

## **Spanish validation of NODS screening in a Chilean representative sample**

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In a probabilistic and representative sample from Santiago, Chile, this research aims to validate the Spanish-language National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS) and its abbreviated form for the Chilean context. 1032 individuals were surveyed at home using a standardized questionnaire. Results show high reliability for both lifetime and past-year versions of the screening, with structural validity supported by factor analyses. The study found 2.4% of the sample classified as lifetime pathological gamblers and 0.8% for the past year, consistent with higher ranges of international studies. Severe gambling disorder rates are higher in Chile compared to Spain. Concurrent validity suggests that the abbreviated form of the scale (NODS-Clip) did not perform adequately compared to the lengthy Chilean adaptation of NODS, which is reliable for assessing gambling problems.


*Keywords:* gambling; gambling problems; validation.

### **Validación del examen NODS en español en una muestra representativa chilena**

En una muestra probabilística y representativa de Santiago, Chile, esta investigación tiene como objetivo validar la adaptación del National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS) en español y su forma abreviada para el contexto chileno. Se encuestaron 1032 personas en sus hogares utilizando un cuestionario estandarizado. Los resultados muestran una alta fiabilidad para las versiones de toda la vida y del último año del cribado, con validez estructural apoyada por análisis factoriales. El estudio encontró que el 2.4% de la muestra se clasificó como jugadores patológicos de por vida y el 0.8% en el último año, consistente con los rangos más altos de estudios internacionales. Las tasas de trastorno severo del juego son más altas en Chile en comparación con España. La validez concurrente sugiere que la versión corta del instrumento tuvo un desempeño inferior a la

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adaptación chilena extensa del NODS, la cual resultó ser confiable para evaluar problemas de juego.

*Palabras clave:* apuestas; trastornos del juego; validación

### **Validação espanhola da triagem NODS em uma amostra representativa do Chile**

Em uma amostra probabilística e representativa de Santiago, Chile, esta pesquisa tem como objetivo validar o Questionário Nacional de Pesquisa de Opinião DSM-IV para Problemas de Jogo (NODS) em espanhol e sua versão abreviada para o contexto chileno. 1032 indivíduos foram pesquisados em suas casas usando um questionário padronizado. Os resultados mostram alta confiabilidade para as versões do questionário referente a toda a vida e ao último ano, com validade estrutural apoiada por análises fatoriais. O estudo constatou que 2,4% da amostra foi classificada como jogadores patológicos ao longo da vida e 0,8% no último ano, o que é consistente com faixas mais altas de estudos internacionais. As taxas de transtorno grave de jogo são mais altas no Chile em comparação com a Espanha. A validade concorrente sugere que a versão abreviada da escala (NODS-CliP) não teve um desempenho adequado em comparação com a longa adaptação chilena do NODS, que é confiável para avaliar problemas de jogo.

*Palavras-chave:* jogatina; problemas de jogo; validação

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The term “gambling” refers to a variety of behaviors that have evolved over time and vary from one culture to another (Walker & Dickerson, 1996). The main characteristic of these activities is that participants/gamblers are unable to influence the outcome of the game by skill or rational means of winning. Gambling is also distinct from other forms of entertainment since the outcome of the game indicates a reward or a loss, typically in the form of money (Carbonell et al., 2009). Thus, gambling activities range from buying lottery tickets to participating in complex trades in which individuals can raise their earnings by relying on chance and sometimes a minimum influence of knowledge and skill (Volberg et al., 1997). Additionally, each culture has its own unique traditional games of chance, which can be a source of gambling and complicate demographic comparisons and analysis (Raylu & Po Oei, 2004). Among this wide range of activities and game outcomes, there are some behaviors linked to gambling that can be harmful. When people engage in any type of gambling heavily, they may have challenges such as debt, broken relationships, depression, job loss, and others related to the dangers that gamblers face when they play excessively (Fisher, 2000; Muggleton et al., 2021; Walker & Dickerson, 1996). In addition, the gambling extension has also raised questions about the potential negative impacts on the wider social network of gamblers and society (Pyle, 2017). Researchers have debated the key point at which gambling becomes problematic, and numerous conceptualizations and screens have been created to evaluate and comprehend gambling behavior (Delfabbro & King, 2019; Dickerson, 1990).

