Profiles of Problematic Social Networking Site Use: A Cross-Cultural Validation of a Scale With Spanish and Mexican Adolescents

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Abstract

In recent years, increasing interest in social networking site (SNS) use has resulted in a large body of research examining addiction to SNSs. The aim of this study was to cross-culturally validate a Spanish adaptation of the Problematic Social Networking Site Use Scale (PSNUS) based on the General Problematic Internet Use Scale (GPIUS-2) and to stablish profiles by using latent profile analysis (LPA) to compare the proportion of problematic use between Spanish and Mexican adolescents. The sample was composed of 1,534 Spanish and Mexican students (55.0% girls) 15–17 years of age. Confirmatory factor analysis and the invariance of the PSNUS were examined; the scale displayed good structural validity and achieved full metric invariance. The PSNUS demonstrated good reliability indexes, convergent, discriminant, and criterion validity with respect to the number of days the participants used an SNS, the duration of use, and GPIUS-2 dimension scores. LPA based on the five PSNUS dimensions revealed the existence of five profiles: among them, a clear non-problematic user group that comprised 44.6%; an at-risk group that comprised 13.2% of the sample; and a clear problematic user profile making up 2.9% of the sample. This study provides validation of the PSNUS for two Spanish-speaking countries; it may be used as an alternative to the prevailing component model of addiction to SNS use.

Keywords: social networking sites; problematic social networking site use; cross-cultural study; emotion regulation; adolescence

Introduction

Information and Communication Technologies (ICTs) have become an almost indispensable resource for everyday life and communication, to the point that they are sometimes referred to as RICTs (Relation, Information and Communication Technologies; Gabelas et al., 2012). In this regard, social networks play a key role due to their relevance in interpersonal communications online (Ostendorf et al., 2020). According to We are Social and Hootsuite (2022), the average person spends almost 2 hours and 30 minutes per day using social networks. This massive and growing usage has led to a heightened interest in studying this phenomenon and its impact on health and well-being.

Behaviours centred on inappropriate or problematic use of ICTs have been the main focus for researchers. The research of Griffiths (1995) and Young (1998) laid the groundwork for the study of behaviours connected to the usage of ICTs. These scientists initially referred to this phenomenon as "internet addiction," conceptualizing it as a condition with characteristics similar to those of substance use. In the last two decades, researchers have coined several terms and used several paradigms to approach this condition, namely internet pathological use, compulsive use, addiction, or Problematic Internet Use (PIU). Regarding the latter, Davis (2001) and Caplan (2002) were the first to conceptualize PIU as model of its own.

The model of PIU does not allude to Griffiths's (2005) components model of addiction (as analogous to a chemical addiction and sharing a series of components, namely salience, tolerance, withdrawal, relapse, mood regulation, and conflicts) but, rather, posits a cognitive-behavioural model in which problematic use involves a set of cognitive processes and dysfunctional behaviours that lead to negative consequences in several areas of the individual's life (Caplan, 2010). Moreover, Davis (2001) proposed that this cognitive-behavioural model of PIU could be further categorized into two categories: specific internet problematic use (SPIU, denoting the condition in which an individual pathologically uses the internet for a purpose; for example, online gaming) and generalized PIU (GPIU, referring to a global set of online behaviours).

Both approaches have received attention and are established and growing fields of research. Their study has been especially extensive in the past decade, regarding, for instance, general problematic use (Caplan, 2010; Laconi, Kaliszewska-Czeremska, Gnisci, et al., 2018; Lopez-Fernandez et al., 2023; Machimbarrena et al., 2019) and SPIUs such as video games (Beranuy et al., 2020; Pontes et al., 2014) or online gambling (González-Cabrera et al., 2020; Montiel et al., 2021). In fact, to date, the only internet activities considered pathological or disordered are two types of SPIU, namely internet gaming disorder (APA, 2013; World Health Organization, 2018) and gambling disorder, predominantly online (World Health Organization, 2018). This has sparked debate on whether the difference between GPIU and SPIU is meaningful today (Montag et al., 2015).

In this whirlwind of terms and conceptualizations, the use of social networks has not been spared and, as with other SPIUs, interest in social networking site (SNS) use has resulted in a large body of research approached employing different paradigms and a plethora of concepts. As can be gathered from several reviews, analysis of the negative use of social networks as an addiction problem has been the dominant paradigm to date (see, for example, Andreassen, 2015; Carbonell & Panova, 2017; Hussain & Starcevic, 2020; Kuss & Griffiths, 2017; van den Eijnden et al., 2016; Varona et al., 2022). Nonetheless, conceptualizations other than addiction, such as the aforementioned PIU (Caplan, 2010), have also demonstrated their validity and received attention. Moreover, the addiction paradigm has been criticized for being created from an atheoretical perspective (Kuss et al., 2014) and for presenting no clear comparability between substance addiction and internet-related behaviour (Kardefelt-Winther et al., 2017; Rumpf et al., 2018).

Although scales of SNS addiction have been validated in Spanish (Valencia-Ortiz & Cabero-Almenara, 2019; Vallejos-Flores et al., 2018), to the best of our knowledge, there has been no validation studying Spanish for analysing the problematic use of SNSs according to Caplan's (2010) cognitive-behavioural approach, which does exist in other languages for Facebook use (Marino et al., 2017), Instagram use (Assunção et al., 2017), and overall SNS use (Casale & Fioravanti, 2017; Svicher et al., 2021).

Currently, the validation of assessment instruments unrelated to the addiction model is of great interest (Varona et al., 2022). Addiction model–based questionnaires often magnify the problem, since they often set lower cut-off scores that do not endorse all components of the addiction model as originally proposed by Griffiths (2005). For instance, the Bergen Facebook Addiction Scale (Andreassen et al., 2012), which relies on the addiction model, is made up of six items that evaluate different aspects of Facebook addiction. However, the authors proposed a polythetic scoring system, which implies that not all items (in this case, components) are required to conclude that the disorder is present. As stated by Griffiths, this situation may generate an artificial oversizing of the problem and the pathologization of an everyday activity (Griffiths, 2017), as instruments based on the addiction model tend to include lower cut-off scores that do not align with the original aim.

