

Spanish version of the Phubbing Scale: Internet addiction, Facebook intrusion, and fear of missing out as correlates

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Abstract

Background: Phubbing is an increasingly common behavior that involves using a smartphone in a social setting of two or more people and interacting with the phone rather than with the other people. Research to date on phubbing has measured it using different scales or single questions, and therefore standard measures with appropriate psychometric properties are needed to improve its assessment. The aim of our study was to develop a Spanish version of the Phubbing Scale and to examine its psychometric properties: factor structure, reliability, and concurrent validity. **Method:** Participants were 759 Spanish adults between 18 and 68 years of age. They completed an online survey. **Results:** The results support a structure that is consistent with the original validation study, with two factors: Communication Disturbance and Phone Obsession. Internal consistency was found to be adequate. Evidence of concurrent validity was provided via a hierarchical regression model that showed positive associations with measures of internet addiction, Facebook intrusion, and fear of missing out. **Conclusions:** These results indicate that the Spanish version of the Phubbing Scale exhibits appropriate psychometric properties.

Keywords: Phubbing, communication disturbance, phone obsession, validation.

Resumen

Versión española de la Escala de Phubbing: adicción a Internet, intrusión de Facebook y miedo a perderse algo como correlatos. Antecedentes: el incremento del uso de los teléfonos móviles ha derivado en el incremento del phubbing, que se define como la conducta de ignorar a otras personas durante una interacción social por el uso del teléfono móvil. El objetivo de este estudio es desarrollar y validar la escala de Phubbing en su versión española y examinar sus propiedades psicométricas: estructura factorial, fiabilidad y validez concurrente. **Método:** se administró una batería de tests a 759 adultos españoles entre 18 y 68 años. **Resultados:** los resultados mostraron una estructura de dos factores consistente con la versión original: Disrupción de la comunicación y Obsesión con el teléfono móvil. La consistencia interna fue adecuada y las evidencias de validez concurrente, mediante regresión jerárquica, mostraron correlaciones positivas con medidas de adicción a Internet, adicción a Facebook y miedo a perderse algo (FoMO). **Conclusiones:** la escala de Phubbing en su versión española muestra adecuadas propiedades psicométricas.

Palabras clave: Phubbing, interferencia en la comunicación, adicción al móvil, validación.

Phubbing, or using a smartphone in a social setting of two or more people and interacting with the phone rather than with the other person or people present, has become increasingly common in our daily lives (Chotpitayasunondh & Douglas, 2016). Karadağ et al. (2015) developed the Phubbing Scale and identified two factors reflecting two theoretical components: Communication Disturbance (how often individuals disturb their face-to-face communications by using their mobile phones) and Phone Obsession (need for their mobile phone in environments that do not involve a face-to-face interaction). These factors have a clear addictive component and, consequently, they examined the relationships between phubbing behavior and addictions to mobile phones, SMS, internet, social media, and video games. All these

addictions were shown to be independent predictors of phubbing but the association with social media addiction was stronger than the association with internet addiction.

Research has also focused on academic and work (Roberts & David, 2017; Ugur & Koc, 2015) and romantic relationships (Abeele, Antheunis, & Schouten, 2016; Cizmeci, 2017; Roberts & David, 2016; Wang, Xie, Wang, Wang, & Lei, 2017). Associations between phubbing and social media addiction have been consistently found (Chasombat, 2015; Karadağ et al., 2015) and phubbing is considered to be driven by the need to belong and to feel connected to others (Chotpitayasunondh & Douglas, 2016) or a response to being phubbed by another person in romantic relationships (Abeele et al., 2016; Cizmeci, 2017; David & Roberts, 2017; Roberts & David, 2016; Wang et al., 2017).