The prevalence of casinos and locations with slot machines, like convenience stores and small businesses, may be contributing to Chile’s rise in gambling activity. An important challenge is monitoring gambling activities and providing longitudinal data to understand the

numerous factors involved, including game features, venue features, accessibility, and gambler characteristics and behaviors, among others (McMillen & Wenzel, 2006). Research has shown that the growth of legal gambling is associated with problem gambling (Volberg, 2004; Wiebe & Volberg, 2007).

Recent evidence has also demonstrated the impact of the internet on the phenomenon. Allami et al. (2021) review points to internet gambling as the main risk for developing pathological gambling. Studies have also incurred in the relation with financial motivations (Tabri et al., 2022), the impact of cryptocurrency trading (Delfabbro et al., 2021) and advertising (Syvertsen et al., 2022).

One of the most crucial diagnostic tests for pathological gambling is the National Opinion Research Center DSM Screen for Gambling Problems [NODS] (Gerstein et al., 1999), a screening tool created to identify gambling problems in accordance with DSM-IV criteria (Stinchfield, 2003). Fisher (2000) explains that in validation and the subsequent prevalence studies, researchers have little control over factors related to the location of the samples, the date of the field work, and the age of the participants, and the way they work makes it possible to gauge how well the device works with various populations. Therefore, the research cited below includes validations of NODS within people participating in gambling treatment programs, substance abusers, as well as general population samples.

Stinchfield (2003) using a sample from general population ( $n=803$ ) and another from people in a gambling treatment program ( $n=259$ ) in Minnesota, found adequate scores of internal consistency (Cronbach's alpha) for the first, second and the combined groups were: 0.81, 0.77 and 0.98, respectively. Hodgins (2004) discovered excellent test-retest reliability (44 participants, using a period of 2-4 weeks) with  $r=.99$  for and  $r=.98$  considering questions about lifetime and past year gambling experiences, respectively; Cronbach's alpha coefficient was .79 using a sample of volunteer problem gamblers ( $n=102$ ) in Canada. One single construct with three subfactors was identified, these were: negative behavioral consequences, preoccupation and

impaired control over gambling and tolerance, and withdrawal and relief gambling (Hodgins, 2004). Within a population of individuals with substance abuse disorders ( $n=157$ ) in the United States, Wickwire et al. (2008) found a good internal consistency (Cronbach's alpha was .88) and adequate levels of concurrent and discriminant validity. In Sweden, a self-assessment version of NODS in a population of people seeking treatment for their gambling problems ( $n=319$ ), showed low Cronbach's alpha for the two measured occasions one week apart from each other ( $\alpha=.47$  and  $.52$ , respectively) (Fager, 2007). Finally, Toce-Gerstein, Gerstein, and Volberg (2009), using a sample composed of six surveys ( $n=8867$ ), developed a short version, called NODS-CLiP (reference to loss of Control, Lying, and Preoccupation), which through three items captured 96.2% of problem gamblers.

Therefore, the primary goal of the research is to assess the NODS-performance CLiP's in a representative sample from Santiago, Chile, as well as the Spanish translation of the NODS questionnaire.

## **Method**

### ***Sample***

A multi-stage random sample was created, and 1032 people were polled as a result. In the initial stage, 140 blocks from each of Santiago's counties were chosen at random. After that, 10 homes were selected through systematic sampling, leaving out marketplaces, schools, hospitals, and other facilities. Finally, in each house an individual was selected, according to a Kish-table. The final sample had a 2.2% error associated, according to 95% confidence.