An approach based on a cognitive-behavioural model would prevent this issue, as it would allow for the differentiation of problematic versus non-problematic use of SNSs through its different dimensions and, therefore, the establishment of profiles (and not necessarily dichotomous categories). This approach has been successfully applied to general PIU where several studies have found between three and five user profiles. This type of analysis allows both establishing a continuum from non-problematic to severe PIU with a prevalence of between 4.9% (Machimbarrena et al., 2019) and 13.6% (Pontes et al., 2016) and distinguishing individuals who do present a high

score driven by dimensions that are not problematic on their own (such as those with high scores in mood modification). In an example of such profiling applied to SNS use, Assunção and Matos (2017) rendered four profiles of users: non-problematic (49.8%), mood regulators (12.2%), intermediate users (20.2%), and problematic users (17.7%).

The first objective of this study was to fill a gap in the literature regarding problematic SNS use by validating an assessment tool that allows analysis of the problematic use of SNSs in Spanish. For this purpose, the GPIUS-2 by Caplan (2010) was adapted for SNSs. This adaptation, from a GPIU questionnaire to an SPIU questionnaire, has been successfully performed with other SPIUs (Lopez-Fernandez, 2018) and is based on research findings that find overlap between GPIU and PSNU (Montag et al., 2015). The original scale on which we based it consists of five dimensions, two of which (cognitive preoccupation and compulsive use) are grouped into a second-order factor. However, one very common structure (validations of the scale in France, Italy, and Portugal) finds four factors (preference for social online interaction, mood regulation, negative consequences, and deficient self-regulation), failing to find differences between the dimensions of cognitive preoccupation and compulsive use (Fioravanti et al., 2013; Laconi, Kaliszewska-Czeremska, Tricard, et al., 2018; Pontes et al., 2016). Finally, in the Spanish version (Gámez-Guadix et al., 2013), in addition to the original structure, the model includes a second-order general factor. In the current study, in addition to these models, a model with the original five dimensions (without a second-order model) and a bifactorial model with five dimensions and a general factor are tested.

The second aim of this study was to analyse the possible existence of profiles and the number of people affected in relation to the problematic use of social networks and to compare these between two countries, namely Spain and Mexico. It was hypothesized that, as in the case of PIU, there would be between three and five user profiles according to the PSNUS dimensions and that the prevalence of problem users would be approximately 15% (Assunção & Matos, 2017). In the absence of previous scientific evidence, the following research question also arose: Which sample (Spanish or Mexican) would present the highest proportion of problems with respect to the use of SNSs?

Methods

Participants

The final sample was composed of 1,534 Spanish and Mexican students (55.0% girls) from 15 to 17 years of age (36.6%, 15 years old; 36.2%, 16 years old; and 27.2%, 17 years old) that currently used or had previously used SNS. The Spanish sample was composed of 705 adolescents (46.8% girls), with a mean age of 15.7 (SD = 0.8) years, attending 10 secondary education and vocational training schools in the Basque country. The Mexican sample was composed of 829 adolescents (61.9% girls), with a mean age of 16.0 (SD = 0.8) years, from nine preparation schools in Jalisco.

The region selected in each country was the result of convenience sampling. Jalisco (officially the Free and Sovereign State of Jalisco), is one of the 31 states which, along with Mexico City, comprise the 32 Federal Entities of Mexico. Located in the western region of Mexico it has a population of approximately more than 8 million inhabitants. The Human Development Index (HDI) for the region is 0.788, which is considered a high level. The official language as in Mexico is Spanish although indigenous languages such as Huichol, Náhuatl, Purépecha and Otomí are spoken as well. The Basque country or the Basque Autonomous Community is one of the 17 autonomous communities that conform Spain. Located in the norther region it has an approximate population of 2 million inhabitants. The HDI for the region is 0.937, which is considered a very high level. In the Basque Country Spanish and Basque are the official languages. The subjects selected for each sample were the result of a single-stage cluster sampling were the sampling units were schools in Basque Country and Jalisco. Ten public or subsidized schools (at random) from a list of schools in each of those areas were selected randomly, the 10 schools in the Basque Country accepted participation while 9 in the state of Jalisco did so.

Assessment Instruments

The Problematic Social Networking Site Use Scale (PSNUS) is an adaptation of the GPIUS-2 scale as proposed by Caplan (2010) in which the wording of some items has been adapted to exchange the term "Internet" for "Social Networking Sites". The authors of the manuscript followed the indications for the creation and adaptation of scales

from the guidelines and standards for questionnaire design (American Educational Research Association; National Council on Measurement in Education). The original scale consists of 15 items and has been adapted to several languages, including Spanish (in Spain and México; Gámez-Guadix et al., 2012, 2013). It shows either four or five factors: preference for interaction through SNS (PI-SNS), mood modification, cognitive preoccupation, compulsive use (sometimes these two factors are combined to form the deficient self-regulation factor or as a second order factor comprising the cognitive preoccupation and compulsive use dimensions) and negative consequences. Responses are given on a 6-point Likert scale, from 1 (*completely disagree*) to 6 (*completely agree*).

Three experts in the field of study validated the content of this scale and achieved high interjudge reliability throughout the process (Cohen's κ > .9). As the Spanish used in Spain and Mexico presents slight dialectical variations, two interviews with adolescents were conducted to analyse the adequacy and comprehension of the items in Castilian and Mexican Spanish. Following this interview, for instance in one of the items the word "comunicar" (to communicate) was kept in the Castilian Spanish version while in the Mexico version the word "platicar" (talk) was favoured. Therefore, questionnaire with a slightly different wording for both each sample (see Table A1).

Additionally, to assess the scale's concurrent validity, the participants answered questions about their time spent on SNSs. First, they were asked to indicate the number of days per week (*daily* or *a few days a week*) and the number of hours per day (*less than an hour*, *between 1 and 2 hours*, *3 to 4 hours* or *4 hours or more*) they spent on SNSs. Lastly, the participants completed Caplan's (Caplan, 2010) original GPIUS-2.

Procedure

The participating centres were first contacted by e-mail. When they agreed to participate, they were contacted by phone or video conference by the research team to get instructions on how to submit the required documents (consents and letter to parents) and to receive the links to the survey. The questionnaires were completed through an online platform, in the classroom, under guidance from school staff (generally, the teacher or school counsellor). The staff encouraged the participants to take their time reading the items and to give truthful answers. Participation was voluntary and anonymous, and no compensation was provided. Consent was obtained from parents, students and school management. The only inclusion criteria were to use or have used SNSs and to present parental consent. There were no exclusion criteria. The study was approved by the Research Ethics Committees of Universidad del País Vasco (UPV/EHU) (code: M10_2020_020) and Universidad Internacional de la Rioja (UNIR) (Code PI025_2020).

