



Reliability and Validity of Short-Form Generic Scale of Being Phubbed and Phubbing Among Turkish Adolescents and Young Adults

Alican Kaya¹ · Mehmet Şata² · Nuri Türk³ · Halil İbrahim Özok² · Murat Yıldırım^{4,5}

Received: 29 December 2023 / Revised: 18 June 2024 / Accepted: 20 June 2024
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Abstract

Presently, people focus their attention on their phones while communicating. The behavior known as phubbing is considered a new behavioral addiction. It may lead to many problems in the relationships of adolescents and adults. Therefore, we aimed to examine the measurement invariance of the short-form development of the generic scale of being phubbed and phubbing across two study samples among Turkish adolescents and young adults. A team of 12 experts was assigned the task of translating and back-translating the scales in accordance with the test adaptation guide. The data were collected from 451 Turkish adolescents ($n=206$ high school students) and young adults ($n=245$ university students). The measurement invariance of adolescents and young adults was investigated using a confirmatory factor analysis, in which increasingly strict equality constraints were applied to model parameters. Based on the model's results, both the three-factor 12-item General Phubbed Being Scale (GSPB) and the four-factor 12-item General Phubbing Scale (GSP) were found to have good construct validity. A measurement invariance analysis showed that both GSPB and GSP were reliable and valid in both sample groups (i.e., adolescents and adults) to measure phubbing. These results will facilitate the identification of phubbing behaviors that adolescents and young adults exhibit and are exposed to. Moreover, this study provides short and effective measurement tools that can be used in studies to prevent and intervene in phubbing behavior.

Keywords Generic scale of being phubbed · Generic scale of phubbing · Measurement invariance · Adolescents · Young adults

✉ Murat Yıldırım
muratyildirim@agri.edu.tr; muratyildirimphd@gmail.com

Alican Kaya
akaya@agri.edu.tr

Mehmet Şata
mehmetsata@yyu.edu.tr

Nuri Türk
nuri.turk@siirt.edu.tr

Halil İbrahim Özok
haliliozok@yyu.edu.tr

- ¹ Department of Guidance and Psychological Counselling, Agri İbrahim Cecen University, Ağrı, Turkey
- ² Department of Measurement and Evaluation, Van Yüzüncü Yıl University, Van, Turkey
- ³ Department of Guidance and Psychological Counselling, Siirt University, Siirt, Turkey
- ⁴ Department of Psychology, Faculty of Science and Letters, Agri İbrahim Cecen University, Fırat Mahallesi Yeni Üniversite Caddesi No: 2 AE/1, 04100 Merkez, Ağrı, Turkey
- ⁵ Department of Social and Educational Sciences, Lebanese American University, Beirut, Lebanon

Introduction

Social activities have become increasingly centered around phubbing in recent years. Phubbing is defined as the behavior of people who ignore others with their attention focused on their phones while talking or spending time with them (Chotpitayasunondh & Douglas, 2016). It is a term formed from the words *phone* and *snubbing* (Chotpitayasunondh & Douglas, 2016). Thus, phubbing is a multi-sided process that involves both actors: the actor (i.e., phubber) and the receiver (i.e., phubbee) (Nazir & Pişkin, 2016). Several studies have demonstrated that phubbing can lead to negative health outcomes in adolescents and adults (Batmaz et al., 2024; Beukeboom & Pollmann, 2021; Tanhan et al., 2024; Türk & Yıldırım, 2024). The use of smartphones has gradually become a social preference among them (Rainie & Zickuhr, 2015). Moreover, adolescence is a critical period for technology addiction (Kaya et al., 2023; Türk et al., 2024). Addictions developed in this period can have devastating effects on subsequent stages of development (e.g.,

adulthood). Some individuals, particularly adolescents and emerging adults, were found to be potentially addicted to several online activities, such as online gaming, social media usage, and phubbing (Ryan et al., 2014; Rosendo-Rios et al., 2022). These two developmental groups are, therefore, at risk in a similar way.