Women make up 54.7% of the sample, while males make up 45.3% of it. In terms of socioeconomic status, 37.7% fall into the medium-high category, 28.0% into the medium-low category, 20.1% into the high category, and 14.2% into the poor category, as shown in

Table 1. Socioeconomic status was measured via the occupation of the household's primary income earner, using a six-level categorical item. Options ranged from informal/occasional or unskilled work to top executives and high-prestige independent professionals. Respondents selected the category best describing that person's job; higher categories denote higher socioeconomic status. Lastly, the mean age is 44.06 years (SD=16.841). All the analyses presented, excluding the sample description, are weighted by these three variables.

**Table 1**

*Sample*

Sex	Men	45.3%
	Woman	54.7%
Socioeconomic status	High	20.1%
	Medium high	37.7%
	Medium low	28.0%
	Low	14.2%

***Instruments***

National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS). The NODS screening is composed of 34 questions about gambling problems, which has been validated in its English version (Wickwire et al., 2008). Half of them is related to last year, and the other half asks about the whole life. The possible answers are “yes” (1) and “no” (0), the first indicating gambling problems. According to the guideline of the questionnaire, the final variable, which is the weighted sum of the variables, allows to categorize the individuals in: low risk, risk gambler, problem gambler, and pathological gambler. We translate and adapt a Spanish version for Chile.

NODS CLIP. This instrument corresponds to the short version of NODS screen, which uses variables related to loss of control, lying and preoccupation, according to Toce-Gerstein, Gerstein, and Volberg

(2009), who showed how NODS CLiP successfully identified problem gamblers.

**Validation variables.** To validate the NODS questionnaire, we created several variables (about behavior related to gambling) that allow to carry out an analysis that points towards concurrent validity. The first variable is “What do you feel about gambling?”, with categories “attraction”, “rejection”, and “indifference”, as responses. The second variable is “When you have the chance of gambling, do you do it?”, coding 1 as “yes”, and 0 as “no”. The third variable is “When you participate in your favorite activities, how many time do you usually spend?”, with five response categories: “less than one hour”, “between one and two hours”, “between three and five hours”, “between six and twelve hours”, “more than twelve hours”. The next variable is “What is the largest amount of money that you have lost in gambling in the same day?”, with the exact amount as response. Finally, we included “Have you wished to receive help in order to avoid gambling?”, with “yes” and “no” as answers.

### ***Procedure***

To ensure standardized practices in data collecting, a pollster team was trained in the study’s goal, sample selection, and survey application. Following individual selection, the interviewer went through the survey’s purpose with each household resident in order to acquire their informed consent. A questionnaire with 70 variables was then used after that.

### ***Data Analysis***

First, internal consistency of both versions of NODS questionnaire are exposed, according to Kuder-Richardson Formula, which is an appropriate measure given dichotomous responses. Then, two confirmatory factor analyses were performed, using the robust unweighted least squares (ULSMV) estimator, available in Mplus v. 6.12, which is appropriate for categorical variables. These analyses tested a unidimensional

model as the factor structure of the NODS. Finally, an analysis that points towards concurrent validity is presented, using association statistics such as Chi-square and Analysis of Variance (ANOVA), to identify differences according to NODS categories.

### ***Ethical Statement***

All the participants agreed to participate in the study voluntarily, signing an informed consent in which the objectives of the study were indicated. In the same consent, it was informed that the data collected would be treated confidentially and that only the research team would have access to them. All methods in this study were carried out in accordance with the Declaration of Helsinki. All protocols were approved by the Bioethics Committee of the Faculty of Economics and Business of Universidad Andrés Bello in resolution 622/2023.

### **Results**

Both screening versions are reliable, given the Kuder-Richardson Formula. The whole life version is 0.900, and the last year version, 0.895. The confirmatory factor analysis for whole life NODS version, presents a high goodness of fit ( $\chi^2(119) = 146.291$ ,  $p < 0.05$ ; CFI=0.984; TLI=0.982, RMSEA=0.015), and all the factor loadings are significant and higher than 0.3, as can be seen in Table 2. In the last year version, it was necessary to drop the last variable, because all the individuals reported “no”. However, the goodness of fit was adequate ( $\chi^2(104) = 122.426$ ,  $p > 0.05$ ; CFI=1.000; TLI=1.003, RMSEA=0.013), and all the factor loadings were significant and higher than 0.3.

