



Spanish Validation of the Long and Short Versions of the Problematic Pornography Consumption Scale (PPCS and PPCS-6) in Adolescents

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Abstract

Although 1–14% of adolescents may experience problematic pornography use (PPU), psychometrically sound instruments for assessing PPU in Spanish-speaking adolescents are scarce. Given the advantages of the different forms of the Problematic Pornography Consumption Scale (PPCS), the aim of the present study was to assess the psychometric properties of the PPCS and PPCS-6, and to examine associations between PPU and age among boys and girls. Two school-based adolescent samples were recruited in Spain ($n = 650$; $M_{age} = 16.0$ [$SD = 1.1$]; 50% girls and 50% boys) and Mexico ($n = 160$; $M_{age} = 15.8$ [$SD = 1.1$]; 68% girls) to assess the psychometric properties of the PPCS and PPCS-6. Confirmatory factor analysis was applied and convergent and discriminant validity with other measures related to PPU was also tested. The results provided empirical support for the six-factor structure of the PPCS and the one-factor structure of the PPCS-6. Boys with older age showed higher levels of tolerance than girls on the PPCS in both countries. Both the PPCS and the PPCS-6 may be considered valid psychometric instruments for the assessment of PPU in Spanish-speaking adolescents from Spain and Mexico.

Keywords Compulsive sexual behavior · Sexually explicit material · Addictive behaviors · Compulsive behaviors · Problematic pornography use · Adolescents

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Introduction

Pornography use has increased in youth, changing since the advent of the internet (Alexandraki et al., 2018; Lewczuk et al., 2022). Adolescents' pornography use estimates vary widely between studies due to conceptual and methodological shortcomings, such as examining nationally representative vs. convenience samples, or focusing on samples of adolescents only or adolescents and young adults (Peter & Valkenburg, 2016). Nevertheless, based on data from nationally representative and large-scale adolescent studies from the US, Canada, and Europe (Bóthe et al., 2020a, 2020b, 2020c, 2021c; Lobe et al., 2011; Wolak et al., 2007), 23–63% of adolescents (aged between 9 and 17 years) have reported pornography use. For some individuals, this pornography use might eventually develop into problematic pornography use (PPU, i.e., persistent, poorly controlled use despite clinically significant distress and functional impairment). Approximately 1–14% of adolescents may experience PPU (Ballester-Arnal et al., 2017a, 2017b; Bóthe et al., 2020a, 2020b, 2020c, 2021b, 2021c, 2021d; Efrati & Gola, 2018; Pizzol et al., 2016; Štulhofer et al., 2020; Svedin et al., 2011).

It has been suggested that PPU may be considered a behavioral addiction, given that it presents neural and behavioral alterations akin to those found in other addictions (Castro-Calvo et al., 2021; Gola et al., 2017). However, there is still no absolute scientific consensus on the categorization of PPU as an addiction, impulse control disorder, or compulsivity-related disorder, nor on its definition (Bóthe et al., 2022a, 2022b; Brand et al., 2020; Gola et al., 2020; Griffiths, 2022; Sassover & Weinstein, 2022; Kor et al., 2014; Gola et al., 2017; Sassover & Weinstein, 2022). PPU seems characterized primarily by excessive time using or thinking about pornography (although not always; Bóthe et al., 2020a, 2020b, 2020c, 2021c; Chen et al., 2022), loss of interest in other activities, difficulties controlling use, unsuccessful attempts to reduce or cease use, and continued or escalating use despite negative consequences (Stark et al., 2018). In addition, PPU has been associated with higher levels of relational frustration and with lower levels of relational satisfaction (Bóthe et al., 2020a, 2020b, 2020c, 2021c).

The World Health Organization's (WHO's) 11th revision of the International Classification of Diseases (ICD-11) has recently added clinical and course features to the essential requirements for the diagnosis of compulsive sexual behavior disorder (CSBD). These features include pornography use and cybersex among the varieties of problematic sexual behaviors. Further, a common reported history from those with CSBD may include sexually acting out during pre-adolescence or adolescence with risky sexual behaviors, extensive pornography use,

or use of masturbation to cope with negative feelings (WHO, 2022). Additional developmental considerations in presentations of CSBD are noted in the ICD-11 that identify the association with a high prevalence of childhood trauma including sexual abuse, and that adolescents and adults have high rates of co-occurring mental, behavioral, and neurodevelopmental disorders, as well as disorders due to substance use (Bóthe et al., 2019a, 2019b; Slavin et al., 2020a, 2020b; WHO, 2022). Although there are various factors that may create challenges for assessment of CSBD during adolescence, it is noted that risky or problematic sexual behaviors have the potential to interfere with healthy social and emotional development (WHO, 2022), leading to loneliness and isolation (Butler et al., 2018; Efrati & Amichai-Hamburger, 2019). Thus, PPU has been recognized by the latest update of the ICD-11 as a manifestation of CSBD (WHO, 2022).

To conceptualize and operationalize both pornography use and PPU, multiple studies have created heterogeneous ad hoc assessments that in most cases include only a single item measuring frequency or time spent using pornography (Kohut et al., 2020; Short et al., 2012). The variability in definition and assessment creates barriers to understanding these constructs and their correlates. Therefore, the need to avoid ad hoc idiosyncratic assessments and to focus on the development of instruments with adequate psychometric properties has been highlighted (Kohut et al., 2020).