As studies on understanding the phenomenon of phubbing and phubbed increase, new measurement tools continue to be developed. Partner Phubbing Scale (Roberts & David, 2016), Parental Phubbing Scale (Pancani et al., 2020), and Boss Phubbing Scale (Roberts & David, 2017) regarding phubbing have been developed so far. Among these scales, it is known that the Partner Phubbing Scale has been adapted to Turkish culture (Çizmecı, 2017). These scales have the common feature that they consist of unidimensional structures. In addition, it is seen that exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were never conducted while developing the scales (Roberts & David, 2017), and EFA and CFA were conducted on the same sample (Roberts & David, 2016). Also, Karadağ et al. (2015) reported that phubbing behavior has two dimensions, namely phone obsession and communication disorder, in the scale they developed. This scale contained some items (e.g., *When I wake up in the morning, I first check the messages on my phone*) relating to phone addiction rather than phubbing. Moreover, the scale was not subjected to a CFA analysis, and psychometric properties such as test-retest reliability, concurrent validity, and construct validity were not assessed. The result is that, in addition to these psychometric deficiencies, these scales, which were only tested on limited contexts and individuals, cannot be generalized (Chotpitayasunondh & Douglas, 2018).

In light of the Expectation Violation Theory (Burgoon & Jones, 1976) and the Newcomb ABX Model (Newcomb, 1953) from which phubbing and phubbed are derived, it is evident that a multidimensional measurement tool is required. The theory and model argue that phubbing contains elements such as nomophobia, interpersonal conflict, self-isolation, and problem acknowledgement, whereas phubbed contains features such as perceived norms, feeling ignored, and interpersonal conflict. These scales (i.e., General Phubbed Being Scale [GSBP] and General Phubbing Scale [GSP]) were developed by Chotpitayasunondh and Douglas (2018), which were also adapted to Turkish culture through adult samples (Ergün et al., 2019; Yam & Kumcağız, 2020). The GSBP and GSP scales were designed as 22 and 15 items to provide construct validities, criterion validities, convergent validities, discriminant validities, internal consistency reliabilities, and test-retest reliabilities. This multi-item scale structure may decrease the data quality as it may increase individuals' boredom, inattention, and fatigue. For this reason, Li (2022) reduced the GSBP and GSP scales to 12 items each and created short forms of the scales. Li (2022) conducted this short-form development

study only on adolescents. On the other hand, the present study attempted to ensure the use of the scales on larger samples by making measurement invariance between different age groups. This study examines all sub-dimensions of the phubbing and phubbed phenomenon. Short and effective scales are needed when researchers work with adolescents and young adults. This study will contribute to filling this gap in the literature.

Method

Participants

The study data were collected from 451 participants. A convenience sampling method was used during the data collection process to collect data simultaneously from high school ($n = 206$) and university ($n = 245$) students. As part of the data collection, it was sought to include individuals from various types of high schools and departments. In the high school sample, 72.3% (149) of students were female, while 27.7% (57) were male. When their grade levels were examined, 37.9% (78) of students were in 9th grade, 25.2% (52) were in 10th grade, 23.3% (48) were in 11th grade, and 13.6% (28) were in 12th grade. According to self-reported socioeconomic levels, 20.4% (42) of the individuals were low, 75.2% (155) were moderate, and 4.4% (9) were high, while their mean age was 15.93 ± 4.41 . In the university sample, 64.5% (158) of students were female, while 35.5% (87) were male, when their grade levels were examined, 4.1% (10) were 1st grade, 18.8% (46) were in 2nd grade, 51.4% (126) were in 3rd grade, and 25.7% (63) were in 4th grade. According to self-reported socioeconomic levels, 26.5% (65) of the individuals were low, 72.2% (155) were moderate, and 1.2% (3) were high, and their mean age was 23.26 ± 3.92 .

Power Analysis

A regression-based power analysis was carried out prior to data collection, and it was determined that the smallest sample size would be 133 (power analysis conditions $\alpha = .05$, $1 - \beta = .80$, effect size = .06 (small effect)). After data collection, a post-hoc power analysis was performed, and the power of samples was determined to $\beta = .96$ for the high school and $\beta = .97$ for the university.