In the sample, 85.7% of the individuals are categorized as “low risk”, and 2.4% as “pathological gambler”, in the whole life NODS variable (the percentage of the rest of the categories can be observed in Table 3). In the other version of the screening, the most problematic category is lower, reaching 0.8% of the sample.



**Table 2**

*Confirmatory factor analyses*

Whole life	Factor loading	p value	Last year	Factor loading	p value
V1	0.819	0.000	V1	0.806	0.000
V2	0.821	0.000	V2	0.870	0.000
V3	0.825	0.000	V3	0.808	0.000
V4	0.898	0.000	V4	0.877	0.000
V5	0.866	0.000	V5	0.817	0.000
V6	0.965	0.000	V6	0.970	0.000
V7	0.961	0.000	V7	0.949	0.000
V8	0.790	0.000	V8	0.830	0.000
V9	0.805	0.000	V9	0.788	0.000
V10	0.861	0.000	V10	0.885	0.000
V11	0.934	0.000	V11	0.909	0.000
V12	0.844	0.000	V12	0.910	0.000
V13	0.861	0.000	V13	0.949	0.000
V14	0.977	0.000	V14	0.898	0.000
V15	0.861	0.000	V15	0.863	0.000
V16	0.472	0.003	V16	0.692	0.003
V17	0.744	0.000	V17		

**Table 3**

*NODS distribution*

Whole life	Low risk	85.7%
	Risk gambler	8.9%
	Problem gambler	2.9%
	Pathological gambler	2.4%
Last year	Low risk	91.5%
	Risk gambler	5.3%
	Problem gambler	2.4%
	Pathological gambler	0.8%

27.8% of the low-risk individuals declares “attraction” to gambling, increasing this to 51.0% in risk gambler, to 63.0% in problem gambler, and to 69.6% in pathological gamblers, according to whole life NODS version. Between these variables there is a significant relation,  $\chi^2 (6, 1009) = 60.890$ ,  $p < 0.001$ .

Regarding last year's NODS version, 28.9% of the individuals in low-risk category declared they feel attracted to gambling, growing to 100.0% in pathological gamblers (the percentage of the rest of the categories can be observed in Table 4).

These variables are significantly related,  $\chi^2 (6, 1009) = 56.150$ ,  $p < 0.001$ , although there are more than 20% of the cells with less than five cases.

56.7% of the individuals in low-risk category in the whole life NODS version declares if they have the chance of gambling, they will do it. The percentage increases in the problematic categories and, particularly, in pathological gamblers, which reach 93.1%. These variables are significant related,  $\chi^2 (3, 982) = 30.916$ ,  $p < 0.001$ .

In last year's NODS version, a similar pattern is observed. The 57.4% of individuals in low-risk category declares “yes” in the question “When you have the chance of gambling, do you do it?”, increasing to 100.0% in pathological gamblers (the percentage of the rest of the categories can be observed in Table 5). Although there is a significant relation between both variables,  $\chi^2 (3, 982) = 34.501$ ,  $p < 0.001$ , there are more than 20% of cells with less than five observed cases.

Respect to the amount of time invested in gambling, 65.0% of individuals in low-risk category, in whole life NODS version, declares “less than one hour”. The modal category in risk gambler, on the other hand, is “between three and five hours” (39.2%); in problem gambler is “less than one hour”, but with 35.5% of individuals in this cluster; and in pathological gambler is “between one and two hours” (46.3%). Just 5.6% of pathological gamblers claim to spend “less than one hour,” which is an interesting result. Between these variables there is a significant relationship,  $\chi^2 (12, 887) = 246.816$ ,  $p < 0.001$ , although there are more than 20% of cells with less than five observed cases.