Researchers investigating social media addiction have mainly focused on Facebook addiction, also referred to as Facebook intrusion (Andreassen, 2015; Elphinston & Noller, 2011), but little research explored the association between Facebook addiction and phubbing. In addition, social media addiction and Facebook intrusion have been found to be predicted by fear of missing out,

FoMO (Błachnio & Przepiórka, 2017; Przybylski, Murayama, DeHaan, & Gladwell, 2013). This is not surprising given that FoMO is defined as a pervasive apprehension that others might be having rewarding experiences from which one is absent, and which is characterized by the desire to stay continually connected with what others are doing (Przybylski et al., 2013). FoMO has been found to be associated with problematic mobile phone use (Cheever, Rosen, Carrier, & Chavez, 2014; Elhai, Levine, Dvorak, & Hall, 2016; Hong, Chiu, & Huang, 2012) and phubbing behavior (Karadağ et al., 2015), but also been suggested to be a key predictor of social media or Facebook addiction (Andreassen, 2015; Beyens, Frison, & Eggermont, 2016; Przybylski et al., 2013)- which in turn is also consistently predicted by internet addiction. Moreover, internet addiction has been shown to be an independent predictor of phubbing even accounting for social media addiction (Karadağ et al., 2015).

Given the increase in phubbing behavior and the variability in its assessment, standard measures with adequate psychometric properties need to be further developed and validated for different samples. Although there are questionnaires in Spanish designed to assess the addictive use of internet and mobile phones (Beranuy, Chamarro, Graner, & Carbonell, 2009), there are no instruments in this language to measure the Phubbing phenomenon. The aim of our study was to develop a Spanish version of the Phubbing Scale (Karadağ et al., 2015) and to examine its psychometric properties: factor structure, reliability, and concurrent validity. Previous research focused on students and exploratory analysis, we considered general adult population and included confirmatory factor analysis to establish the scale's internal validity. To provide empirical evidence of the scale's concurrent validity we examined correlations with internet addiction, Facebook intrusion and FoMO.

Method

Participants

The sample consisted of 759 Spanish adults (319 males and 440 females) between 18 and 68 years ($M = 29.07$, $SD = 12.07$). Inclusion criteria were: 18 years or older, Spanish nationality and residence and being a mobile phone user. Sample characteristics are shown in Table 1.

Instruments

Sociodemographic variables. We included demographic such as age, gender, nationality, city of residence, marital status, education level, and social status.

Phubbing. The Phubbing Scale (PS; Karadağ et al., 2015) comprises 10 items rated on a five-point Likert scale from 1 (never) to 5 (always). Exploratory factor analysis with Oblimin rotation showed two factors: Communication Disturbance and Phone Obsession. PS was adapted into Spanish using a back-translation method following the International Test Commission recommendations (2005; Muñiz, Elosua, & Hambleton, 2013). Two Spanish professional translators translated the original. Next, the authors and translators rated the equivalence of the two versions and systematically reviewed each of the items until reaching consensus. Then, the Spanish version was translated back into English by a different translator (a native English speaker),

after which the research team compared the original and back-translated English versions to ensure semantic and conceptual equivalence. Finally, the PS was administered to 30 students in a pilot session. Items are shown in Table 2.

In the process of producing the Spanish version, item 5 (“I don’t think that I annoy my partner when I’m busy with my mobile phone”) was reworded as a positive statement because the pilot sample reported problems understanding the negative direction of the sentence, given that all the other items are presented as positive statements. Research has shown that an instrument with all items formulated in the same direction and referring to the target construct is preferable to prevent response bias (Suárez et al., 2018; Solís-Salazar, 2015; Van Sonderen, Sanderman, & Coyne, 2013). We added “or family, if you do not have a partner” in item 5 to avoid response bias due to relationship status. The term “always” was removed from items 2 and 6 to ensure coherence with the scale of responses, which also included “always” as a possible response. Finally, as there was a degree of repetition between items 4 and 2 (both referred to friends) we changed the wording of item 4 so that it referred to the family.

Internet addiction. The Internet Addiction Scale (IAS; Karadağ et al., 2015) consists of six items rated on a five-point scale from 1 (never) to 5 (always). Higher scores indicate higher level of addiction ($\alpha = .75$).