Measures

The Generic Scale of Phubbing (GSP)

The 12-item GSP was used to assess phubbing behavior (Li, 2022). There were four dimensions on the scale: items for nomophobia (NP) (e.g., "I cannot stand leaving my phone alone"), interpersonal conflict (IC) (e.g., "I get irritated if

others ask me to get off my phone and talk to them”), self-isolation (SI) (e.g., “I feel good when I stop focusing on others and pay attention to my phone instead”), and problem acknowledgement (PI) (e.g., “I find myself thinking ‘just a few more minutes’ when I am using my phone”), which are rated on a 7-point Likert scale from 1 (*never*) to 7 (*always*). The total score ranges between 12 and 84. The higher the score, the greater the phubbing behavior.

The Generic Scale of Being Phubbing (GSBP)

The 12-item GSBP was used to assess being phubbing (Li, 2022). There were three dimensions on the scale: Items for perceived norms (PN) (e.g., “Others seem to check their phones for messages and social media updates”), feeling ignored (IC) (e.g., “Others would rather pay attention to their phones than talk to me”), and interpersonal conflict (IC), (e.g., “I find myself thinking ‘I’ve had enough’ when others are using their phones”), which are rated on a 7-point Likert scale from 1 (*never*) to 7 (*always*). The higher the score, the greater the phubbing behavior.

Procedure and Ethics

After obtaining Institutional Review Board (IRB) approval, the online link was prepared. Google Form was used in the link design to facilitate data collection. The form description explained the scope and duration of the study to the participants. The prepared form was shared with university students using social media platforms such as WhatsApp, Instagram, and Twitter. Additionally, school administrators in high schools were informed in order to collect data from high schools. Following the permission obtained from the families of high school students who volunteered to participate in the study, the survey was conducted. Participants were asked to complete the questionnaire once. However, it was informed that they could stop answering the questionnaire if they felt uncomfortable. In order to protect the anonymity of the participants, they were asked not to provide their personal information. Participants were required to provide their consent prior to participating in the study. Siirt University’s ethics committee approved the protocol of this study (reference number: 3790), and all phases of the research followed the Helsinki Declaration.

Translation Process

This scale was adapted for Turkish high school and university students in accordance with the “International Test Commission Guidelines for Test Adaptation: A Criterion Checklist” (Hernández et al., 2020). Therefore, the requirement for this scale was determined first, and then permission for its adaptation was obtained from its

original developers. Four researchers translated the scale items, response options, and instructions originally in English into Turkish as part of the adaptation process for the Generic Scale of Being Phubbed and Phubbing Scale. Upon reviewing the translation form, it is necessary to determine whether the items in the original form are equivalent to those in the translation form. To achieve this, one-way translations and evaluations of translations made by other translators were used as qualitative methods. This was addressed by preparing an expert evaluation form, which included both the original and translated instructions, items, and response options for the scales. The form was evaluated separately by a group of eight experts comprising field and language experts (i.e., two experts in linguists, five experts in psychology, and one expert in measurement and evaluation). As a consequence of the evaluation, the translation of each item agreed to by field and language experts was included in the scale. The procedures resulted in the creation of the translation form. Afterwards, the translation form of the scale was applied to the sample.