The lack of uniformly accepted diagnostic criteria for PPU has led to the development of instruments from multiple theoretical frameworks and conceptualizations (e.g. addiction, social cognitive, atheoretical, or compulsive behavioral perspectives) (Fernandez & Griffiths, 2021). More than 20 psychometric instruments have been identified, and these have been classified in a recent review according to 17 components of addiction (Fernandez & Griffiths, 2021). Most instruments show robust psychometric properties, although the aforementioned review especially recommended the Problematic Pornography Consumption Scale (PPCS; Bóthe et al., 2018). More specifically, of all the instruments, the PPCS (Bóthe et al., 2018) was highlighted as the only one that assessed six core components of addiction (salience, mood modification, withdrawal, tolerance, relapse, and conflict) (Griffiths, 2005), and also incorporated a validated threshold to identify individuals with PPU, so its use in clinical and research settings was highly recommended. The PPCS (Bóthe et al., 2018) has also been considered particularly accurate in terms of reliability, validity, sensitivity, specificity, clinical utility, and cross-cultural adequacy, as described in other reviews and empirical studies comparing different psychometric properties of instruments for the assessment of PPU (Bóthe et al., 2017).

The PPCS assesses (1) salience, defined as the high importance of pornography in the person's life, such that it

dominates their thinking, feelings, and behaviors; (2) mood modification, defined as the subjective calming or negative-emotion-decreasing experience that individuals report as a consequence of pornography use; (3) conflict, relating to interpersonal, occupational, educational, or intrapsychic concerns; (4) tolerance, defined as the process when increasing amounts of pornography are required to achieve the same effects or the same amount of pornography use result in less satisfying experiences; (5) relapse, defined as the tendency for repeated returns to earlier patterns of pornography use after abstinence or control, and (6) withdrawal, defined as unpleasant feelings and emotional states that occur when pornography use is discontinued or reduced (Böthe et al., 2018).

Subsequent to the validation of the 18-item PPCS, a shorter 6-item scale (PPCS-6; Böthe et al., 2021b, 2021d) was developed to address common barriers to assessment, such as lack of resources (e.g., large data collection) or the presence of participants with limited attentional capacity (e.g., individuals with ADHD, and adolescents), including community samples, pornography site visitors, and treatment-seeking individuals. Later, the PPCS-6-A (Böthe et al., 2021b, 2021d) was developed to evaluate PPU in adolescents. The PPCS-6-A also demonstrated strong psychometric properties. The development of this instrument for adolescent populations partially supplements the lack of psychometrically sound tools for this specific target group. In fact, Fernandez and Griffiths (2021) found that only one of the 22 instruments included in their review had been validated among adolescents (Doornwaard et al., 2016). Moreover, there may be strong cultural biases in research of pornography use during adolescence (Peter & Valkenburg, 2016). Specifically, most studies to date come from North America, Australia, and specific European countries (e.g., Croatia, Netherlands and Belgium), resulting in important knowledge gaps in other countries, such as Hispanic/Latino countries (e.g., Spain, Mexico) (Grubbs & Kraus, 2021; Grubbs et al., 2020; Klein et al., 2021).

In addition to the lack of data in Hispanic/Latino countries, there are limited validated assessment instruments in Spanish, with the Pornography Consumption Inventory (PCI) (Leon-Larios et al., 2019) being the only instrument to specifically measure pornography use. However, while the PCI considers pornography use and motivations, it does not assess PPU, and it does not have a clinical cut-off score. This situation limits screening for PPU and conducting research in a Spanish-speaking samples.

Given the advantages of the PPCS (Böthe et al., 2018) and PPCS-6 (Böthe et al., 2021b, 2021d), and the lack of Spanish-language screening instruments for PPU and limited knowledge regarding adolescent PPU, the aims of the present study were to (1) translate the PPCS to Spanish and assess the psychometric properties of the translated instrument using confirmatory factor analysis (CFA), (2) test its

convergent and discriminant validity with other measures related to PPU; and (3) describe PPU's potential association with sex and age in two independent samples of Spanish and Mexican adolescents. Based on previous studies, we hypothesized that the PPCS would show a six-factor structure (i.e., salience, mood modification, conflict, tolerance, relapse, and withdrawal) and a one-factor solution would be adequate for the PPCS-6 (Böthe et al., 2018, 2021b, 2021d). Furthermore, we hypothesized, as observed in other studies (Böthe et al., 2021b, 2021d; Farré et al., 2020), that older versus younger adolescents would report higher levels of PPU and boys would report higher levels of PPU than girls in both samples (i.e., Spain and Mexico). We also hypothesized that there might be differences in the Mexican and Spanish samples due to socio-cultural factors. For example, prior studies have suggested that Spain has greater restrictions on the use of the internet than does Mexico (Martínez de Morentin et al., 2014). Additionally, differences exist between boys and girls in the frequency of sexual behaviors (Gil-Llario et al., 2017), and different levels of social restraint may interfere with the enjoyment of certain sexual activities (Hofstede, 2001). These factors could generate differences in the two samples and influence the validation process.

Having these two Spanish-speaking countries maximizes the applicability to a larger population as observed in other studies (Roux et al., 2021), aids in cross-validating the scale across different populations, and helps to address culture-related gaps and biases that have been reported in research on adolescent pornography use (Peter & Valkenburg, 2016).

Method

Participants and Procedure

Two population-based samples of adolescents recruited in Spain and Mexico were analyzed. The inclusion criteria were: (1) any sex, (2) aged between 12 and 18 years, inclusively (age range for adolescence used in multiple previous studies; e.g. Guerra-Marmolejo et al., 2021; Schmithorst & Yuan, 2010), (3) attending schools in Spain or Mexico, and (4) understanding Spanish. Students who presented cognitive or literacy difficulties or mental disorders that could alter the understanding of the survey battery were excluded from the study.

For recruitment, multiple public and private schools in Spain (selected through the official list of Spanish educational centers) were contacted online, as well as various private and public associations in Mexico. Four schools (three private and one charter school) in Spain and four schools (three public and one private school) in Mexico consented to participate in the study over the 2020–2021 and 2021–2022 academic years. The eight schools are located in different

geographical areas and have different socio-economic profiles in each country.

