.651	-14.752	.000	.83**	.000	.000	.000	.000

Continued

Table 3 *Continued*

Factors	Gambling Frequency	*N*	Mean	*SD*	*t*	*p*	*d*	*p* by age group			
								13–14	15	16	17–18
	High	381	1.80	.667							
Parental Attitude	Not Gambling	1740	1.92	.834	-12.958	.000	.75*	.000	.000	.000	.000
	High	358	2.56	.924							
EDGAR Total	Not Gambling	1570	1.51	.443	-20.281	.000	1.21**	.000	.000	.000	.000
	High	324	2.06	.460							

*Medium size effect; **High size effect; Risk Perception is reverse keyed.

Table 4
EDGAR-A factors and Total Score: Correlations with gambling intensity and intention

	EDGAR-A				
Subscale	AC	RP	NP	PA	Total scale
Gambling intensity within last 12 months	.170** (2514)	.190** (2611)	.219** (2639)	.203** (2567)	.288** (2315)
Gambling intention	.348** (2480)	.310** (2577)	.234** (2594)	.283** (2536)	.436**(2286)

**$p < .001$; AC: Accessibility; NP: Normative Perception; PA: Parental attitude; RP: Risk Perception (reverse keyed)

justifying whether preventive interventions should include activities or components aimed at modifying the four factors analyzed.

When it comes to preventing gambling in teenagers, universal prevention is the most developed (Keen et al., 2017). Currently, most preventive interventions assume that all young people suffer from the same deficiencies, and therefore receive the same universal intervention. An easy-to-use risk factor assessment tool such as the one obtained in this study is convenient for conducting needs assessments, early detection of risk, and adapting interventions to the target population. It is also a useful tool for evaluating the effectiveness of complex prevention programs that require different measures.

Several potential limitations must be discussed. First, EDGAR-A discriminates among adolescents with different attitudes and beliefs about the risk of gambling (i.e., risk perception), but does not discriminate groups related to gambling-related harm (i.e., consequences). However, although EDGAR-A does not assess objective risk, it could be considered a predictive or indirect measure of it. Therefore, it would be of interest in the practical application that EDGAR-A could be used in conjunction with instruments that assess related consequences that subjects may report. Second, only a limited subset of gambling activities (i.e., five modes) was examined. In the present study, non-commercial gambling (e.g., card or skill games with friends or family) was not included. This gap could exclude onset gambling episodes or even underrate gambling prevalence. Moreover, the Parental Attitudes Scale was designed for heterosexual parent families, which is a limitation for emerging family structures such as single-parent families or homosexual parent families. In the case of families with homosexual parents, six of the seven items are directly applicable. In the case of single-parent families, six of the seven items are also applicable, but the plural "my parents" has to be adapted to "my mother or father."

Regarding validity analysis, research on the measurement of at-risk gambling is in an initial phase and it was not possible to find validated tools that evaluated similar concepts to the factors included in EDGAR-A. However, it would be desirable for future research to explore the relationship between scale scores with other objective

measures obtained from external sources. In this sense, to facilitate greater understanding of reliability aspects future research should consider a longitudinal approach. This approach would also make it possible to verify predictive validity. For example, to ascertain whether parental perception corresponds with the attitude of the parents, measured by means of self-reporting. Or whether normative perception correlates with the prevalence of gambling behavior in adolescents from the same close environment, educational center or city. In the same way, longitudinal studies could provide information on the predictive power over gambling consequences (i.e., objective risk). In the absence of repeated measures, it is not possible for this study to answer the question of whether low risk perceptions and high perceived accessibility or favourable attitudes towards gambling could lead to real risk.

It is suggested that the research continues concerning the construction of a battery of measures to facilitate the comparison of comprehensive models (Spurrier et al., 2015). Namely, an instrument capable of measuring a range of factors and developing risk profiles to guide decision-making regarding the type of preventive intervention most appropriate for each population.

Despite the limitations of this study, the results offer robust support on the structural validity and internal consistency of the psycho-social risk scale of gambler teenagers. There are few means or techniques for assessing at-risk gambling; this study provides a rare and valid new instrument to serve the empirical testing of theoretical models and a tool for the evaluation of prevention programs. The results suggest that the EDGAR-A scale is a useful means for the identification of adolescent candidates requiring a selective intervention. Its use is both simple and, at the same time, capable of operating with four risk factors, making it practical for making decisions about the desired objectives to be achieved from preventive interventions. These type of early and selective interventions have been shown to be effective in reducing other addictive behaviors (Conrod et al., 2006; 2008; 2010).

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