Psychometric Properties of the Phubbing Scale among Iranian Students

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ABSTRACT

Aims The purpose of the present study was to investigate the validity and reliability of the Phubbing scale among Iranian students.
Materials & Methods The participants were 330 students of Semnan University who were selected by cluster random sampling. All of them completed the Phubbing scale, the Quality of Relationships Inventory (QRI), and the Mobile-based Social Networking Addiction scale. Reliability analysis, confirmatory factor analysis, and item-total correlation were run to investigate the psychometric properties of the Phubbing scale.
Findings The findings showed that the Phubbing scale was saturated with two factors of communication disorder and mobile phone obsession. Cronbach's alpha of the Phubbing scale was 0.82. Correlation of communication disorder and mobile phone obsession with social networking addiction and quality of the relationship was inconsistent with theoretical orientations.
Conclusion The Persian version of the Phubbing scale has acceptable psychometric properties to the student community and can be used as a reliable instrument in psychological study.

Keywords Communication Disorder; Social Networking; Reproducibility

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Introduction

The present age is the era of the communication revolution, and communication technologies are constantly changing[1]. Undoubtedly, one of the technologies that contribute greatly to human well-being is the mobile phone. This device has been used in various fields of human life and has become a sociocultural product due to its abundant capacities[2]. The mobile phone was initially introduced as a portable device, and after a short time, it radically changed the way of communication among people[3]. Mobile phones are considered to be a barrier to social communications and interactions, and this device, with its many abilities, interferes with interpersonal interactions. In addition, to interpersonal harm, mobile phones harm interactions between parents and children[4], job interactions[5], and education[6]. The use of mobile phones has led to the formation of social contradictions. On the one hand, people always want to socialize and communicate with others. On the other hand, when they face someone, they are neglected by him or her, because they are communicating with others through the mobile phone[3]. One of the benefits of the present study is the focus on identifying the performance of a modern tool that affects interpersonal relationships. Several researchers have been trying to describe this situation and convince people to abandon their mobile phones and talk to each other. In response to this effort, a new word, Phubbing was coined[7]. Phubbing can be described as looking at the cellphone while communicating with others, to avoid friendly communication[8].

Phubbing is a new concept that derives from the two words "Subbing" and "Phone." It describes the action of someone who looks at the cell phone in social environments, directing his or her attention to something else. In 2012, some writers and poets were invited to create a new word to describe this behavior. This term was introduced and used by the Stop Phubbing Campaign[9].

Phubbing harms social interactions and can be observed everywhere[10]. People, instead of face-to-face conversations, tend to communicate virtually with each other. Phubbing has been considered as an attention disorder and followed widespread discussions, and can be found in almost all social groups[11].

Phubbing may occur in a variety of ways. People may send an SMS, surf the web, check the clock, respond to calls, etc. when they are busy with their cell phones[9]. The negative impact of Phubbing behavior in social conversations on nonverbal behaviors is evident from each person when using a mobile phone. During a face-to-face relationship, the relationship between the speaker and the listener is created and maintained using non-verbal behaviors. These non-verbal signs do not exist when people show a Phubbing behavior, and thus may lead to distance and neglect[7]. To establish a satisfactory mutual relationship, individuals must have full attention to each other[12] and it is not sufficient to be in the presence of each other[13]. Leggett[13] defines presence as a process in which we have full attention to others without being distracted by anything from within or outside of our senses.

In principle, people may be physically beside one another, but they are not fully aware of the presence of others[5]. So far, many studies have been conducted on Phubbing. The results of a study[14] showed that the use of mobile phones harms the satisfaction of the relationship among emotional partners, and as the Phubbing increases, the levels of satisfaction from the relationship are reduced. They also found that the use of smartphones along with daily stressors, could have long-term effects on the mental health of the user, and in particular, levels below the satisfaction of the relationship which result from Phubbing are related to lower levels of life satisfaction.

The effect of Phubbing on the satisfaction of the relationship is influenced by the conflicts caused by such behavior[5]. Lenhart and Duggan[15] showed that Phubbing was found among colleagues in addition to spouses [16]. Robert and David[5] showed that among those who experience Phubbing, those with anxious attachment style report a higher level of mobile engagement compared to those who do not have anxious attachment style and the negative effects of Phubbing increase over time.

Researchers have devised an instrument to measure Phubbing in individuals. This instrument is a ten-item questionnaire that has two components called communication disorder and obsessive-compulsive disorder. Kardag et al.[8] conducted the exploratory analysis of the Phubbing determinants in six stages and encountered these two factors, and Bartlett's test was equal to KMO=0.87 (p≤0.01), and the Cronbach's alpha coefficient was calculated for each factor. Cronbach's alpha value for communication disorder and the obsessive-compulsive disorder was 0.87 and 0.85, respectively. However, a recent study has shown that the Phubbing scale has a four-factor structure[17]. Since individuals who are addicted to social networks spend a lot of time using mobile phones, the social networking addiction scale was used as evidence for convergent validity. Moreover, because of the impact on interpersonal relationships, the Quality of Relationships Inventory (QRI) was used as evidence for divergent validity. According to the literature available, and because there was no instrument to measure Phubbing in Iran, the present study aimed at studying the psychometric properties of the Phubbing scale.