Once schools showed interest in participating in the study, all necessary information regarding the study procedure was provided to them, as well as how to address participants' questions during the assessment. Schools were offered the possibility of conducting the assessment using pencil and paper or online through Google Forms. Due to the situation arising from the COVID-19 pandemic, all schools chose the online assessment. Students in each grade and group were assessed on the same day, supervised by teachers who had received prior training in the evaluation protocol and could contact the research team with any questions. There was no financial compensation for either the schools or the participants. However, a psychoeducational workshop on the use of pornography and its implications for adolescents was given to those schools that participated in the study.

A total of 1848 adolescents agreed to participate (regardless of having ever used pornography). After discarding questionnaires with missing and inconsistent responses, the final sample included 1,810 adolescents (650 from Spain and from 1160 Mexico). In the Spanish sample, the mean age was 16.0 (SD = 1.1) years and sex was equiprobably distributed (50% girls versus 50% boys), while the mean age of the Mexican adolescents was 15.8 (SD = 1.1) years, and the percentage of girls was 67.8% in this sample. Table S1 (supplementary material) includes a description of participants in the study, stratified by country.

Measures

Pornography Use and Problematic Pornography Use

Pornography Consumption Inventory (PCI; Reid et al., 2011) The PCI assesses pornography-use motivations with four factors (i.e., sexual pleasure, arousal seeking, sexual curiosity, and emotional avoidance). The scale includes 13 Likert-type items (1 = Never; 5 = Many times). The scores range from 15 to 75, and there is no established cut-off, with higher scores indicating greater tendencies to use pornography for specific reasons. For the present study, the Spanish validation was used (see Supplemental Materials), which presents an excellent reliability > 0.90 in all factors and an internal consistency of 0.93 (Leon-Larios et al., 2019). This version adapted to the Spanish population showed a factorial structure of the scale divided into three dimensions (i.e., emotional avoidance, sexual curiosity, and excitement seeking and sexual pleasure), plus a global total score. In the study sample, internal consistency was also between very good to excellent for the different factor scales ($\alpha = 0.88$ for emotional avoidance, $\alpha = 0.92$ for sexual curiosity, $\alpha = 0.94$ for excitement-pleasure, and $\alpha = 0.93$ for the total score).

Problematic Pornography Consumption Scale (PPCS; Bóthe et al., 2018, PPCS-6; Bóthe et al., 2021b, 2021d) The PPCS assesses PPU with 18 Likert-type items with seven options of responses (1 = Never; 7 = All the Time). The items are subdivided into 6 factors: salience, emotional modification, conflict, tolerance, relapse, and abstinence. Total scores range from 18 to 126, with a score ≥ 76 being considered a cut-off score for high-risk of PPU. The original validation obtained good psychometric properties ($\alpha = 0.93$) (Bóthe et al., 2018). In the study sample, internal consistency was $\alpha = 0.94$ for the total score.

The PPCS was translated from English into Spanish (Appendix, Supplemental Materials) in accordance with the International Test Commission Guidelines for Translating and Adapting Tests (International Test Commission [ITC], 2010). Experienced bilingual clinical psychologists with extensive experience in behavioral addictions translated the items from the original PPCS into Spanish. The translated items were then back-translated by an independent native English speaker (TS), and the observed differences between both versions were discussed and resolved by common consensus. The Spanish version of the PPCS was then reviewed by two other independent Spanish-speaking clinical psychologists, who had not been involved in the previous back-translation process. In the translation process, two other independent psychologists revised the Spanish to be adapted to the Mexican population.

For the Spanish adaptation of the PPCS-6 (see Supplemental Materials), six of the 18 items of the PPCS were used, as suggested by the original validation of the PPCS-6 and the PPCS-6-A (Bóthe et al., 2021b, 2021d).

Loneliness

The University of California Los Angeles Loneliness Scale—Version 3 (UCLALS-3; Russell, 1996) The UCLALS-3 assesses the severity of loneliness with 20 items, with scores ranging from 20 to 80. Higher scores reflect greater loneliness. For the present study, the scale adapted and validated in a Spanish sample was used with a Cronbach's alpha of 0.91 (Expósito & Moya, 1993). In our study sample, internal consistency was $\alpha = 0.71$ for the total score.

Sociodemographic Variables

Sociodemographic variables included age, biological sex (with the item “indicate your biological sex”: boy, girl, or other with specification), gender (with the item: “you feel like a”: boy, girl, or other with specification), educational level (12–18 years of education, adapted to each school system in Mexico or Spain), and academic grades (from Failing to Excellent, adapted to each school system in Mexico or Spain). Each item included the possibility of answer abstention.

Statistical Analysis

Stata17 for Windows (Stata-Corp, 2021) was used for the statistical analyses. Generalized Structural Equation Modeling (GSEM) was used for the CFA, defining a six-factor model for the PPCS and a one-factor model for the PPCS-6. The GSEM constitutes an extension of standard structural equation models, with the advantage of allowing for generalized linear response functions for both discrete and continuous variables (different measurement scales can be grouped together in the same latent construct). Therefore, a limitative hypothesis based on the normal distribution of the data is not required in this model, and GSEM can be used in the analysis of categorized/ordinal data. In addition, compared to Structural Equation Modeling (SEM), GSEM is a very powerful and flexible procedure (it allows multiple estimation families [not only Gaussian, but also Bernoulli, binomial, multinomial, negative binomial, gamma, ordinal and Poisson], estimation methods [not only regress, but also logit, probit, cloglog, ologlog, ologit, oprobit, mlogit, poisson, and gamma], and estimation links [not only identity, but also log, logit, probit and cloglog]). In Stata, GSEM provides important features not provided by SEM. For example, it allows for: generalized linear response functions as well as linear response functions allowed by SEM; multilevel models, something SEM does not; and, categorical latent variables, which are not allowed by SEM. Furthermore, GSEM's method ML can use more observations in the presence of missing values than can SEM's method ML. A prior study demonstrates how multiprocess models can be fit with the GSEM procedure in Stata (Bartus, 2017).