Data Analysis

Robust maximum likelihood estimation was used for the confirmatory factor analysis. For the selection of a model, the two most widely used models in the literature were compared. Following the recommendations of several authors (Hu & Bentler, 1999), each model's goodness of fit was evaluated using the comparative fit index (CFI), the Tucker Lewis index (TLI), the root mean square error of approximation (RMSEA) and the standardised root mean square residual (SRMR).

After a model was selected, configural invariance was tested to assess the invariance of the measurement model between Spanish and Mexican adolescents. This model was compared with a more restrictive model (metric factorial invariance) and in the final step involved testing a scalar factorial invariance of the model was calculated. The fit of each model was compared to the fit of the previous model. If model fit did not worsen, the subsequent model was selected. Although there are many different statistical methods to decide when model fit worsens, the usual procedure is through ΔRMSEA and ΔCFI. If the Δs is lower than .01 it is assumed that invariance exists (Cheung & Rensvold, 2002).

To analyse the reliability of the scale, Cronbach's alpha, McDonald's omega and the composite reliability were calculated. Convergent and discriminant validity were analysed using the approach suggested by Fornell & Larcker (1981; convergent validity is achieved if a given latent construct presents an average variance extracted [AVE] of 0.50, whereas discriminant validity is demonstrated when the square root of the AVE for each latent construct is higher than the correlations between it and the rest of the latent constructs). Regarding the latent profile analysis, (Collins & Lanza, 2009) was performed. The analyses were conducted from two or more profiles, and several fit indices were used to help establish the optimal number of latent classes. These included (i) the Akaike Information

Criteria, Bayesian Information Criteria, and the Sample Adjusted Bayesian Information Criteria; (ii) the entropy criterion and (iii) the Lo-Mendell-Rubin adjusted likelihood ratio test (Nylund et al., 2007).

Finally, Welch's *t*-tests were performed to compare the mean scores between Spanish and Mexican students. Cohen's *d* statistic was used to calculate the effect size. Due to the great number of comparisons, and in order to limit Type I error, only values equal to or less than *p* = .001 were considered statistically significant.

In order to perform the data analyses, we used the statistical packages MPLUS 8.0 (Muthén & Muthén, 1998) and IBM SPSS Statistics for Windows (version 25).

Results

Factorial Structure of the Questionnaire

With regard to the factorial structure of the questionnaire, first, Caplan's (2010) original six-dimensional model (formed by five first-order factors plus a second-order factor) was tested showing a good fit (see Table 1), we labelled this model as "original model". This model was then compared to other models in the literature. The first comparison model consisted of 4 factors (i.e., it merged cognitive preoccupation and compulsive use under one factor, named deficient self-regulation); this model also obtained an adequate fit. Regarding a more general factor of GPIU two models were tested.

One model comprised the original structure but added a second higher order factor (this model was labelled as hierarchical model), while the other was a bi-factorial model comprising the five dimensions of the original scale as well as a general factor (this model was labelled as bi-factorial model). While this model showed the best fit in terms of adjustment indices some of the parameters were not significant or showed counter-intuitive effects between dimensions (negative relationships among dimensions). Lastly, a five-dimensional model (i.e., it retained the five dimensions but omitted the second-order factor of deficient self-regulation) was tested. This last model yielded the best results in terms of the highest CFI and TLI and the lowest SRMR and RMSEA, and it was also the most parsimonious. Therefore, the five-dimensional model was conserved.

In should be noted that in line with previous validations (Fioravanti et al., 2013; Pontes et al., 2016), an inspection of the modification indices suggested covarying two error terms of items 4 and 9 and items 13 and 14. This may have been a result of the similar wording (*control the amount of time I spend on SNS* vs *control the time I use*, for items 4 and 9 respectively) and underlying latent construct being assessed by these indicators (e.g., *I think obsessively about checking SNS* and *I have a hard time trying to resist the urge to check SNS* for item 13 and 14 respectively). After adding these constraints, this final model was tested, and the goodness of fit improved significantly, ΔS-Bχ^2 (Δdf = 2) = 13.87, *p* = .001, in comparison to the previous two models. This latter model also resulted in overall better fit indices and standardised item loadings (Fig. 1); thus, this model was retained to explore invariance.

Measurement of Invariance of the PSNUS in Spain and Mexico

To evaluate the generalizability of the model across both samples (Spain and Mexico), a multi-group confirmatory factor analysis was performed. For the analysis, an unconstrained model with factor loadings free to vary between subgroups was compared with a more constrained model in which the factor loadings were held constant across subgroups. Before conducting the multi-group analysis, separate confirmatory factor analyses were performed for each country. As shown in Table 1, the analysis of each subsample revealed a good fit, although the fit indices for Mexican adolescents were lower. However, the indicators were still under the threshold for adequacy, and the measurement invariance analyses were performed. The measurement invariance of the five-factor solution was supported at the configural and metric levels. Regarding the scalar invariance, the model fit worsened (ΔCFI or ΔRMSEA $\geq$ 0.01), and, therefore, full scalar invariance was not achieved. However, the analysis of the modification indices indicated that partial invariance could be achieved by freeing items 4 and 13. This model obtained good fit indices and did not worsen in comparison to that obtained with the metric invariance; thus, partial scalar measurement invariance was achieved.