**Table 4**

*What do you feel about gambling?*

		Attraction	Rejection	Indifference
Whole life	Low risk	27.8%	16.8%	55.4%
	Risk gambler	51.0%	5.7%	43.3%
	Problem gambler	63.0%	25.7%	11.3%
	Pathological gambler	69.6%	1.8%	28.6%
Last year	Low risk	28.9%	16.6%	54.5%
	Risk gambler	49.6%	7.8%	42.7%
	Problem gambler	82.8%	5.8%	11.4%
	Pathological gambler	100.0%	0.0%	0.0%

**Table 5**

*When you have the chance to go gambling, do you do it?*

		Yes	No
Whole life	Low risk	56.7%	43.3%
	Risk gambler	78.7%	21.3%
	Problem gambler	76.1%	23.9%
	Pathological gambler	93.1%	6.9%
Last year	Low risk	57.4%	42.6%
	Risk gambler	84.0%	16.0%
	Problem gambler	97.8%	2.2%
	Pathological gambler	100.0%	0.0%

In last year's NODS version, there are clearer differences. The modal categories in low risk, risk gambler, problem gambler, and pathological gambler are "less than one hour" (62.7%), "between one and two hours" (38.0%), "between three and five hours" (47.9%), and "more than twelve hours" (42.8%), respectively, as can be seen in Table 6. There is a significant relationship between these variables,  $\chi^2(12, 887) = 456.574$ ,  $p < 0.001$ , although there are more than 20% of cells with less than five observed cases.

**Table 6**

*When you participate in your favorite activities, how much time do you usually spend?*

		Less than one hour	Between one and two hours	Between three and five hours	Between six and twelve hours	More than twelve hours
Whole life	Low risk	65.0%	24.5%	8.7%	1.7%	.0%
	Risk gambler	33.1%	27.1%	39.2%	.6%	0.0%
	Problem gambler	35.5%	29.8%	28.1%	6.6%	0.0%
	Pathological gambler	5.6%	46.3%	29.2%	4.3%	14.6%
Last year	Low risk	62.7%	24.9%	10.6%	1.7%	.0%
	Risk gambler	28.3%	38.0%	31.2%	2.4%	0.0%
	Problem gambler	29.1%	17.6%	47.9%	5.4%	0.0%
	Pathological gambler	0.0%	32.0%	21.3%	4.0%	42.8%

According to the largest amount of money lost in gambling during the same day, the low-risk category in whole life NODS version presents the mean of 101189 pesos ( $SD=35383$ ), increasing to 86753 pesos ( $SD=236287$ ) in pathological gamblers. According to ANOVA test, there is a main effect of the gambler cluster,  $F(3, 859) = 19.595$ ,  $p < 0.001$ . The Bonferroni post-hoc test suggests that the pathological gamblers present a mean significant different from all the other categories.

In the last year NODS version, there is a similar pattern. In low-risk category, the mean is 11860 pesos ( $SD=36938$ ), increasing the percentage until 155984 ( $SD=402928$ ) in pathological gamblers (the means of the rest of the categories can be observed in Table 7). Also, there is a main effect of clusters,  $F(3, 859) = 22.057$ ,  $p < 0.001$ , and the Bonferroni post-hoc test suggests that pathological gamblers are different to other categories.

According to clusters, there are disparities in the desire to receive assistance. According to the entire life NODS version, 0.8% of people in the low-risk category declare it, bringing the rate up to 51.3% among pathological gamblers. There is a significant relationship between both

variables,  $\chi^2(3, 913) = 242.824$ ,  $p < 0.001$ , although there are more than 20% of cells with less than five observed cases.

In last year's NODS version, a similar pattern is observed. While 53.3% of pathological gamblers acknowledge wanting help, only 1.4% of people classified as low risk do (see Table 8). Between both variables there is a significant relationship,  $\chi^2(3, 913) = 103.038$ ,  $p < 0.001$ , although there are more than 20% of cells with less than five observed cases.