Facebook intrusion. The Facebook Intrusion Questionnaire (FIQ; Elphinston & Noller, 2011) comprises eight items rated on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicate higher levels of intrusion ($\alpha = .79$).

Fear of missing out. The Fear of Missing Out Scale (FoMOs; Przybylski, Murayama, DeHaan, & Gladwell, 2013) includes 10 items rated from 1 (not at all true of me) to 5 (extremely true of me). Higher scores indicate a higher level of the fear of missing out ($\alpha = .83$).

Table 1
Sociodemographic characteristics

Variables	N	Percentage
Gender		
Men	319	42
Women	440	58
Age		
18-30	534	70.9
31- 50	140	18.4
More than 50 years	81	10.7
Marital status		
Single	534	70.4
Married	199	26.2
Divorced	23	3
Widowed	3	0.4
Education		
Primary	3	0.4
Secondary	346	45.6
University	410	54.0
Social status		
Student	397	52.3
Employed	212	27.9
Student and employed	106	14
Unemployed retired	44	5.8

Procedure

The study procedures were carried out in agreement with the Declaration of Helsinki. The Research Ethics Committee of the University of Malaga, Spain, approved the study. All subjects were informed about the study and all provided informed consent. Participants completed an online survey which was disseminated through the website of the University of Malaga. A snowball sampling strategy was adopted to recruit student and non-student participants, who were informed about the anonymity of the study. The time required to complete the survey was approximately 15 minutes. We did not exclude any participant from the dataset. As respondents were obliged to answer all the survey questions, there were no missing data.

Data analysis

To analyze the internal structure of the PS, a cross-validation strategy was employed, splitting the sample into two random groups. In accordance with the procedure used by Karadağ et al. (2015), with the first sample ($n = 391$) we performed an exploratory factor analysis (EFA) of PS scores using Oblimin rotation with IBM SPSS and FACTOR program (Lorenzo-Seva & Ferrando, 2013). Factors with eigenvalues above 1 were considered to establish the number of factors and the root mean square of residuals (RMSR) was used as a measure of fit. Values of RMSR close to .05 indicate a good fit (Ferrando & Aguiano-Carrasco, 2010; Harman, 1976).

With the second sample ($n = 368$), we used confirmatory factor analysis (CFA) to test two models, each with two correlated factors: a) model 1, the model proposed by Karadağ et al. (2015), and b) model 2, a new proposal with different items loading on the factors and providing a better rationale from a theoretical point of view. To test for a difference between the fit of the two competing models we used the method described by Satorra and Bentler (2001), which computes a significance test on the difference between Satorra-Bentler scaled chi-square statistics, as described by Crawford and Henry (2003). Finally, we tested the selected model in the total sample.

These CFAs were carried out with EQS 6.3 software package. Analyses were performed on the polychoric correlation matrix, using the maximum likelihood and robust estimation methods. The Satorra-Bentler chi-square (S-B χ^2) was computed with the following goodness-of-fit indices (Bentler, 2006): the comparative fit index (CFI), the non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA). Values of the CFI and NNFI close to .95 are indicative of a good fit (Hu & Bentler, 1999). Values of the RMSEA below .06 indicate a good fit (Hu & Bentler, 1999) and those less than .08 a reasonable fit (Browne & Cudeck, 1993).

The corrected item-factor correlations were also computed. Values greater than .30 were considered satisfactory. Internal consistency was assessed by calculating the composite reliability for scores on each factor. Values greater than .70 were considered acceptable.

Concurrent validity was examined through hierarchical regression analysis, testing the relationship between PS scores and scores on internet addiction, Facebook intrusion, and FoMO. In this analysis, the sample was reduced to 613 participants because 146 individuals did not use Facebook.

Results

Exploratory factor analysis of PS scores

Using the first sample we conducted an EFA of PS scores. The Kaiser-Meyer-Olkin (KMO) index was .83, and Bartlett's test of sphericity was statistically significant [$\chi^2(45) = 1236.88$; $p < .001$]. Two factors had eigenvalues values higher than 1, and the correlation between them yielded a coefficient of .56. The RMSR was equal to .057. The factor loadings are shown in Table 2. Items 1 to 5 loaded on the first factor, which we labeled Communication Disturbance (CD). Items 6 to 10 loaded on the second factor, labeled Phone Obsession (PO).