Figure 1. *Confirmatory Factor Analysis of the Problematic Social Networking Site Use Scale (PSNUS).*
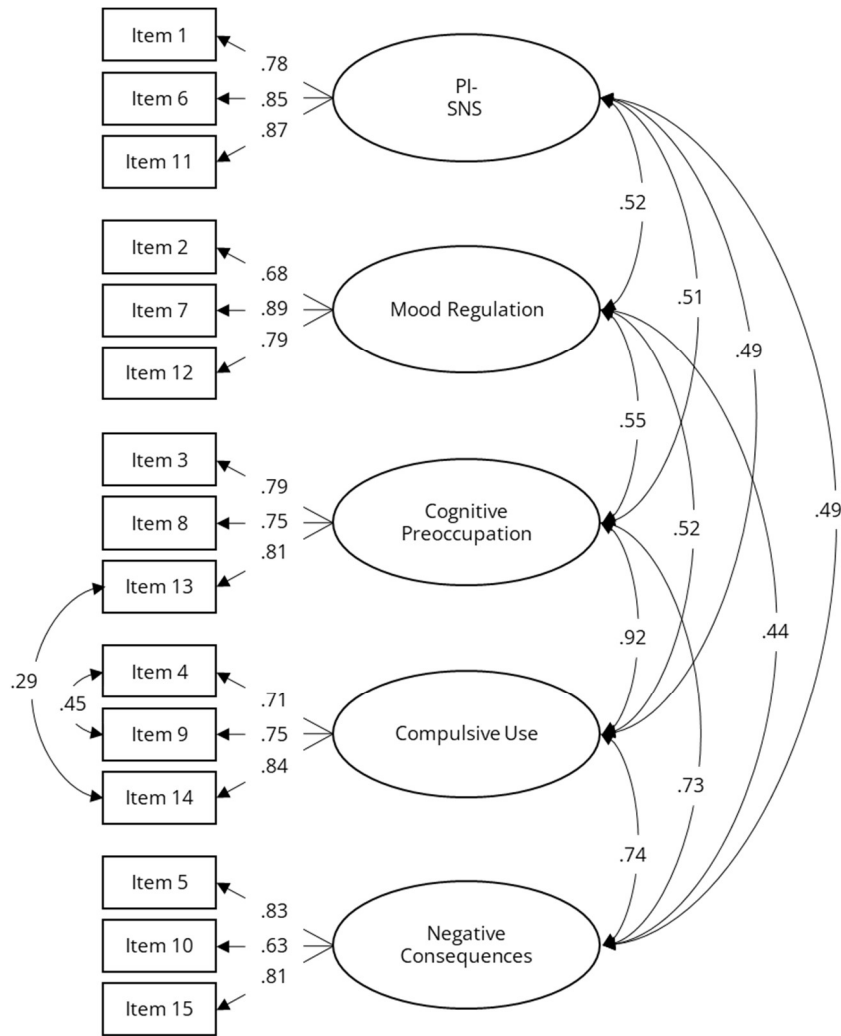
Note. PI-SNS = Preference for interaction through SNS. Values reflect standardized coefficients.

Validity and Reliability Analysis

Following measurement invariance, validity and reliability analysis were performed. Using the method proposed by Fornell and Larcker (1981), convergent and discriminant validity were examined, according to this method and as can be seen in Table 2 the five dimensions obtained AVE values higher than .50 presenting appropriate convergent validity in all dimensions of the PSNUS. Moreover, the square root of the AVE for each latent construct demonstrated that the value for each latent construct was higher than the correlations between it and the other constructs, indicating the discriminant validity of each latent dimensions of the PSNUS.

In other to explore the criterion validity of the PSNUS dimensions, we compared the scores on the dimensions of the PSNUS to the scores on the dimensions of the GPIUS-2, the number of times a week participants used SNS and the number of hours they spent using SNS. Regarding criterion validity, the scales of the GPIUS-2 showed significant correlations with each of their parallel dimensions (PI-SNS: $r = .76$, $p < .001$; mood regulation: $r = .73$, $p < .001$; cognitive preoccupation: $r = .71$, $p < .001$; compulsive use: $r = .73$, $p < .001$ and negative consequences: $r = .69$, $p < .001$). Additionally, participants were asked if they used their SNSs daily or a few times a week. A Welch t-test comparison yielded significant results for the dimensions of mood regulation (daily: $M = 9.60$ and $SD = 4.39$; a few times a week: $M = 8.02$ and $SD = 4.31$; $t = -3.98$; $p < .001$; $d = .35$), cognitive preoccupation (daily: $M = 6.51$ and $SD = 3.57$; a few times a week: $M = 5.47$ and $SD = 3.07$; $t = 3.67$; $p < .001$; $d = .30$) and compulsive use (daily: $M = 7.35$ and $SD = 3.91$; a few times a week: $M = 5.38$ and $SD = 3.05$; $t = 6.81$; $< .001$; $d = .51$). Lastly, the time spent using SNSs correlated positively and significantly with all dimensions of the PSNUS (PI-SNS: $r = .22$, $p < .001$; mood regulation: $r = 28$, $p < .001$; cognitive preoccupation: $r = .29$, $p < .001$; compulsive use: $r = .23$, $p < .001$ and negative consequences: $r = .20$, $p < .001$). These findings lend further empirical support to the overall and criterion-related validity of the PSNUS.

Table 1. *Overall Model Testing and Measurement Invariance Analyses Across Country.*

Model	S-Bχ²	df	Comp. models	ΔS-B χ²	Δdf	p	CFI	ΔCFI	TLI	RMSEA [CI 95%]	ΔRMSEA	SRMR
Overall model testing												
Original model	560.214	82	—	—	—	—	.939	—	.922	.064 [.059, .069]	—	.037
Four factor model	592.684	84	—	—	—	—	.938	—	.923	.063 [.058, .068]	—	.048
Hierarchical model	622.163	84	—	—	—	—	.931	—	.914	.067 [.062, .072]	—	.051
Bifactor model	371.385	76	—	—	—	—	.962	—	.941	.052 [.047, .057]	—	.051
Five factor model	551.118	80	—	—	—	—	.943	—	.925	.062 [.057, .066]	—	.035
Five factor model¹	**319.334**	**78**	**—**	**—**	**—**	**—**	**.971**	**—**	**.961**	**.045 [.040, .050]**	**—**	**.032**
Measurement invariance testing												
1. Spain	150.618	78	—	—	—	—	.975	—	.966	.039 [.030, .048]	—	.040
2. Mexico	233.595	78	—	—	—	—	.969	—	.958	.049 [.042, .057]	—	.033
3. Configural	389.658	156	—	—	—	—	.971	—	.961	.046 [.040, .052]	—	.036
4. Metric	429.887	166	3–4	43.28	10	< .001	.968	—	.959	.047 [.042, .053]	.001	.040
5. Scalar	579.996	176	4–5	189.81	10	< .001	.952	−.016	.942	.056 [.051, .062]	.010	.042
6. Scalar (without item 4 and 13)	499.319	174	4–6	88.4529	8	< .001	.960	−.008	.952	.051 [.046, .056]	.004	.041

Note. S-Bχ² = Satorra-Bentler χ² scaled test; *df* = Degrees of freedom; ΔS-Bχ² = Adjusted SBχ2 difference; Δ*df* = difference in number of degrees of freedom between tested models; *p* = significance value; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; ΔCFI = differences in Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; TLI = Tucker Lewis Index; CI 95% = 95% confidence interval for RMSEA. Six factor model = five first-order factors plus a second-order factor; for factor model = cognitive preoccupation and compulsive use under one factor, named deficient self-regulation; five factor model = the five original dimensions without the second-order factor of deficient self-regulation; five factor model¹ = previous model but adjusted for errors based in line with previous validations. Selected model indicated in boldface.