A multi-group model was defined evaluating invariance across countries, with the analysis supported by differences in the frequency of pornography use and problems associated with pornography use across jurisdictions (Rowland & Uribe, 2020; Willis et al., 2022). Specifically, metric invariance (measurement unit equivalence) was assessed, a key issue in determining whether an instrument functions in a similar manner across diverse populations. For this test, the factor loadings are constrained to be equivalent across groups, while allowing item intercepts to vary freely. Without establishing measurement invariance, comparisons may not reflect actual group differences, but instead may relate to differential item functioning across groups, resulting in distorted findings and potentially misleading implications (Jeong & Lee, 2019). For this test, the factor loadings are constrained to be equivalent across groups, while allowing the item intercepts to vary freely.

Next, due to the significant results in the test measuring the invariance of the measurement coefficients, separate models were obtained for the samples from Spain and Mexico. Cutoff values of 0.08 for the Root Mean Squared Error of Approximation (RMSEA < 0.08), 0.90 for Comparative Fit Index

(CFI > 0.90), 0.95 for Tucker-Lewis Index (TLI > 0.95), and 0.08 for Standardized Root Mean Squared Residuals (SRMR < 0.08) were considered relatively good fit (Hu & Bentler, 1999). In addition, only high factor loadings (standardized coefficients above 0.60 with $p < 0.05$ for each item with its latent factor) and adequate internal consistency of the factors were considered good fits (Cronbach's alpha and omega coefficients higher than 0.70 were considered acceptable and higher than 0.80 good).

The convergent and discriminant validity of the PPCS was assessed through Pearson correlations with theoretically relevant measures. Both convergent and discriminant validity are measures of construct validity, but differences exist. Specifically, convergent validity provides evidence regarding the extent to which two constructs that are theoretically related are, in fact, related, whereas discriminant validity provides evidence regarding the extent to which two constructs that are theoretically distinct are, in fact, distinct. Since the significance tests for correlation coefficients are strongly linked to sample sizes (small correlation coefficients tend to achieve significant results in large samples, while high correlation coefficients may result in non-significant findings in small samples), effect sizes for correlation estimates were interpreted according to the following guidelines (Rosnow & Rosenthal, 1996): small for $|r| > 0.10$, moderate for $|r| > 0.24$ and large for $|r| > 0.37$ (these thresholds correspond to Cohen's d s of 0.20, 0.50 and 0.80 respectively).

Associations between PPCS scores and participants' sex and age were evaluated with one-way analyses of variance (ANOVAs). In this work, two groups of age were considered: 12–15 (this range correspond to the early adolescence stage) versus 16 to 18 (middle to late adolescence stage). The effect sizes of the mean differences were measured through standardized Cohen's d coefficients (considering null effects for $|d| < 0.20$, low-poor for $|d| > 0.20$, mild-medium for $|d| > 0.50$ and large-high for $|d| > 0.80$) (Kelley & Preacher, 2012). For these analyses, controlling for the potential increase in Type I error due to multiple statistical comparisons was done using the Finner-method, a family-wise procedure (Finner & Roters, 2001).

Results

Analysis of the Invariance by the Origin of the Country

Table 1 displays the results of the initial multi-group GSEMs. Adequate goodness-of-fit was achieved for the three models. The joint tests measuring the invariance of the parameters between the groups reached significance ($p < 0.001$), which provided evidence regarding the difference of the measurement coefficients between the Spanish and the Mexican

samples. Table 1 also displays the tests measuring invariance for each parameter and model, which allows more precise identification of the specific items with measurement differences between the countries. For the PPCS, 8 items demonstrated significant differences in the multi-model for the 6-factor solution, and 7 items demonstrated significant differences in the multi-model for the 1-factor solution. For the PPCS-6, items demonstrated significant differences in the invariance test.

Confirmatory Factor Analysis Stratified by Country

Table 2 shows the results of the GSEMs obtained for the PPCS and the PPCS-6, stratified by country. Goodness-of-fit statistics were close to the cutoff values for considering relatively good fit between the hypothesized model and the observed data, with the best fit for the one-factor model and for the data from Spanish participants. Additionally, all standardized factor loadings were higher than 0.60 and achieved statistical significance.

Table 1 Multi-group models measuring invariance by country of origin

PPCS		Six-factor solution			One-factor solution	
Item	Content	Factor	χ^2	<i>p</i>	χ^2	<i>p</i>
1	Porn is an important part of my life	Salience	9.08	.003*	0.08	.782
7	Thoughts about how good watching porn		0.53	.469	0.05	.820
13	Continually planning when to watch porn		13.52	< .001*	30.80	< .001*
2	Porn used to restore the tranquility	Mood	27.44	< .001*	14.66	< .001*
8	Porn used to rid of negative feelings		27.66	< .001*	14.32	< .001*
14	Porn used to I release tension	Conflict	0.59	.441	1.06	.303
3	Porn caused problems in sexual life		0.88	.348	4.98	.026*
9	Porn to prevent from bringing out the best		1.69	.194	0.34	.563
15	Neglecting other leisure activities	Tolerance	0.21	.647	9.34	.002*
10	Needing more porn for satisfaction		6.19	.013*	6.53	.011*
16	Watching more extreme porn		6.20	.013*	1.39	.239
5	I unsuccessfully tried to reduce porn	Relapse	0.43	.512	0.08	.777
11	Reducing porn for a short period of time		0.20	.658	2.20	.138
17	Resisting watching porn for only a little	Withdrawal	0.04	.850	2.81	.094
12	Agitated when unable to watch porn		11.28	.001*	36.55	< .001*
18	Missing porn greatly		11.30	.001*	1.35	.245
Invariance join test for the group			$\chi^2=67.60$ (<i>df</i> =10), <i>p</i> <.001		$\chi^2=107.84$ (<i>df</i> =15), <i>p</i> <.001	
Fit statistics			RMSEA=0.077; SRMR=0.051 CFI=0.948; TLI=0.906		RMSEA=0.073; SRMR=0.060 CFI=0.935; TLI=0.905	
PPCS-6		One-factor solution				
Item	Content	Factor	χ^2	<i>p</i>		
1	Porn is an important part of my life	Global	1.93	.164		
14	Porn used to I release tension		0.43	.514		
15	Watching more extreme porn		6.14	.013*		
10	Needing more porn for satisfaction		8.21	.004*		
11	Reducing porn for a short period of time		0.80	.371		
12	Agitated when unable to watch porn		11.52	.001*		
Invariance join test for the group			$\chi^2=28.79$ (<i>df</i> =5), <i>p</i> <.001			
Fit statistics			RMSEA=0.058; SRMR=0.041 CFI=0.987; TLI=0.980			