**Table 7**

*What is the largest amount of money that you have lost in gambling on the same day?*

		M	SD
Whole life	Low risk	101189	35383
	Risk gambler	25547	44076
	Problem gambler	42670	80442
	Pathological gambler	86753	236287
Last year	Low risk	11860	36938
	Risk gambler	33724	74761
	Problem gambler	30929	35436
	Pathological gambler	155984	402928

**Table 8**

*Have you wished to receive help in order to avoid gambling?*

		Yes	No
Whole life	Low risk	0.8%	99.2%
	Risk gambler	3.7%	96.3%
	Problem gambler	12.4%	87.6%
	Pathological gambler	51.3%	48.7%
Last year	Low risk	1.4%	98.6%
	Risk gambler	13.4%	86.6%
	Problem gambler	11.6%	88.4%
	Pathological gambler	53.3%	46.7%

**Table 9***NODS CLiP and NODS questionnaire*

	Low risk	Risk gambler	Problem gambler	Pathological gambler
NODS CLiP	2%	29%	73%	100%
NODS CLiP 21	5%	43%	94%	99%

Finally, Table 9 presents the percentages captured by NODS CLiP in our sample, compared to the previous validation of this screen. The percentages correspond to people in each NODS category that report “yes” to any of the three variables included in the short version of the questionnaire. The performance of NODS CLiP in the Chilean sample is similar to the previous study in low risk and pathological gambler categories. Nevertheless, in risk and problem gamblers, the percentage captured by NODS CLiP is lower than in Toce-Gerstein, Gerstein, and Volberg (2009) research. The most significant distinction between the two studies is that the short form of the Chilean sample only includes 49.9% of risk, problem, and pathological gamblers overall, whereas this figure was 96.2% in the original validation study.

## Discussion

The analyses presented suggest that NODS screen is a reliable and valid measure of gambling problems in its Spanish version. The utilization of a probabilistic and representative sample in a big metropolis of a developing country like Chile is the research’s most significant contribution. In the sample, 9 of 10 the individuals are categorized as “low risk”, in the whole life NODS variable and in the last year version. NODS distribution for the whole life and last year respectively were At-risk gambler 8.9% and 5.3%, Problem gambler, 2.9% and 2.4% Pathological gambler 2.4% and 0.8%. This means that prevalence of pathological gambling is in the high range (0.4 to 1%) of international epidemiological studies (APA, 2018). For the whole life, 10,5 were non

gambler in a country of Latin culture like Spain (Labrador et al., 2020), lower than a 25.0% of non-gamblers in Chile. On the other hand, in this same recent Spanish sample a 84.5% of the gamblers was categorized as low risk, 2,9% as At-risk gambler, 1.0% problem gambler and 1.1% pathological gamblers (Labrador et al., 2020). Results suggest that gambling is more prevalent in Spain, but that severe gambling disorder (problem and pathological gambler) are more important in Chile (5,3% versus 2,1% in Spain).

Importantly, the abbreviated NODS-CLiP performed poorly in this Chilean sample: it captured only about half of those classified as at-risk, problem, or pathological gamblers by the full NODS (see Table 9). This shortfall likely reflects a combination of low base rates (which depress screening sensitivity/PPV in population surveys), cultural/linguistic nuances affecting endorsement of “control/lying/preoccupation” items, and potential social-desirability underreporting in face-to-face interviews. Practically, these results caution against using the CLiP as a stand-alone screener in Chile; the full NODS—or the CLiP followed by a longer instrument—appears preferable for public health screening and prevalence estimation. Future work should examine locally calibrated cutoffs, cognitive testing of item wording, and augmentation with additional indicators (e.g., chasing/losses, functional impairment) to improve short-form detection in this context.

To contextualize the low proportion at high risk observed, studies from other American countries report similar prevalence and size of the “at-risk” population in general-population surveys. In Canada (PGSI), 0.6% were classified as problem gambling and 2.7% as at-risk in 2018, suggesting that a substantial share of potential harm may occur at sub-clinical levels rather than in severe cases. In Mexico, a national survey estimated 0.3% with gambling disorder (DSM-5). In Brazil, 1.0% pathological gambling and 1.3% problem gambling were observed (DSM-IV). In the United States, national surveys indicate temporal stability and low rates in the general population, consistent with systematic reviews that place the problem within relatively small ranges.