Lastly, and in order to check the reliability of the scale, several reliability measures were calculated to test the reliability of the questionnaire (Cronbach's alpha, McDonald's omega and composite reliability). The results are displayed in Table 2. The PSNUS dimensions obtained adequate reliability indices for all indicators.

Table 2. *Reliability Indicators for the PSNU Scale.*

	α	ω	CR	AVE	1.	2.	3.	4.	5.
1. Preference for interaction through SNS	.87	.87	.80	.70	**.84**				
2. Mood Regulation	.82	.83	.84	.64	.48	**.80**			
3. Cognitive preoccupation	.82	.83	.82	.61	.43	.47	**.78**		
4. Compulsive use	.84	.85	.81	.60	.42	.37	.60	**.77**	
5. Negative consequences	.77	.78	.80	.58	.41	.43	.75	.64	**.76**

Note. α = Cronbachs's Alpha; ω = McDonald's Omega; CR = composite reliability; AVE = Average Variance Extracted. The coefficients in bold on the diagonal of the table represent the square root of the Average Variance Extracted for each latent construct.

Latent Profiles Based on the PSNUS Dimensions

A latent profile analysis was performed to characterise the participants' SNS use according to their country and the scores obtained in the five-dimensional PSNUS. The results obtained from testing solutions from two to six profile models are displayed in Table 3. A close analysis of the obtained profiles, together with the fit indices, led to the selection of the five-profile solution as the best choice, as the Lo-Mendel-Rubin Likelihood Ratio Test (LMR-LRT) *p*-value test was no longer significant with six profiles (i.e., the six-profile solution did not yield significant changes over the k-1 solution). Moreover, the five-profile solution provided the most interpretable profiles.

**Table 3.** *Fit of the Profile Models Based on the PSNU Dimensions.*

# Profiles	AIC	BIC	SABIC	LRM-LRT Value	LRM-LRT *p* value	Entropy	Prob. Min–Max
2	41,226.54	41,327.91	41,267.56	1,585.64	.000	.83	.93–.96
3	40,766.07	40,904.79	40,822.20	465.41	.018	.86	.88–.96
4	40,438.85	40,614.93	40,510.10	334.70	< .001	.82	.78–.93
5	**40,252.78**	**40,466.20**	**40,339.13**	**196.25**	**.027**	**.84**	**.77–.94**
6	40,112.43	40,363.20	40,213.89	151.40	.656	.82	.79–.93

Note. AIC = Aikake Information Criterion; BIC = Bayesian Information Criterion; SABIC = Sample-Size Adjusted BIC; LMR-LRT = Lo-Mendell-Rubin Adjusted LRT Test; Prob Min–Max: Classification Probabilities for the Most Likely Latent Class Membership. The selected model is shown in boldface.

This five-profile solution according to the standardised scores is depicted in Figure 2. The profile comprising the largest portion of the sample was labelled as non-problematic users. Participants in this profile scored below the means for all dimensions of the scale (e.g., *M* = 3.5 for negative consequences). The second-largest group was labelled as regular users; they showed a similar pattern to those in the previous profile but with scores slightly above the mean (e.g., *M* = 7.4 for negative consequences). An in-between group, labelled as mood regulator users, comprised 15% of the sample; this group obtained the highest mean score for mood regulation (*M* = 13.71) through SNS use but scored even lower than the regular user profile in the rest of the dimensions (e.g., *M* = 3.77 for negative consequences). Lastly, there were two problematic groups; they obtained higher scores for most dimensions but particularly for negative consequences. The larger of the two (13.2%) was labelled as at-risk users; they obtained scores above the mean for negative consequences (*M* = 10.86). The smaller of the two, composed of 2.9% of the sample, scored the highest in the negative consequences dimension (*M* = 15.55).

Regarding differences by country, the χ^2 test revealed significant differences (4, *N* = 1,540) = 44.21; *p* < .001; Cramer's *V* = .17. An analysis of the standardised residuals revealed that fewer Spanish adolescents were classified as mood regulators (11.3% of the Spanish sample and 18.1% of the Mexican sample) and at-risk users (9.9% and 15.9%, respectively), while more Spanish adolescents were classified as regular users (30.6% and 19.1%, respectively). No statistical differences were found among the non-problematic users (45.7% of the Spanish sample and 43.7% of the Mexican sample) or the severe problematic users (2.4% and 3.3%, respectively).

Figure 2. *Results of the Five Profile Solution Model According to the PSNUS Dimensions.*
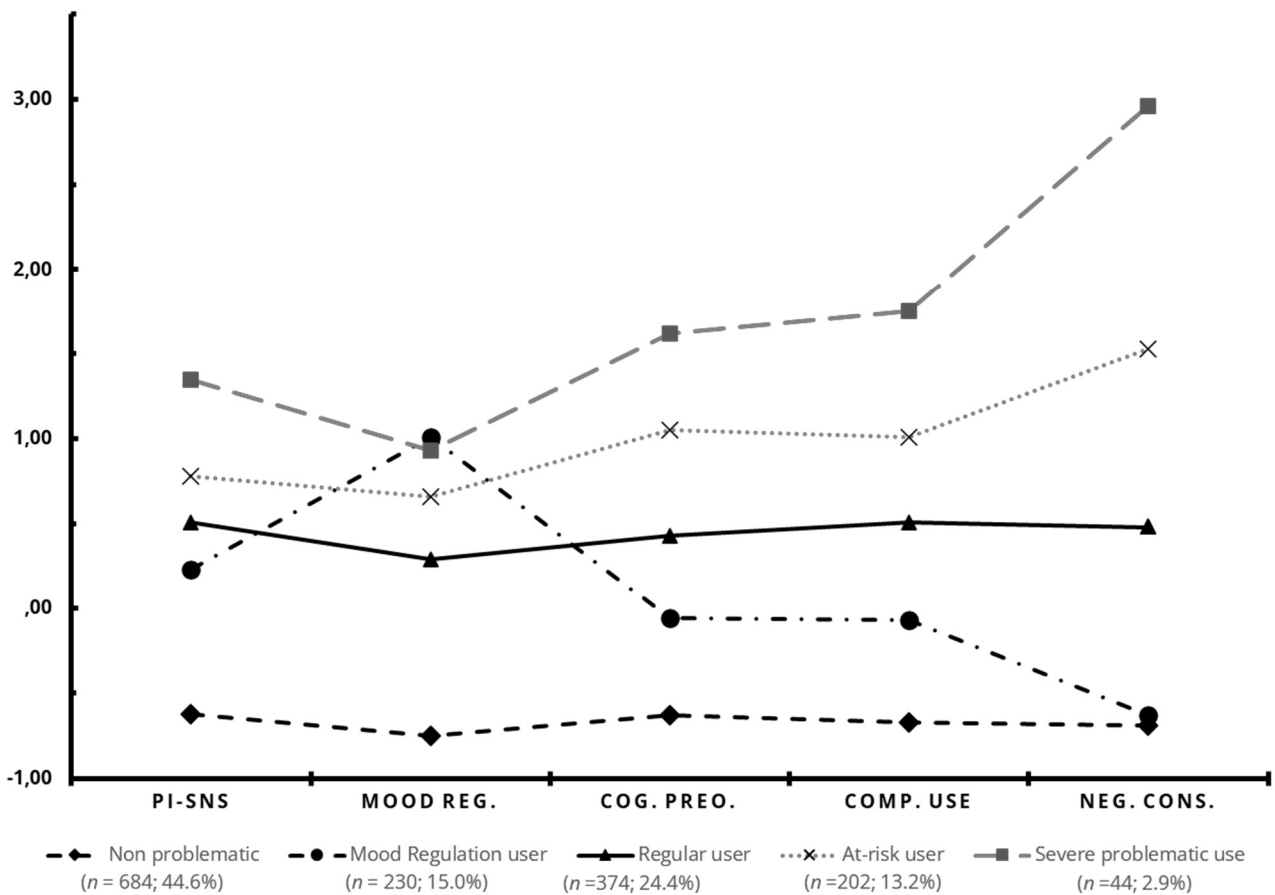
Note. PI-SNS = Preference for interaction through social networking sites; Mood Reg. = mood regulation; Cog. Preo = cognitive preoccupation; Comp. Use = compulsive use; Neg. Cons = negative consequences. The displayed scores represent the standardized scores.