Data Analysis

Correlation analysis and descriptive statistics were used to determine the relationship between variables. Confirmatory factor analysis and multi-group confirmatory factor analysis were performed to provide evidence for the validity of the measurements obtained from the measurement tools. We utilized Cronbach’s and McDonald’s coefficients as evidence of the reliability of measurements obtained from measurement tools. The assumptions that must be met were tested prior to the CFA analysis. First, it was examined whether there was missing data analysis in the data set, and it was determined that there was no missing data. Moreover, there were no outliers in the data. Multivariate skewness (Z_s) and kurtosis (Z_k) values and χ^2 value for multivariate skewness and kurtosis were calculated to test the multivariate normal distribution assumption of the data set. In the present study, it was determined that the data set did not exhibit a multivariate normal distribution (for the phubbing scale, $Z_s = 12.18$ ($p = .000$), $Z_k = 10.17$ ($p = .000$), $\chi^2 = 251.87$ ($p = .000$); for the being phubbed scale, $Z_s = 7.27$ ($p = .000$), $Z_k = 5.35$ ($p = .000$), $\chi^2 = 81.48$ ($p = .000$)). As multivariate normality could not be achieved, the maximum likelihood with robust (MLR) method was selected as the parameter estimation method in CFA. The CFA analyses were conducted using Mplus (8 version) statistical package. It was determined that there was no bilateral correlation greater than .80; in other words, no multicollinearity problem existed, and there was a linear relationship between the variables.

Results

Firstly, descriptive statistics and correlation analyses were presented for the study's high school and university samples. Table 1 shows the correlations between all the scales and their sub-dimensions.

In terms of skewness and kurtosis values, all the measurement tools used in this study were within the range of ± 1.00 . This indicates that the resulting scores are normally distributed (Tabachnick & Fidell, 2013). Correlations between the variables revealed that GSBP and GSP had a positive relationship in both sample groups, which was stronger in the university sample.

To confirm the validity of the Phubbing (GSP) and Phubbed (GSBP) scales, the confirmatory factor analysis was conducted after examining the descriptive statistics and correlations of the measurements obtained from the measurement tools used in this study. In the first step, first-order and second-order models were tested for the high school and university samples, respectively. Table 2 shows the model fit values for the tested models.

According to Table 2, both the first-order and second-order models tested in the university sample, and the university sample had acceptable fit values. It was determined that all tested models' χ^2/df statistics ranged from 1.527 to 2.534,

and these values were acceptable (MacCallum et al., 1996). The RMSEA values ranged from .051 to .084, which were considered acceptable (MacCallum et al., 1996). The CFI values were between .933 and .975, NNFI/TLI values ranged between .912 and .968, and SRMR values ranged from .048 to .078 and were found to be acceptable (Hu & Bentler, 1999).

Testing Measurement Invariance

We conducted a multi-group confirmatory factor analysis (i.e., measurement invariance) to determine whether the Turkish version of the GSBP and GSP scales measures the same construct in both high school and university samples. The measurement invariance is tested in four steps. It comprises four types of invariances: configural invariance, metric invariance, scalar/threshold invariance, and strict invariance (Widaman & Reise, 1997). As a first step, configural invariance refers to examining the equivalence of factor structure between groups. At this stage, parameters are not constrained across groups. It is considered the base model. It indicates that the items in the measurement tool represent the same structure across the groups. Metric invariance tests refer to a hypothesis that the regression slopes (i.e., factor loadings) of the items in the measurement tool are equal or invariant across groups. In the regression

Table 1 Descriptive statistics and correlations for high school and university students