df degrees of freedom, *RMSEA* Root Mean Squared Error of Approximation

CFI Comparative Fit Index, *TLI* Tucker-Lewis Index, *SRMR* Standardized Root Mean Squared Residual, *PPCS* Problematic Pornography Consumption Scale, *PPCS-6* Problematic Pornography Consumption Scale 6

*Bold: significance test. Spain: *n*=650. Mexico: *n*=1,160

Table 3 includes a description of the PPCS factor scores, and the inter-factor scores. Correlations between the PPCS factors were high. Cronbach's alphas and omega coefficients were between acceptable to excellent in all cases. Overall, the results provided empirical evidence for the six-factor structure of the PPCS and the one-factor structure of the PPCS-6.

Convergent-Discriminant Capacity

As evidence of the convergent capacity, the PPCS factor scores (salience, mood modification, conflict, tolerance, relapse and withdrawal) obtained relevant positive correlations with the PCI scales (emotional avoidance, sexual curiosity, excitement-pleasure) in both samples from Spain and Mexico (see Table 4). And as evidence of discriminant validity, the

Table 2 Problematic Pornography Consumption Scale: Standardized factor loadings in the generalized structural equation modeling (confirmatory factor analysis) and goodness-of-fit statistics

PPCS		Six-factor solution			One-factor solution	
Item	Content	Factor	Spain	Mexico	Spain	Mexico
1	Porn is an important part of my life	Salience	0.762	0.732	0.743	0.675
7	Thoughts about how good watching porn		0.687	0.705	0.675	0.683
13	Continually planning when to watch porn		0.763	0.746	0.749	0.742
-A2	Porn used to restore the tranquility	Mood modification	0.865	0.782	0.728	0.642
8	Porn used to rid of negative feelings		0.712	0.806	0.643	0.635
14	Porn used to I release tension	Conflict	0.789	0.832	0.692	0.772
3	Porn caused problems in sexual life		0.628	0.496	0.624	0.507
9	Porn to prevent from bringing out the best		0.605	0.615	0.536	0.584
15	Neglecting other leisure activities	Tolerance	0.793	0.795	0.778	0.767
10	Needing more porn for satisfaction		0.856	0.906	0.831	0.596
16	Watching more extreme porn	Relapse	0.740	0.773	0.739	0.655
5	I unsuccessfully tried to reduce porn		0.810	0.693	0.653	0.683
11	Reducing porn for a short period of time		0.839	0.847	0.667	0.820
17	Resisting watching porn for only a little	Withdrawal	0.774	0.752	0.571	0.722
12	Agitated when unable to watch porn		0.825	0.650	0.792	0.539
18	Missing porn greatly		0.816	0.691	0.796	0.710
Goodness-of-fit indexes		RMSEA	0.072	0.074	0.057	0.079
		CFI	0.972	0.946	0.987	0.935
		TLI	0.941	0.901	0.962	0.918
		SRMR	0.032	0.038	0.026	0.042
PPCS-6		One-factor solution				
Item	Content	Factor	Spain	Mexico		
1	Porn is an important part of my life	Global	0.706	0.728		
14	Porn used to I release tension		0.716	0.686		
15	Watching more extreme porn		0.787	0.730		
10	Needing more porn for satisfaction		0.798	0.765		
11	Reducing porn for a short period of time		0.649	0.602		
12	Agitated when unable to watch porn		0.775	0.617		
Goodness-of-fit indexes			RMSEA	0.072	0.024	
		CFI	0.991	0.999		
		TLI	0.973	0.996		
		SRMR	0.017	0.010		

RMSEA Root Mean Squared Error of Approximation, CFI Comparative Fit Index, TLI Tucker-Lewis Index

SRMR Standardized Root Mean Squared Residual, PPCS Problematic Pornography Consumption Scale, PPCS-6 Problematic Pornography Consumption Scale 6

Spain: $n=650$. Mexico: $n=1160$

correlation coefficients estimated between the PPCS and the UCLALS-3 were into the null to low effect size ranges.

Comparison of the Problematic Pornography Consumption Scale Factor Scores Between Sex and Age Groups

Table 5 shows the comparison of the PPCS factor scores between sex and age groups for the total sample and stratified by the groups defined by sex and age. Boys obtained higher mean scores compared with girls on all PPCS measures. Older adolescents also achieved higher mean scores on the PPCS tolerance factor but non-significant differences on the other factors (salience, mood modification, conflict, relapse or withdrawal). The last column of Table 5 also reports correlations between age (years) and the PPCS factor scores. No relevant associations emerged (all effect size values were weak within the null to poor range).

Discussion

There is a lack of screening instruments for PPU in Spanish-language and limited knowledge regarding adolescent PPU (Fernandez & Griffiths, 2021; Peter & Valkenburg, 2016). Therefore, the aims of the study were to assess the psychometric properties of the long and short Spanish versions of

the PPCS and examine potential associations with age and sex in two independent samples of adolescents, providing evidence about the replicability and generalizability of the findings.