Confirmatory factor analysis

The two factors obtained through the EFA were theoretically appropriate and consistent with Karadağ et al. (2015). However, in

Table 2
Factor loadings from the EFA of PS scores in the first sample ($n = 391$)

Items	Factor loading	
	1	2
1. My eyes start wandering on my phone when I'm together with others [Estoy pendiente de mi teléfono móvil cuando estoy en compañía de otras personas]	.508	
2. I am busy with my mobile phone when I'm with my friends [Estoy ocupado/a con mi teléfono móvil cuando estoy con mis amigos/as]	.644	
3. People complain about me dealing with my mobile phone [Otras personas se quejan sobre mi uso del teléfono móvil]	.826	
4. I'm busy with my mobile phone when I'm with my family [Estoy ocupado/a con mi móvil cuando estoy con mis familiares]	.528	
5. I think that I annoy my partner when I'm busy with my mobile phone (or family, if you do not have a partner) [A mi pareja le molesta que esté ocupado/a con el móvil (o familiares, si no tienes pareja)]	.617	
6. My phone is within my reach [Mi teléfono móvil está a mi alcance]		.595
7. When I wake up in the morning, I first check the messages on my phone [Lo primero que hago al despertarme es mirar mis mensajes en el móvil]		.589
8. I feel incomplete without my mobile phone [Me siento vacío/a sin mi móvil]		.713
9. My mobile phone use increases day by day [Cada día aumenta mi uso del teléfono móvil]		.457
10. The time allocated to social, personal or professional activities decreases because of my mobile phone [El tiempo que dedico a actividades sociales, personales o profesionales se reduce por el tiempo que uso el móvil]		.548

Table 3
Results from the CFA of PS scores with the second sample (n = 368)

Model	χ^2	S-B χ^2	df	CFI	NNFI	RMSEA
Model 1 (Karadağ et al., 2015)						
1a. Two-correlated factors	359.887	206.236	34	.929	.906	.117 [.102, .133]
1b. Two-correlated factors with correlated error (E3,E5)	268.309	152.644	33	.951	.933	.099 [.084, .115]
Model 2 New proposal						
2a. Two-correlated factors	229.963	127.716	34	.961	.949	.087 [.071, .103]
2b. Two-correlated factors with correlated error (E3,E5)	142.462	78.2794	33	.981	.974	.061 [.044, .078]

the model of Karadağ et al. (2015) item 10 loaded on factor 1 and item 5 loaded on factor 2. Consequently, we carried out CFA to test two models, each with two correlated factors:

- a) Model 1 with Factor 1 (items 1, 2, 3, 4, 10) and Factor 2 (items 5, 6, 7, 8, 9)
- b) Model 2, a new proposal with: Factor 1 (items 1, 2, 3, 4, 5) and Factor 2 (items 6, 7, 8, 9, 10)

The fit of these models was tested in the second sample (Table 3). Model 1 showed a poor fit, with an unsatisfactory RMSEA index (model 1a). The Lagrange multiplier test showed an improvement when the error covariance between items 3 and 5 was considered, which is theoretically coherent. When this covariance was considered (model 1b) the fit of the model was superior to that of model 1a, but the RMSEA still failed to meet the criterion for adequate fit (i.e., a value less than .08). The inclusion of the covariance was statistically significant, according to the result of the Satorra-Bentler scaled chi-square difference test, used to compare these nested models (Table 4).

The fit of model 2 was better than that of models 1a and 1b. The CFI and NNFI values were close to .95, although the RMSEA index was higher than .08 (model 2a). To improve the fit, we once again introduced the error covariance between items 3 and 5 (model 2b). The indices for the new model indicated a good fit, with CFI and NNFI values above .95 and an RMSEA index of .061. The Satorra-Bentler scaled chi-square difference test for inclusion of the error covariance was also statistically significant (Table 4).