Scores on the Dimensions of the PSNUS

Lastly, the scores were compared for each item and their respective dimensions of the PSNUS between the Spanish and Mexican adolescents. Significant differences were found in eight of the 15 items and in four out of the five dimensions (Table 4). In general, Mexican adolescents scored higher in the dimensions of PI-SNS and mood regulation, while Spanish adolescents obtained higher scores in cognitive preoccupation and compulsive use. Despite these differences, it is worth noting that overall, there were no significant differences between the two countries (Spain: M = 36.00 and SD = 13.53; Mexico: M = 35.37 and SD = 15.26; t = 0.85; p = .396; d = .04).

Discussion

The aim of this study was to adapt and validate the PSNUS tool for use in two Spanish-speaking countries. For this purpose, several models that presented adequate fit indices and that coincided with other validation studies based on the GPIUS-2 scale (Caplan, 2010) were first analysed. This adaptation of a cognitive-behavioural model of the problematic use of SNSs is in line with Casale and Fiovaranti's (2017) study, presenting the strength of a global vision of SNS use (i.e., not emphasizing a specific one). This is of particular interest in a rapidly changing world where there are many fluctuations in the number of users of applications—new ones emerge and others disappear or are forced to adapt, as was the case for Musical.ly (now TikTok; Ortega-Barón et al., 2022) and where the relationship of SNS use and mental health issues is examined mostly through the addiction model (e.g., Hou et al., 2019; Lee, 2019).

Table 4. *Welch's t Comparisons in the Items and Dimensions of the PSNUS.*

# Item	Dimension	Spain M (SD)	Mexico M (SD)	t (p)	Cohen's d 95% CI [LL, UL]
1	I prefer social interaction trough social networking sites over face-to-face communication.	2.16 (1.27)	2.40 (1.48)	−3.34 (< .001)	−0.17 [−0.27, −0.07]
6	Social interaction through social networking sites is more comfortable for me than face-to-face interaction.	2.25 (1.36)	2.38 (1.45)	−1.72 (.086)	−0.09 [−0.19, 0.01]
11	I prefer communicating with people through social networking sites rather than face-to-face.	1.90 (1.20)	2.29 (1.47)	−5.69 (< .001)	−0.29 [−0.39, −0.19]
Preference for interaction through SNS		6.32 (3.33)	7.06 (3.98)	−3.96 (< .001)	−0.20 [−0.30, −0.10]
2	I have used social networking sites to talk with others when I was feeling isolated.	2.73 (1.65)	3.19 (1.66)	−5.42 (< .001)	−0.28 [−0.38, −0.18]
7	I have used social networking sites to make myself feel better when I was down.	3.35 (1.69)	3.35 (1.74)	0.05 (.963)	0.00 [−0.10, 0.10]
12	I have used social networking sites to make myself feel better when I've felt upset.	2.93 (1.65)	3.08 (1.73)	−1.70 (.089)	−0.09 [−0.19, 0.01]
Mood Regulation		9.01 (4.19)	9.57 (4.48)	−2.55 (.011)	−0.13 [−0.23, −0.03]
3	When I haven't visited social networking sites for some time, I become preoccupied with the thought of checking social networking sites	2.46 (1.58)	2.18 (1.33)	3.70 (< .001)	0.19 [0.09, 0.29]
8	I would feel lost if I was unable to go into social networking sites.	2.45 (1.51)	2.04 (1.27)	5.81 (< .001)	0.30 [0.20, 0.40]
13	I think obsessively about checking social networking sites when I am offline.	1.97 (1.27)	1.97 (1.27)	0.09 (.928)	0.01 [−0.10, 0.11]
Cognitive Preoccupation		6.89 (3.67)	6.16 (3.41)	4.01 (< .001)	0.21 [0.11, 0.31]
4	I have difficulty controlling the amount of time I spend on social networking sites.	3.14 (1.61)	2.47 (1.53)	8.32 (< .001)	0.43 [0.33, 0.53]
9	I find it difficult to control my use of social networking sites.	2.48 (1.46)	2.29 (1.50)	2.53 (.012)	0.13 [0.03, 0.23]
14	When offline, I have a hard time trying to resist the urge to check social networking sites.	2.34 (1.39)	1.98 (1.25)	5.26 (< .001)	0.27 [0.17, 0.37]
Compulsive Use		7.96 (3.79)	6.72 (3.84)	6.36 (< .001)	0.33 [0.22, 0.43]
5	My use of social networking sites has made it difficult for me to manage my life.	2.05 (1.36)	2.06 (1.36)	−0.17 (.864)	−0.01 [−0.11, 0.09]
10	I have missed social engagements or activities because of my use of social networking sites.	2.00 (1.37)	1.92 (1.34)	1.13 (.259)	0.06 [−0.04, 0.16]
15	My use of social networking sites has created problems for me in my life	1.77 (1.21)	1.91 (1.29)	−2.09 (.037)	−0.11 [−0.21, −0.01]
Negative Consequences		5.82 (3.03)	5.86 (3.47)	−0.25 (.803)	−0.01 [−0.11, 0.09]