The CFAs supported the hypothesized six-factor structure of the PPCS (salience, mood modification, conflict, tolerance, relapse, and withdrawal) and the one-factor structure of the PPCS-6. Goodness-of-fit measures were in the relatively good range (fit indexes were close to but did not reach the cutoff values for reasonable adequacy), with the best fit for the one-factor model and for data from Spanish participants. The PPCS factor scores obtained relevant positive correlations with PCI scales in both adolescent samples (Spain and Mexico), providing empirical evidence regarding convergent and discriminant validity. These correlations may arise from both psychometric instruments specifically measuring mood modification (Fernandez & Griffiths, 2021). Previous research on motivations for pornography use also shows greater associations between PPU and emotional avoidance and stress reduction than with other motivations such as pleasure seeking or sexual curiosity (Bóthe et al., 2020a, 2020b, 2020c, 2021c).

No significant correlations were observed between PPU factors and loneliness. Previous studies found significant differences in the levels of loneliness between people who consumed pornography at non-problematic, low-risk and at-risk levels (assessed with the PPCS), with higher levels of

Table 3 Descriptive statistics and inter-factor correlations of the Problematic Pornography Consumption Scale

	Range	Consistency		Descriptive		Correlations							
		α	Omega	Mean	SD	2	3	4	5	6	7	8	
Spain ($n = 650$)													
1	PPCS Salience	3–21	0.769	0.781	4.46	2.86	0.632	0.781	0.776	0.762	0.584	0.873	0.855
2	PPCS Mood modification	3–21	0.826	0.835	4.20	2.87	1.0	0.687	0.592	0.742	0.643	0.828	0.781
3	PPCS Conflict	3–21	0.751	0.764	4.07	2.84		1.0	0.650	0.852	0.577	0.870	0.857
4	PPCS Tolerance	3–21	0.840	0.870	5.19	3.70			1.0	0.687	0.596	0.844	0.830
5	PPCS Relapse	3–21	0.839	0.848	4.36	3.17				1.0	0.645	0.904	0.878
6	PPCS Withdrawal	3–21	0.883	0.804	5.36	4.26					1.0	0.813	0.782
7	PPCS Total	18–126	0.943	0.941	27.65	16.79						1.0	0.971
8	PPCS-6 Total	6–42	0.862	0.867	9.48	6.23							1.0
Mexico ($n = 1160$)													
1	PPCS Salience	3–21	0.770	0.773	3.82	2.11	0.583	0.715	0.772	0.680	0.626	0.873	0.854
2	PPCS Mood modification	3–21	0.836	0.848	3.52	1.80	1.0	0.620	0.533	0.644	0.582	0.773	0.717
3	PPCS Conflict	3–21	0.726	0.730	3.50	1.82		1.0	0.673	0.619	0.579	0.824	0.814
4	PPCS Tolerance	3–21	0.804	0.829	3.97	2.57			1.0	0.584	0.611	0.844	0.838
5	PPCS Relapse	3–21	0.824	0.839	3.66	2.38				1.0	0.601	0.826	0.731
6	PPCS Withdrawal	3–21	0.773	0.780	4.25	3.19					1.0	0.834	0.790
7	PPCS Total	18–126	0.932	0.931	22.72	11.53						1.0	0.953
8	PPCS-6 Total	6–42	0.836	0.850	7.63	4.25							1.0

α Cronbach's alpha, *SD* standard deviation

PPCS Problematic Pornography Consumption Scale, *PPCS-6* Problematic Pornography Consumption Scale 6

Table 4 Correlation matrix assessing the relationships between the Problematic Pornography Consumption Scale scores with external measures: Convergent/discriminant reliability

	PPCS						PPCS-6	
	Saliency	Mood	Conflict	Tolerance	Relapse	Withdr	Total	Total
Spain (<i>n</i> = 650)								
PCI: emotional avoidance	0.602 [†]	0.581 [†]	0.566 [†]	0.755 [†]	0.626 [†]	0.547 [†]	0.720 [†]	0.702 [†]
PCI: sexual curiosity	0.518 [†]	0.383 [†]	0.422 [†]	0.554 [†]	0.460 [†]	0.358 [†]	0.524 [†]	0.497 [†]
PCI: excitement—pleasure	0.557 [†]	0.393 [†]	0.388 [†]	0.660 [†]	0.480 [†]	0.485 [†]	0.587 [†]	0.572 [†]
PCI: total score	0.660 [†]	0.525 [†]	0.530 [†]	0.777 [†]	0.610 [†]	0.553 [†]	0.718 [†]	0.695 [†]
UCLALS-3: total score	0.069	0.147	0.083	0.021	0.083	-0.006	0.070	0.076
Mexico (<i>n</i> = 1,160)								
PCI: emotional avoidance	0.567 [†]	0.453 [†]	0.481 [†]	0.665 [†]	0.424 [†]	0.454 [†]	0.612 [†]	0.598 [†]
PCI: sexual curiosity	0.611 [†]	0.431 [†]	0.448 [†]	0.618 [†]	0.501 [†]	0.507 [†]	0.631 [†]	0.589 [†]
PCI: excitement—pleasure	0.665 [†]	0.458 [†]	0.506 [†]	0.720 [†]	0.546 [†]	0.579 [†]	0.707 [†]	0.695 [†]
PCI: total score	0.716 [†]	0.517 [†]	0.553 [†]	0.774 [†]	0.574 [†]	0.601 [†]	0.757 [†]	0.730 [†]
UCLALS-3: total score	0.136	0.151	0.098	0.115	0.105	0.099	0.139	0.133

[†]Bold: medium to large effect sizes

PCI Pornography Consumption Inventory, UCLALS-3 The University of California Los Angeles Loneliness Scale

loneliness among the last group (Bóthe et al., 2018). The lack of associations here could be explained by the fact that, as observed elsewhere (Maes & Vandenbosch, 2022), during the early part of the COVID-19 pandemic, pornography use in young people was particularly motivated by arousal and stress levels. Other studies have found no differences in adolescents pornography use motivations before and during the pandemic (Bóthe et al., 2022a, 2022b). The lack of association could also be explained by the possibility that other variables, such as attachment style and anxiety, may have stronger associations with PPU among adolescents than loneliness (Efrati & Amichai-Hamburger, 2019). Finally, the weaker relationship between loneliness and PPU in adolescents, in comparison with adults, may suggest that they may have other motivations for engaging in pornography use than loneliness.