Based on these results we selected model 2b, with error covariance between items 3 and 5, as showing the best fit to the data and we proceeded to test this model with the total sample to verify the factor structure. The Mardia's coefficient was equal to 15.88, which provide evidence of positive kurtosis and justify the use of robust estimation methods (Bentler, 2006). All the goodness-of-fit indices were satisfactory, with values inside the bounds for a good fit: S-B χ^2 (33) = 117.58, CFI = .98; NNFI = .98; RMSEA = .058 [.047, .070]. Table 5 shows the corresponding factor loadings.

Psychometric properties of the items and reliability

Table 6 also shows the corrected item-factor correlations. All values were above .30. composite reliability for scores on the CD and PO factors were .85 and .76, respectively. Both values are satisfactory.

Evidence of concurrent validity

To study concurrent validity, we conducted a hierarchical regression analysis with scores on the two PS factors as the dependent variable and scores on the IAS, FIQ and FoMOs Scale as predictors in this order, in accordance with their respective correlation coefficients (Tables 6-7).

The model obtained when entering internet addiction in the first step of the analysis explained 10.8% of the variance in CD scores. With Facebook intrusion added to the equation, the variance explained by the model was 12.8%. Finally, with FoMO added, the variance explained was 13.4%, with all three predictors being statistically significant. The analysis shows that scores on

Table 4
Results obtained with the second sample (n = 368) when using the Satorra-Bentler scaled chi-square to test differences between nested models of the PS

Model comparison				
More constrained	Less constrained	Δ S-B χ^2	Df	p
Model 1a	Model 1b	69.048	1	<.001
Model 2a	Model 2b	75.458	1	<.001

Table 5
Standardized factor loadings for the selected model (model 2b) of the PS, corrected item-factor correlations, means and standard deviations (N = 759)

Model 2b	Factor loading	Item-factor correlation	M	SD
Communication			10.28	3.54
Disturbance				
Item 1	.799	.601	2.62	0.97
Item 2	.856	.666	1.98	0.83
Item 3	.673	.630	1.59	0.87
Item 4	.743	.595	2.22	0.92
Item 5	.540	.530	1.86	1.09
Phone Obsession			13.50	3.78
Item 6	.562	.453	4.12	0.94
Item 7	.616	.473	3.44	1.37
Item 8	.722	.534	2.13	1.14
Item 9	.591	.420	2.01	1.03
Item 10	.629	.466	1.80	1.04
Correlation				
F1-F2	.674			
E3-E5	.546			

CD are positively related to scores on internet addiction, Facebook intrusion, and FoMO, such that when other predictors are constant the score on CD increases by 0.188 for each point increase in the internet addiction score, by 0.07 for each point increase in Facebook intrusion, and by 0.04 for each point increase in FoMO.

The same steps were followed for the PO factor. The three predictors were statistically significant in the final model. When other predictors are constant the score on PO increases by 0.36, 0.10, and 0.06 for each point increase in the scores on internet addiction, Facebook intrusion, and FoMO, respectively.

Table 6

Pearson correlation between scores on the two factors of the PS and correlates

Variables	Communication disturbance	Phone obsession
Internet addiction	.33**	.53**
Facebook intrusion	.28**	.40**
Fear of missing out	.22**	.31**

Note: ** $p < .01$

Table 7

Hierarchical regression with scores on the two factors of the PS as dependent variables

Variables	B	SE β	β	t	p	ΔR^2	F
<i>Communication disturbance</i>							
Intercept	6.07	.51		11.98	<.001		
Internet addiction	.19	.04	.23	5.33	<.001	.108**	73.83**
Facebook intrusion	.07	.02	.14	3.26	.001	.020**	44.71**
Fear of missing out	.05	.02	.09	2.05	.041	.006*	31.36**
<i>Phone obsession</i>							
Intercept	6.56	.49		13.53	<.001		
Internet addiction	.36	.03	.41	10.49	<.001	.276**	232.46**
Facebook intrusion	.10	.02	.18	4.61	<.001	.031**	134.96**
Fear of missing out	.06	.02	.10	2.65	.008	.008**	93.20**