	Scale	Descriptive statistics						Correlations								
		Mean	SD	Skew	Kurt	α	ω	1	2	3	4	5	6	7	8	9
High school sample (N=206)	GSBP	42.57	14.02	0.35	-0.49	.85	.85	--	.59**	.85**	.84**	.27**	.09	.21**	.33**	.23**
	PN	17.25	5.39	-0.44	-0.25	.78	.79	--	.20**	.24**	.13	.10	.05	.11	.15*	
	FI	13.57	6.91	0.46	-0.78	.92	.92	--	.65**	.25**	.06	.19**	.34**	.21**		
	IC	11.75	5.99	0.52	-0.54	.79	.80	--	.22**	.04	.22**	.28**	.17*			
	GSP	38.81	15.22	0.44	-0.09	.88	.88	--	.81**	.78**	.82**	.76**				
	NP	11.44	5.36	0.21	-0.98	.85	.85	--	.43**	.50**	.56**					
	IC	7.05	4.21	0.98	0.34	.74	.74	--	.69**	.41**						
	SI	8.72	4.93	0.67	-0.30	.82	.83	--	.42**							
	PA	11.60	4.74	0.12	-0.72	.70	.72	--	--							
University sample (N=245)	GSBP	41.82	13.63	0.36	0.30	.87	.88	--	.71**	.83**	.83**	.42**	.30**	.34**	.29**	.42**
	PN	17.46	5.81	-0.19	-0.67	.80	.81	--	.35**	.33**	.30**	.35**	.12	.15*	.31**	
	FI	12.52	5.66	0.49	-0.31	.90	.91	--	.64**	.37**	.22**	.34**	.28**	.36**		
	IC	11.84	5.78	0.55	-0.42	.86	.86	--	.33**	.15*	.35**	.25**	.33**			
	GSP	39.73	14.56	0.46	0.27	.90	.90	--	.76**	.79**	.80**	.83**				
	NP	12.75	4.76	-0.13	-0.74	.83	.84	--	.41**	.40**	.58**					
	IC	7.64	4.18	0.99	0.59	.80	.81	--	.64**	.52**						
	SI	8.13	4.69	0.90	0.35	.90	.90	--	.52**							
	PA	11.20	4.65	0.20	-0.49	.78	.79	--	--							

GSBP Generic Scale of Being Phubbed, PN perceived norms, FI feeling ignored, IC interpersonal conflict, GSP Generic Scale of Phubbing, NP nomophobia, IC interpersonal conflict, SI self-isolation, PA problem acknowledgement

* $p < .05$; ** $p < .001$

Table 2 Model fit statistics

Measures of fit	High school sample				University sample			
	First-order model		Second-order model		First-order model		Second-order model	
	GSBP	GSP	GSBP	GSP	GSBP	GSP	GSBP	GSP
χ^2/df	1.527	1.730	1.527	2.459	2.003	2.019	2.004	2.534
AIC	9329.929	9193.011	9200.142	9228.902	10,052.216	10,187.953	10,052.216	10,220.481
BIC	9206.361	9332.782	9329.929	9362.017	10,188.765	10,335,006	10,188.764	10,360.531
RMSEA	.051	.060	.051	.084	.064	.064	.064	.079
%90 CI	.026–.072	.037–.081	.026–.072	.065–.103	.046–.082	.046–.083	.046–.082	.062–.096
CFI	.975	.968	.975	.934	.953	.957	.953	.933
NNFI/TLI	.968	.956	.968	.913	.940	.941	.940	.912
SRMR	.048	.053	.048	.078	.049	.062	.049	.073

equations developed for the items of the scalar invariance measurement tool, factor loadings and thresholds are constrained to be equal across groups. The strict invariance model is the most rigorous because it tests whether the construct, item loadings, item thresholds, and residual variances are the same across groups.

A sample size, number of groups compared, and model size were considered when selecting the fit indices (Putnick & Bornstein, 2016). As our measurements involve a large sample size, a two-group comparison, and a large model size, the CFI and RMSEA indices were appropriate to assess measurement invariance (Putnick & Bornstein, 2016). There is no consensus among the studies on cutoff criteria of measurement invariance. However, for the ΔCFI criterion, $\pm .02$ (Rutkowski & Svetina, 2014) is recommended, while values of $\pm .015$ (Chen, 2007) and $\pm .03$ (Rutkowski & Svetina, 2014) are recommended for the $\Delta RMSEA$ and $\Delta SRMR$ criteria. It was determined that both the GSBP and GSP measurement tools met all of the criteria used in the evaluation of measurement invariance. Table 3 shows that the GSBP and GSP scales measured the same construct in both high school and university samples.

A second-level CFA model is found to have acceptable path coefficients when tested on high school and university samples (Fig. 1). While the standardized path coefficients (i.e., factor loads) for the high school sample were in the range of $\lambda = .50-.90$, the error variances were found to be in the range of $\epsilon = .19-.75$. While the standardized path coefficients (i.e., factor loads) for the university sample were in the range of $\lambda = .66-.88$, the error variances were found to be in the range of $\epsilon = .23-.56$. A factor load of at least .30 indicates that the items are suitable for measuring the latent structure. Error variances less than .90 indicate that the measurement of the latent structure is acceptable (Kline, 2011). A statistically significant correlation exists between the sub-dimensions and the total scores in both samples. Accordingly, the sub-dimensions are collected and expressed as a single score type.