Considering the above, we can see how relevant the legal regulation of the different practices associated with gambling is. Chile is a country that does not have a fully developed legal regulation regarding gambling, compared to countries like Spain. For example, it can be mentioned that, to date, Chile does not even have regulations for a market as large as online gambling (Reyes and González, 2023). The difference in the levels of regulation could explain why, even though there is a higher proportion of the population of gamblers in Spain, there is a higher proportion of problematic and pathological gamblers in Chile.

At this point it is worth mentioning that online gambling, which has shown itself to be an incipient market that is growing rapidly, has opened up a whole new range of potential problems. In the first place, this type of gambling opens the possibility for people from one country to place bets in other countries, which leads to possible violations of the law, given the incompatibility of the legal frameworks of different countries. An example of this is the case of greyhound dog racing, which is prohibited in different countries, but on which people can bet from anywhere in the world. On the other hand, there is the issue of taxes. In online betting, when paying with international credit cards, the commercial activity is not necessarily taxed in the country where the betting person is located. This is not only a commercial problem, but also from the point of view of the negative externalities generated by the world of betting, which could completely take over the country of the person who bets, without receiving any type of tax amount.

Likewise, the activity of problematic gamblers or pathological gamblers becomes completely out of the control of betting houses. In the case of Chilean casinos, a person can enlist to be prevented from accessing venues where bets are made, thus acknowledging their inability to control themselves and relying on the mechanisms available to the betting house to favor the process. In online betting this is completely unfeasible, due to the huge supply of gambling places that exist in the market. Although some betting sites promote some self-regulatory mechanisms for their clients (such as setting a daily maximum to



bet), these mechanisms are left to the will of the client who could go to another betting site if he exceeded his limits in a first house of betting.

All these problems, associated with the traditional problems of gambling (addiction, loss of control, financial problems, legal problems and mental health problems, among others), could lead us to think that the phenomenon of gambling will gain relevance and complexity in the future, also considering that the prevalence of pathological gambling is in the high range of international epidemiological studies. For this very reason, it is necessary to urge the authorities to regulate the practices associated with gambling, considering the significant negative externalities associated with problem gambling and pathological gambling.

## **Conclusion**

The NODS test effectively distinguishes between gambling problem-related behaviors and attitudes. Problem and pathological gamblers report a stronger attraction to gambling when given the opportunity, spending more hours playing, losing larger amounts of money, and expressing a desire to receive help to stop gambling. In contrast, the short version of the instrument demonstrated low concordance with the gambling behavior items created and did not perform adequately.

Taken together, these findings suggest that, while the full NODS offers clinically and epidemiologically meaningful discrimination, its abbreviated version is not suitable as a stand-alone screener in this context. The low base rates of at-risk, problem, and pathological gambling in population surveys—which constrained coefficient estimation in our models—also clarify the practical challenge: larger samples enriched for higher-severity cases are needed to yield stable parameters and to probe risk and protective factors with adequate power. In parallel, future work should establish concurrent validity against gold-standard measures (e.g., South Oaks Gambling Screen, SOGS; Jiménez-Murcia, 2009; Problem Gambling Severity Index, PGSI; López-González et al., 2018;

DSM-V diagnostic criteria: APA, 2018) and examine whether culturally adapted wording or locally calibrated cutoffs improve short-form performance.

In sum, even amid low prevalence, the observed gradients in harm underscore the public-health relevance of precise screening: robust instruments are needed not only to identify individuals at highest risk but also to detect subclinical patterns with meaningful impacts on people, their families, and society.

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### **Data Availability**

The datasets generated and/or analyzed during the current study are not publicly available due to confidentiality guarantee for participants but are available from the corresponding author on reasonable request.

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