Note: ** $p < .01$; * $p < .05$

Discussion

Our aim was to develop a Spanish adaptation of the PS by providing empirical evidence regarding its psychometric properties. Exploratory and confirmatory analyses showed that the Spanish version of the PS comprised two factors, Communication Disturbance and Phone Obsession. Both factors are consistent with the definitions given by Karadağ et al. (2015) following exploratory factor analysis. However, in contrast to the model proposed by these authors, the analyses indicated that item 5 loaded on Factor 1 and item 10 on Factor 2, which is more coherent from a theoretical perspective. The findings showed adequate item properties and internal consistency. This validation not only confirms the results of Karadağ et al. (2015) but also provides evidence in support of the two-factor structure in an adult sample, as opposed to the exclusively student samples used in previous studies of phubbing (Karadağ et al., 2015, 2016).

Evidence for the external validity of the PS was provided by the positive associations between internet addiction, Facebook

intrusion and FoMO with both PS factors. These findings are consistent with previous research that has highlighted how internet addiction is not solely a computer-related problem (Griffiths, 1999; Karadağ et al., 2015), and support previous studies on FoMO (Andreassen, 2015; Beyens et al., 2016; Przybylski et al., 2013). Our study provided new evidence suggesting that although FoMO has been considered a predictor of social media or Facebook addiction, both FoMO and Facebook intrusion are independently associated with phubbing. This finding highlights the social component of phubbing, which has been suggested to be driven by the need to feel connected to others (Chotpitayasunondh & Douglas, 2016) and may be a response to being phubbed by another person (David & Roberts, 2017). Further research is needed to examine these behaviors in daily social interactions that are not limited to the context of romantic relationships, the latter having been the focus of much previous research (Abeele et al., 2016; Cizmeci, 2017; Roberts & David, 2016; Wang et al., 2017).

Overall, the results show that the Spanish version of the PS is a suitable tool for assessing phubbing behavior with adequate psychometric properties. One of the main advantages of providing a version of the PS scale in Spanish is that it facilitates comparability across samples and future reproducibility. Replication studies are needed to build scientific knowledge, and recent publications have highlighted the relevance of promoting systematic replication efforts (Koole & Lakens, 2012). However, one of the greatest challenges in this context is the variety of measures used to assess the same constructs in different studies. This study contributes to reduce this well-known source of variability in replication efforts.

This study does have certain limitations. Participants were not recruited by random sampling, thereby restricting the generalizability of the findings. In addition, from our cross-sectional design no causal relationships can be attributed, and bi-directional associations cannot be ruled out. Although new empirical evidence has been provided regarding the association between phubbing and internet addiction, Facebook intrusion, and FoMO, a task for future studies that seek to advance knowledge of this topic would be to include other potential key variables and to replicate the current findings in other countries, thereby enabling cross-cultural comparisons to be made. In addition, it should be noted that while the present study uses a traditional CFA approach, which might be appropriate for examining cross-cultural factorial invariance with a small number of countries, future studies with a large number of countries should consider techniques to ensure the optimization of invariance measurement such as the maximum likelihood alignment approach (Byrne & van de Vijver, 2017).

Research involving different samples — for example, teenagers or clinical populations — is also required in order to understand better the addictive component of this behavior.

To sum up, our study provides evidence regarding the psychometric properties of the PS with a sample of Spanish adults. The factor structure of the Spanish PS comprised two correlated factors, Communication Disturbance and Phone Obsession, and yielded satisfactory goodness-of-fit indices. The internal consistency and psychometric properties of the items were also adequate. We found positive associations between scores on the two factors and internet addiction, Facebook intrusion, and FoMO. The PS is a short and easy-to-administer scale, and our results indicate that it is a suitable tool for assessing phubbing phenomenon.

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