Our second hypothesis (greater PPU severities in boys as compared to girls and older adolescents compared to younger ones) was partially supported. Boys from both countries had higher PPU scores than girls on both PPU measures. These findings are consistent with previous studies, which have observed more pornography use (Grubbs et al., 2015; Regnerus et al., 2016; Wright, 2021) and PPU (Ballester-Arnal et al., 2017a, 2017b; Bóthe et al., 2018, 2021b, 2021d; Harper & Hodgins, 2016; Okabe et al., 2021) in boys than in girls. On the other hand, older adolescents (16–18 years) only achieved higher mean scores in the PPCS tolerance factor, in comparison with adolescents between 12 and 15 years old. Thus, at older ages, adolescents may be more interested in sexuality in general and may use greater amounts of pornography use to achieve similar effects. These results may be placed in the context of previous studies, which by means of a network

analytic approach highlighted tolerance as a central feature of PPU (Bóthe et al., 2020a, 2020b, 2020c, 2021c; Ince et al., 2021).

The findings revealed variations in the scales between the Spanish and Mexican samples, raising important considerations for the use of these scales in these countries. Potential religious, cultural and language differences between countries, as well as American vs European distinctions, may be influencing the manifestation of adolescent PPU in both countries and should be considered when interpreting the findings. The findings highlight the significance of assessing PPU in Spanish-speaking jurisdictions and underscore the need for further research to understand better and address the differences across jurisdictions. Arguably, the study may generate more questions than answers, emphasizing the importance of future investigations to provide a more comprehensive understanding of PPU in Spanish-speaking adolescent populations.

Strengths and Limitations

A strength of the present study is the examination of both the short and long versions of the PPCS. The short version (the PPCS-6) involves a shorter administration time and, consequently, may be used: (a) in those cases where resources are limited; (b) in exploratory research and/or with multiple assessments; and (c) in participants who have limited attentional capacities and/or psychiatric disorders (Bóthe et al., 2021b, 2021d). Another strength is the availability of two independent adolescent samples from two Spanish-speaking countries. This suggests that the PPCS could be a psychometrically appropriate scale for two different Spanish-speaking

Table 5 Comparison of the Problematic Pornography Consumption Scale measures in sex and age groups

PPCS	Girls (n = 325)		Boys (n = 325)		Age 12 to 15 (n = 208)		Age 16 to 18 (n = 442)		Age (yrs)				
	Mean	SD	Mean	SD	$F_{(1,648)}$		$F_{(df=1,648)}$		p	R			
					ldl	Mean	SD	Mean	SD				
Saliency	3.50	1.66	5.43	3.42	83.89	4.24	2.89	4.57	2.84	1.92	.167	0.12	.089
Mood	3.36	1.54	5.04	3.56	60.87	4.01	2.70	4.28	2.95	1.24	.266	0.10	.091
Conflict	3.38	1.83	4.77	3.45	41.28	4.12	3.06	4.05	2.74	0.08	.776	0.02	.055
Tolerance	3.66	2.24	6.72	4.20	134.47	4.63	3.40	5.45	3.80	7.03	.008*	0.23	.151
Relapse	3.49	1.90	5.23	3.87	52.89	4.18	3.03	4.45	3.23	0.98	.324	0.08	.107
Withdrawal	3.44	1.59	7.29	5.14	165.93	5.16	4.18	5.46	4.30	0.68	.409	0.07	.032
Total	20.83	8.93	34.47	19.79	128.44	26.35	16.76	28.26	16.79	1.84	.176	0.11	.122
PPCS-6 Total	6.98	3.39	11.97	7.33	123.76	8.91	6.09	9.74	6.29	2.54	.112	0.13	.123
	Girls (n = 787)		Boys (n = 373)		Age 12 to 15 (n = 444)		Age 16 to 18 (n = 716)		Age (yrs)				
PPCS	Mean	SD	Mean	SD	$F_{(1,158)}$		$F_{(df=1,158)}$		p	R			
Saliency	3.43	1.30	4.63	3.05	87.14	3.74	2.08	3.87	2.12	0.96	.326	0.06	.048
Mood	3.29	1.35	4.00	2.42	40.98	3.49	1.83	3.53	1.77	0.16	.686	0.02	.080
Conflict	3.23	1.13	4.09	2.68	58.77	3.51	1.94	3.50	1.75	0.00	.961	0.00	.032
Tolerance	3.42	1.55	5.14	3.68	124.28	3.76	2.37	4.11	2.69	5.11	.024*	0.14	.123
Relapse	3.33	1.73	4.35	3.25	49.04	3.61	2.26	3.69	2.45	0.30	.583	0.03	.043
Withdrawal	3.57	2.22	5.70	4.26	125.24	4.21	3.30	4.28	3.12	0.11	.742	0.02	.055
Total	20.27	7.54	27.90	15.95	122.68	22.32	11.60	22.97	11.49	0.89	.346	0.06	.082
PPCS-6 Total	6.75	2.78	9.50	5.90	116.48	7.48	4.36	7.73	4.19	0.96	.326	0.06	.092

SD standard deviation. *Bold: significance comparison. †Bold: effect size in the medium to large range

PPCS Problematic Pornography Consumption Scale. PPCS-6 Problematic Pornography Consumption Scale 6. Yrs years

jurisdictions with different cultures, although studies in other Hispanic/Latino countries are needed.