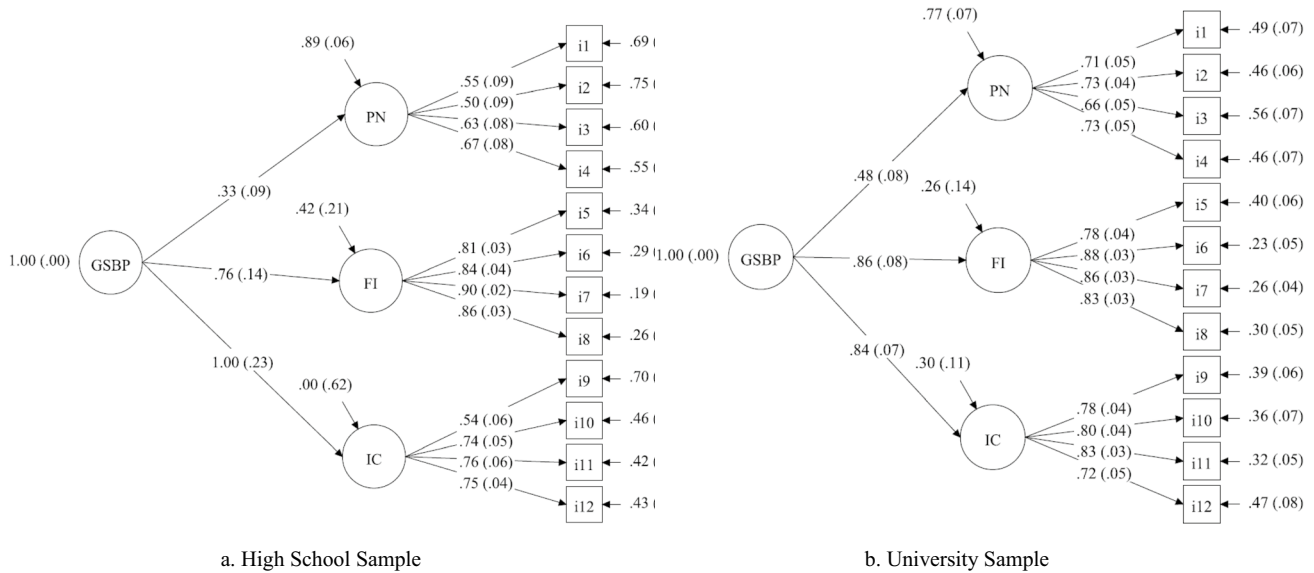
The path coefficients are acceptable for the second-order CFA model tested for high school and university samples (Fig. 2). In the high school sample, the standardized path coefficients (factor loads) were in the range of .50–.94, but the error variances were in the range of

Table 3 The measurement invariance between the GSBP and the GSP

MI	GSBP				GSP			
	CFI	RMSEA [90% CI]	ΔCFI	$\Delta RMSEA$	CFI	RMSEA [90% CI]	ΔCFI	$\Delta RMSEA$
Configural	.957	.059 [.045–.073]			.965	.056 [.041–.070]		
Metric	.959	.054 [.040–.067]	–.002	.005	.961	.056 [.042–.069]	.004	0
Scalar	.946	.059 [.046–.071]	–.014	.005	.950	.055 [.041–.068]	–.011	–.001
Strict	.934	.056 [.044–.068]	–.012	–.003	.933	.061 [.049–.073]	–.017	.006

CFI standards for adequate fit $> .90$. RMSEA for acceptable fit $< .08$. $\Delta CFI \pm .02$; and $\Delta RMSEA \pm .015$, $\Delta SRMR \pm .03$