This study was a cross-cultural and linguistic adaptation with participants in two Spanish-speaking countries. Item analysis revealed significant differences in several of the items and dimensions (Mexican adolescents scored higher in the dimensions of preference for interaction through SNSs and mood regulation, and Spanish adolescents scored higher in cognitive preoccupation and compulsive use). These results are partly consistent with the study conducted by Valencia-Ortiz and Cabero-Almenara (2019), which found that Mexican adolescents scored significantly higher for SNS addiction problems and that Spanish adolescents scored higher for the need to be and obsession with being connected. It should be noted that this study analysed SNS addiction and, therefore, is the results are not fully comparable to ours, based on a cognitive-behavioral model. However, there are also important cultural differences between Mexico and Spain that have not been assessed in this study, but may help to understand cultural differences in relation to technology. Previous studies have suggested the relationship between cultural traits and addictive behaviors (Foster et al., 2014; Lopez et al., 2012). In this sense, a possible explanation for the differences found is related to Hofstede (2011) dimension of invidualism-collectivism (vertical/horizontal). In Mexico, in general, cultural values are closer to collectivism because social groups are more cohesive, while in Spain, with greater financial development, social ties are less strong and there is a greater effect of individualistic values (Carballeira et al., 2015; Hofstede et al., 2010). Some authors have related collectivism (especially vertical versus horizontal) to problems related to the use of technology (Arpaci, 2019). In any case, Mexican society is also evolving towards more individualistic models (like Spain) and especially the younger ones (Díaz-Loving et al., 2018), so all these dimensions of study should be addressed monographically in a future study in order to be compared and analyzed. In addition (and to ensure that there were no differences between countries in the factorial structure), an invariance analysis was performed. The model proved to be completely invariant up to the metric level and partially invariant at the scalar level. Metric invariance is the requirement for meaningful comparisons of the variance-covariance matrices of the latent variables and, therefore, is considered sufficient to run comparisons (Marsh et al., 2018).

The second objective of the present study was to analyse the existence of profiles and proportions of the problematic use of SNSs. Five profiles of problematic SNS use were found, similar to those found in other studies of SNS use (Assunção & Matos, 2017) and those on GPIU, confirming the hypothesis (Machimbarrena et al., 2019; Pontes et al., 2016). The similarity between these studies is noteworthy with respect to establishing three clear types of profiles: a non-problematic profile, a mood-regulating profile, and other, problematic profiles. This finding is relevant because it indicates that problematic use of SNSs should not be understood as purely continuous (i.e., the higher the score, the greater the problem), since it is possible to obtain very high scores in the dimensions of preference for interaction through SNSs and emotional regulation without problematic use of SNSs or the internet. Therefore, it is important to adopt a dimension-based approach, rather than a dichotomous one (i.e, presence or absence of the problem based on an overall PSNU factor score) when assessing the existence of problematic or non-problematic use of SNSs. This is a criticism that can be applied to work such as that by Machimbarrena et al. (2019), in which a cut-off point was established but was not sufficient to determine exactly whether a participant presented negative consequences. Scoring on a global factor would only make sense if some negative consequences are present, which would be the minimum to determine the difference between problematic and non-problematic use.

The profile analysis also allowed us to more accurately identify percentages of problematic SNS use. In this regard, there was a group of participants whose use was clearly problematic (2.9%) and a group of participants who could be at risk (13.2% of the sample). These results partly coincide with the hypothesis that 17% of users are problematic users of SNSs (Assunção & Matos, 2017), but they are more specific in that they subdivide this group into two levels of severity which is a relevant difference. Taking into account that problematic use of social networks is a potentially clinical problem (particularly as is often analysed through the addiction paradigm), prevalence figures should be commensurate with accordingly and therefore closer to the prevalence that we labelled as severe problematic use (2.9%). Stating that up to 15% (17% in the case of Assuncao & Matos, 2017) of participants make PSNU indicates that we may be overestimating the problem or not being able to distinguish the potentially problematic from the really problematic. Therefore the 13.2% of our sample labelled as at risk, should not be equated to a real problematic use but a category that would require further analysis. It should be borne in mind that a key dimension in labelling this SNS use behavior as problematic lies in the negative consequences dimension, which in turn is influenced by the social rules established by parents and teachers. In this sense, penalizing the use of social networks (whether this is problematic or not in terms of deficient self-regulation), generates negative consequences own its own in the form of punishment and ceasing to fulfil obligations by adolescents in order to be able to use them. This is why it would be necessary to accompany further studies of

PSNU with qualitative questions that allow us to distinguish to what extent the negative consequences are a precipitating, consequent or maintaining factor of the problem.

Regarding the comparison between countries, and in response to the research question, no significant differences were found between the group of severe problematic users and the group of non-problematic users; however, there was a higher percentage of Mexican adolescents in the at-risk user profile. These results are relevant for future research and interventions since it is necessary to differentiate between adolescents who present high scores in mood regulation, cognitive preoccupation, or compulsive use without experiencing negative consequences and those who do experience negative consequences. This last group should be of particular interest, in terms of either the more severe case (severe problematic users) or the somewhat less-severe case (at-risk users). Both types of use may be associated with personal, social, academic, or work-related problems, among other possible problems.

This study is not free of limitations. The first limitation is the use of self-reports, with its associated desirability bias; in future, other reports such as those by parents or teachers could be used to corroborate the information given by participants. Second, this study employed convenience sampling, which prevents generalization of the results to the population. Further studies should attempt to gather a larger sample using random sampling to allow generalization of the results and to establish the actual prevalence of the problem. Another limitation of the study regards the approach to validity. In this study, convergent and discriminant validity were analysed using the approach suggested by Fornell and Larcker (1981) rather than the multitrait-multimethod matrix (MTMM) approach proposed by Campbell and Fiske (1959); although convergent validity was measured through the GPIUS, the remaining five elements of the MTMM were not tested. The lack of additional tools for comparing the validity of the results opens future lines of research where the PSNUS is compared with other constructs, thus enhancing the validity of the PSNUS. Finally, in terms of factor structure, there are two limitations to mention. On the one hand, each dimension was measured by only three items, which limits the breadth of the content validity of the scale's dimensions. On the other hand, the "cognitive preoccupation" and "compulsive use" dimensions were highly correlated, which is why other researchers have combined them under the term "deficient self-regulation" and which led us to correlate the errors of some of their items. Future work could research the relationship between these two dimensions and further analyse whether they really form a single dimension.