The present study has limitations. First, data were obtained through self-report, so possible biases (e.g., social desirability bias) should be considered. In addition to the social desirability of the participants, presenting the study to adolescents and families as research on sexuality and pornography may have also influenced their participation and responses, potentially biasing the results. Second, a cross-sectional design was used, limiting conclusions that can be drawn from the findings. Future studies may use longitudinal designs to examine temporal reliability of both the long and short versions (PPCS and PPCS-6) of the scale, as well as life events that could potentially influence PPU. Other limitations are related to the PPCS having been initially developed before the additions of the CSBD clinical and course features, describing social and emotional developmental considerations and insights regarding adolescence. The results of the study may not generalize to all population of Spanish-speaking adolescents and thus should be interpreted with caution. Given the updates to the ICD-11, a growing body of research elucidating that mainstream pornography often places sexual violence as a normative sexual script, and the problems associated with the rise in the nonconsensual viewing and sharing of sexual imagery or image-based sexual abuse, future studies may consider expanding perspectives to include a more holistic and comprehensive operational definition of PPU that is in alignment with sex education programs that are evolving to provide a sex-informed and human rights perspective within a social justice framework in promoting, and identifying problems and barriers related to, sexual wellbeing (DeKeseredy, 2021; Ketting et al., 2016; Lameiras-Fernández et al., 2021; Maas et al., 2021; Sharpe & Mead, 2021). On the other hand, the goodness-of-fit coefficients obtained for the different models also deserve comment and clarification. Although in global terms the fit indices were close to the cut-off points for relatively good fit, there are differences depending on the model. The one-factor model was the best fit compared to the six-factor model, and the models for the Spanish sample provided a better fit compared to the Mexican sample. It should be noted that CFA models are not always interpreted as adequate/reliable/valid when all fit indices meet a certain threshold, and the fit information may be considered in total. In this sense, the results of the study suggest that although the fit is not excellent, it may be deemed reasonable. The results also indicate that using the one-factor model seems more appropriate, at least until new evidence on the validity of the six-factor model becomes available. The scale currently demonstrates variations in its performance across different settings. Therefore, further studies should be conducted to examine these differences between Spain and Mexico and examine further the scale's applicability to each jurisdiction. This process could involve considering items from the original PPCS-6-A

version and rephrasing them as necessary. Moreover, future studies should evaluate the predictive validity of the PPCS and PPCS-6 in adolescents from other Spanish-speaking countries, as well as in treatment-seeking adolescents. Also, additional studies are needed to assess invariance by sex, gender, and age (this cross-cultural adaptation and validation work did not allow for testing of potential differences in the measurement unit equivalence given the relatively small sample sizes that prevented dividing the sample into additional subgroups of appropriate sizes). Finally, it should be noted that the study sample recruitment commenced in 2020, prior to the publication of the adapted original version of the PPCS-6 for adolescents (PPCS-6-A; Böhle et al.,), which could potentially impact the applicability of the findings to this specific age group.

Conclusion

The objective of this study was to address the lack of screening instruments for PPU in Spanish-language countries and limited knowledge regarding adolescent PPU. Both the PPCS and the PPCS-6 can be considered reliable and valid scales to assess PPU in Spanish-speaking adolescents from Spain and Mexico. We recommend using these scales to discriminate between recreational and problematic use of pornography among adolescents. Also, the findings of the present study shed light on the potential applicability of the PPCS in culturally diverse populations, which is currently missing from the literature (e.g., Böhle et al., 2021a; Grubbs et al., 2020; Grubbs & Kraus, 2021; Klein et al., 2022).

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10508-023-02700-9>.

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Data Availability Interested investigators may contact the research team regarding availability of data and these will be reasonably considered on a case-by-case basis.

Code Availability Stata-Corp. (2021). *Stata Statistical Software: Release 17*. Stata Press Publication (StataCorp LLC).

Declarations

Conflict of interest Dr. Fernández-Aranda received consultancy honoraria from Novo Nordisk and editorial honoraria from Wiley. Dr. Potenza discloses that he has consulted for and advised Game Day Data, Addiction Policy Forum, AXA, Idorsia, Baria-Tek, and Opiant Therapeutics; been involved in a patent application with Yale University and Novartis; received research support from the Mohegan Sun Casino and the Connecticut Council on Problem Gambling; consulted for or advised legal and gambling entities on issues related to impulse control and addictive behaviors; provided clinical care related to impulse-control and addictive behaviors; performed grant reviews; edited journals/journal sections; given academic lectures in grand rounds, CME events, and other clinical/scientific venues; and generated books or chapters for publishers of mental health texts. ELTE Eötvös Loránd University receives funding from the Szerencsejáték Ltd. to maintain a telephone helpline service for problematic gambling. ZD has also been involved in research on responsible gambling funded by Szerencsejáték Ltd. and the Gambling Supervision Board and provided educational materials for the Szerencsejáték Ltd's responsible gambling program. The University of Gibraltar receives funding from the Gibraltar Gambling Care Foundation. However, these funding aren't related to this study and the funding institution had no role in the study design or the collection, analysis, and interpretation of the data, writing the manuscript, or the decision to submit the paper for publication. The rest of the authors have no conflicts of interest with the content of this manuscript.

Ethical Approval The Clinical Research Ethics Committee of the International University of La Rioja (reference PI: 018/2020) approved the study. The present study was conducted in accordance with the latest version of the Declaration of Helsinki. A permit from the management boards of each school that agreed to participate in the study was obtained. Each school provided adult students and parents or legal guardians of underage students with information about the study. Those parents or minors who did not wish to participate informed the school board. It was clarified that participation was voluntary and non-remunerated, and individuals could withdraw at any time. All participants provided consent to being included in the study, and parents provided authorization in the case of minors.

Informed Consent All participants provided consent to being included in the study, and parents provided authorization in the case of minors.

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