RMSEA root mean squared error of approximation, SRMR standardized-root mean square residual, CFI comparative fit index



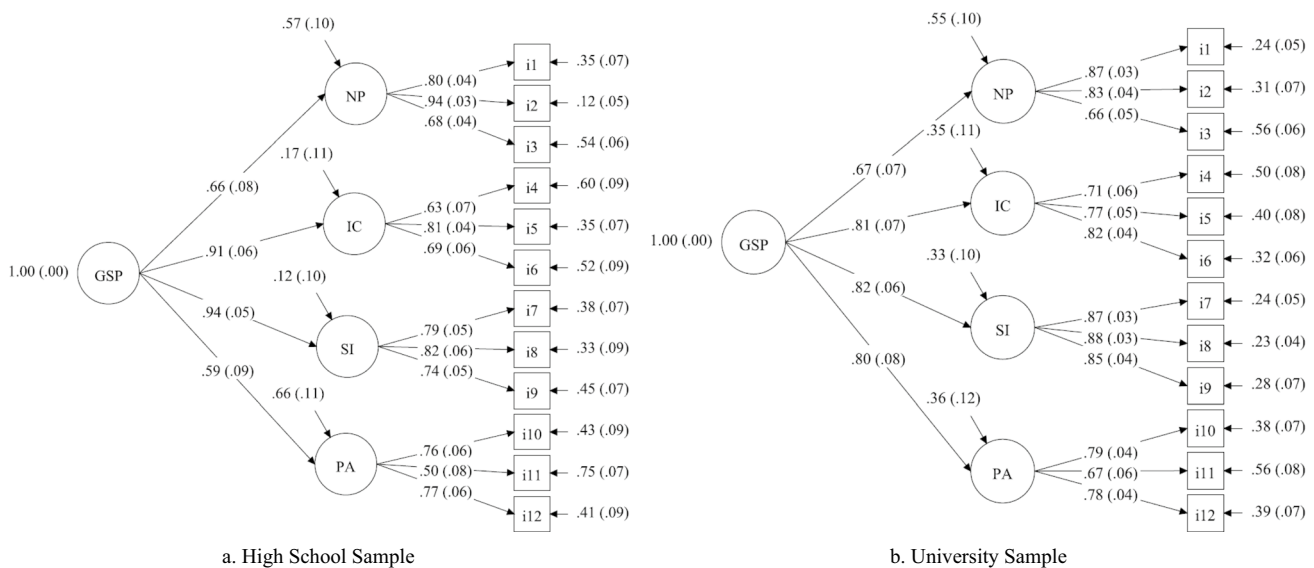
Note. GSBP: Generic Scale of Being Phubbed; PN: Perceived Norms; FI: Feeling Ignore; IC: Interpersonal Conflict

Fig. 1 The second-order CFA results of the GSBP measurement for high school and university students. Note. GSBP, Generic Scale of Being Phubbed; PN, perceived norms; FI, feeling ignored; IC, interpersonal conflict

.12–.75. The standardized path coefficients (factor loads) of the university sample ranged from .66 to .88, while the error variances ranged from .23 to .56. A statistically significant correlation exists between the sub-dimensions and the total scores in both samples. Accordingly, the sub-dimensions are collected and expressed as a single score type.

Discussion

This study aimed to investigate the psychometric properties of the Turkish version of the GSBP and GSP for adolescents and adults. The results indicate that the shortened versions of the GSBP and GSP for Turkish adolescents and adults are psychometrically sound instruments



Note. GSP: Generic Scale of Phubbing; NP: Nomophobia; IC: Interpersonal Conflict; SI: Self-isolation; PA: Problem Acknowledgement.