Despite these limitations, the present study included a large sample of adolescents in two Spanish-speaking countries (which provides important cross-cultural value) and confirmed the invariance and factorial structure of the PSNUS. The validation and cultural adaptation are of great importance, especially in a country like Mexico or Spain, which are among the three Spanish speaking countries with more inhabitants, (about 130 million for Mexico and 47 million for Spain), amounting to a population of 150 million (close to 130 million). Taken this into account, a large population of adolescents could benefit from this instrument.

In addition, measurement invariance tests were conducted to establish the invariance of the PSNUS and to establish the cross-cultural invariance of the scale. The latter test was crucial for examining cultural differences in problematic use of social media between Mexico and Spain. Likewise, its use may have potential for the almost 500 million Spanish speakers who make up this linguistic community, both for the set of countries whose main language is Spanish and for the mass of Spanish speakers in other countries, such as the USA (where they represent more than 15% of the population; Instituto Cervantes, 2022). Moreover, while studies have been conducted in Mexico to analyse PIU or internet addiction (Jocelyne Lugo-Salazar & Pineda-García, 2021), to the best of our knowledge, only two studies have addressed SNS use, and both did so under the addiction paradigm (González Alcántara et al., 2021; Valencia-Ortiz & Cabero-Almenara, 2019). The tool in the current study allowed analysis of the model of (problematic) SNS, thus filling the gap created by most assessment tools, which focus on the component model of addiction and which have been criticized for being atheoretical, confirmatory, and not applicable to all technology-related problems (Billieux et al., 2015). By contrast, the findings of this study based on the cognitive-behavioural model may guide the creation of programmes for the prevention of the problematic use of technology, not necessarily aimed at avoiding mood regulation or raising alarms regarding interactions through SNSs but rather directed at helping address compulsive and obsessive behaviours that could have negative consequences; a criterion that, in our view, is indicated in the results and that should be the one used to set the threshold when deciding whether SNS use is problematic or not.

In conclusion, this study provides adaptation of an instrument in the Spanish language in a cross-cultural approach that will allow other researchers to analyse PSNU from a different framework than that of addiction in Mexico, Spain, and other Spanish-speaking countries. Furthermore, this study is, to our knowledge, the first to provide

relevant data on differences in PSNU between Spain and Mexico. Finally, the study provides a categorization of PSNU profiles according to the dimensions of a cognitive-behavioural model that could guide intervention and prevention programmes.

Conflict of Interest

The authors have no conflicts of interest to declare.

Authors' Contribution

Juan Manuel Machimbarrena: conceptualization, methodology, supervision, writing—original draft, visualization. **Miriam Varona:** conceptualization, data curation, writing—original draft, investigation. **Alexander Muela:** conceptualization, supervision, validation, writing—reviewing & editing. **Joaquín González-Cabrera:** conceptualization, supervision, validation, writing—reviewing & editing.

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Appendix

Table A1. *Problematic SNS Use Scale (PSNUS) / Uso Problemático de Redes Sociales.*

#	Original items adapted from Caplan (2010) to SNS	Castilian Spanish items	Mexican Spanish items
1.	I prefer to communicate through SNS over face-to-face communication	Prefiero relacionarme con otras personas a través de las redes sociales que comunicarme cara a cara	Prefiero relacionarme con otras personas a través de las redes sociales que comunicarme cara a cara
2.	I have used SNS to be with others when I was feeling isolated	He usado las redes sociales para estar con otros cuando me he sentido solo	He usado las redes sociales para estar con otros cuando me he sentido solo
3.	When I haven't been on my SNS for some time, I become preoccupied with the thought of going online	Cuando no me conecto a mis redes sociales durante algún tiempo, empiezo a preocuparme con la idea de conectarme	Cuando no me conecto a mis redes sociales durante algún tiempo, empiezo a preocuparme con la idea de conectarme
4.	I have difficulty controlling the amount of time I spend on SNS	Tengo dificultad para controlar la cantidad de tiempo que uso las redes sociales	Tengo dificultad para controlar la cantidad de tiempo que uso las redes sociales
5.	My use of SNS has made it difficult for me to manage my life	Mi uso de las redes sociales ha producido dificultades en el control de mi vida	Mi uso de las redes sociales ha producido dificultades en el control de mi vida
6.	Social interaction through SNS is more comfortable for me than face-to-face interaction	Me siento más cómodo comunicándome con otras personas mediante las redes sociales que haciéndolo cara a cara	Me siento más cómodo comunicándome con otras personas mediante las redes sociales que haciéndolo cara a cara
7.	I have used SNS to make myself feel better when I was down	He usado las redes sociales para sentirme mejor cuando he estado triste	He usado las redes sociales para sentirme mejor cuando he estado triste
8.	I would feel lost if I was unable to connect to SNS	Me sentiría perdido si no pudiera conectarme a redes sociales	Me sentiría perdido si no pudiera conectarme a redes sociales
9.	I find it difficult to control my SNS use	Me resulta difícil controlar mi uso de las redes sociales	Me resulta difícil controlar mi uso de las redes sociales
10.	I have missed social engagements or activities because of my SNS use	He dejado compromisos o actividades que tenía para estar en redes sociales	He dejado compromisos o actividades que tenía para estar en redes sociales
11.	I prefer communicating with people through SNS rather than face-to-face	Prefiero comunicarme con la gente a través de las redes sociales que hacerlo cara a cara	Prefiero platicar con la gente a través de las redes sociales que hacerlo cara a cara
12.	I have used the internet to make myself feel better when I've felt upset	He usado las redes sociales para sentirme mejor cuando me he sentido enfadado	He usado las redes sociales para sentirme mejor cuando me he sentido enojado
13.	I think obsessively about going online to me SNS when I am offline	Cuando no estoy conectado pienso obsesivamente en conectarme a las redes sociales	Cuando no estoy conectado pienso obsesivamente en conectarme a las redes sociales
14.	When offline from SNS, I have a hard time trying to resist the urge to go online	Cuando no tengo acceso a las redes sociales, me resulta difícil resistir el impulso de conectarme	Cuando no tengo acceso a las redes sociales, me resulta difícil resistir el impulso de conectarme
15.	My SNS use has created problems for me in my life	Mi uso de las redes sociales ha creado problemas en mi vida	Mi uso de las redes sociales ha creado problemas en mi vida

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