Fig. 2 The second-order CFA results of the GSP measurement for high school and university students. Note. GSP, Generic Scale of Phubbing; NP, nomophobia; IC, interpersonal conflict; SI, self-isolation; PA, problem acknowledgement

for measuring phubbing in the Turkish population. The confirmatory factor analyses produced a solution with high internal consistency. These results are consistent with the original study in which the GSBP and GSP were devised (Li, 2022). It was found that the 12-item GSBP and 12-item GSP had adequate psychometric properties. GSBP and GSP structures were confirmed in a sample of Turkish adolescents and adults. Regarding construct validity, the findings were similar to those from previous studies (Chotpitayasunondh & Douglas, 2018; Li, 2022). According to correlation analysis, the 12-item GSBP and 12-item GSP were significantly correlated at the scale and dimension levels with the original scales.

This study supports the findings of previous studies. In accordance with reliability and validity analyses, the 12-item GSBP and 12-item GSP were found to be reliable, convergently valid, and discriminantly valid on the dimensional level, as well as internally consistent, convergently valid, and discriminantly valid on the scale level. In this study, the 12-item GSBP and 12-item GSP have been developed and validated, which has allowed the original scales to be reduced to 54.5% and 80%, respectively, with essentially no loss of psychometric properties. Similar 3 and 4 dimensions were found in the study, in which the scales were adapted for Chinese adolescents. In their study, including original versions of the scales, Chotpitayasunondh and Douglas (2018) stated that previous studies (Karadağ et al., 2015; Roberts & David, 2016, 2017) have not indicated the existence of these dimensions and have only suggested unidimensional architectures of these constructions. In this context, it is essential to present the adaptation of these scales with dimensions and being used for both adolescents and adults.

In both samples, it was seen that the sub-dimensions have statistically significant correlations with the total scores. This result means that the sub-dimensions are collected and expressed in a single score type. It is critical that we continue to advance our understanding of phubbing (Chotpitayasunondh & Douglas, 2016). Both scales may be useful additions to studies of mobile phones and daily face-to-face interaction, acting as covariates to broaden our understanding of how individuals respond to communication partners when mobile phones interfere with their social interactions and even threaten their basic needs (Chotpitayasunondh & Douglas, 2018). Such findings could eventually help to enhance thinking on technology-related ostracism and the consequences of phubbing. Because phubbees may be aware of the reasons for being phubbed, future research should concentrate on potential motives that phubbees may attribute to phubbers for their apparent act of phubbing (Chotpitayasunondh & Douglas, 2016).

The current study has some limitations. This study was based on a cross-sectional design, which limits the ability to establish causal relationships between the variables

under consideration. Future research should employ a longitudinal research design to resolve this limitation. The current study presented preliminary evidence suggesting that the concept of phubbing and being phubbed may also be applicable to Turkish culture. The results indicated that the short versions of the GSBP and GSP for Turkish adolescents and adults possess high reliability and validity. The validation of the GSBP and GSP will stimulate a great deal of future theoretical and empirical research on phubbing and phubbing in the relevant literature. Interventions that target phubbing and being phubbed could facilitate more effective communication and socialization, based on the findings of the present and previous studies. The adaptation of the Turkish version is extremely useful for promoting cross-cultural comparisons of phubbing-related research findings.

The validation of the scales will also contribute to a better understanding of the cultural differences and similarities in phubbing research. Moreover, it is important to ensure that this adaptation gives the opportunity to be utilized by adolescents and adults. Future research could test whether the results of this study have similar reliability and validity characteristics in middle school students. We anticipate that these two measures will promote the advancement of scientific knowledge regarding these two phenomena and increase our comprehension of how mobile phone use affects social interactions and relationships among individuals. The adaptation of these scales will contribute to expanding this comprehension in Turkish literature.

Acknowledgements We thank all participants who voluntarily contributed to this study.

Author Contributions Study conception/design: AK and HIO; data collection: NT and HIO; analysis: AK; drafting of manuscript: AK, NT, and HIO; statistical expertise: MS and HIO; administrative/technical/material support: MS and AK; supervision: MY; and writing—review and editing: MY.

Funding The authors received no financial support for the research, authorship, and/or publication of this article.

Data Availability The data that support the findings of this study are available from the corresponding author [MY] upon reasonable request.

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent to Participate Consent was obtained from all participants included in the study.

Conflict of Interest The authors declare no competing interests.

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