Materials and Methods

This is a correlational study. The statistical

population of the present study included all students of Semnan University who were studying at this university in the academic year of 2017-2018. There is no consensus on the sample size needed for factorial analytical and structural modeling. However, many researchers believe that the minimum sample size required for this purpose is 200 participants[18]. Brown[19] also believes that in an exploratory analysis for each variable, 10 to 20 samples are needed, and at least the size of 200 is defensible. However, in confirmatory factor analysis, many rules of thumb have been offered, including minimum sample size (e.g., N≥100-200), the minimum number of cases per each freed parameter (e.g., at least 5-10 cases per parameter), and the minimum number of cases per indicator in the model. If structural equation modeling is used, a sample size of about 20 is required for each variable. The recommended sample size for the confirmatory factor analysis is about 200 for 10 factors [20]. Therefore, based on the viewpoints mentioned in this study, a sample size of 330 was chosen using the cluster sampling technique. 316 cases were analyzed (missing data= 14).

The mobile-based social networking addiction scale
This scale was designed by Khajehahmadi *et al.*[21], which has 23 items that measure 4 factors including individual performance, time management, self-control, and social relationships. The questionnaire is on a 5-point Likert scale (strongly agree= 1 and strongly disagree= 5). Khajehahmadi *et al.*[21] used Cronbach's alpha method to determine the reliability of the questionnaire. The coefficient of 0.927 was calculated for the whole scale. The Cronbach's alpha coefficients for the subscales of individual performance, time management, self-control, and social relation were 0.907, 0.816, 0.724, and 0.681, respectively. To determine the validity of this scale, only qualitative face validity was used based on the viewpoints of 5 experts. In this study, the content validity index and content validity ratio were not presented.

The Quality of Relationships Inventory (QRI)
This scale was developed by Pierce[22]. It contains 25 items and has 3 subscales of perceived social support, interpersonal conflicts, and depth of relationships. Moreover, in each of the 25 items, you must evaluate the quality of your relationship with your parents and friends. The scoring of each item is from zero (0), low (1), average (2), and high (3). In this scale, the minimum score is zero and the maximum score is 100, and higher scores represent the quality of the relationships. The reliability of this scale has been calculated as 0.83 using the test-retest method.

The Phubbing scale
This scale is made by the Stop Phubbing Campaign and has 10 items which are twofold. The questionnaire is on a five-point Likert scale (1=not

at all true of me, 5= extremely true of me). The first five questions measure relational disorder and the second five questions measure obsessive-compulsive disorder. Question 5 was reversely scored. The reliability of the scale was calculated using Cronbach's alpha method[8]. The reliability coefficients for communication disorder and mobile phone obsession were 0.87 and 0.85, respectively. In this study, the reliability coefficients for communication disorder, mobile obsession, and the total score were 0.70, 0.81, and 0.82, respectively.

To conduct the study, the questionnaire was first translated by two experts from English to Persian. Then, back-translation was done. Problems with the translation of the items were resolved. In a preliminary study, a translated questionnaire was administered to a sample of 24 students. After collecting the questionnaires, words that were not understood by the students were rewritten and replaced by the closest word. The final version of the questionnaire was administered to 425 students among whom 95 of them filled out the questionnaire incompletely. So, they were excluded from the study. Confirmatory factor analysis and reliability analysis were run using Cronbach's alpha. In addition, the convergent and divergent validity of the scale was calculated using a mobile-based social networking addiction scale and the QRI.

Findings
The demographic characteristics of the participants were reported in Table 1.

Table 1) Demographic characteristics of the sample

Variable	Frequency	Percentage
Gender		
Male	95	29
Female	221	67
Miss	14	4
Marital status		
Single	26	80
Married	44	13
Other	3	1
Miss	18	6

The Age mean of participants was 21.13±3.16. The female-to-male ratio is 2.3: 1 (X^2=50.24, p<0.001). The ratio of single to married is about 6:1 (X^2=158.06, p<0.001). To perform a confirmatory factor analysis, first, the univariate and multivariate skewness of the data was investigated and the maximum likelihood estimation was used. Root mean square error of approximation, standardized root mean square residual, comparative fit index, the goodness of fit index, and adjusted goodness of fit index were used to assess the fitness of the model. Different cut-off points have been proposed by experts for fit indices. For example, the value equal to or less than 0.05 for the root mean square error of approximation, the value equal to or greater than

0.96 for the comparative fit index, and the value equal to or less than 0.07 for the standardized root square mean residual indicates the adequate fit of the model[23]. On the other hand, it has been suggested that if the value of comparative fit index, goodness of fit index, and adjusted goodness of fit index is greater than 0.9, and if the value of root mean square error of approximation and standardized root mean square residual is smaller than 0.5, it is regarded as a very good fit and if it is smaller than 0.1, it is regarded as a good fit[24]. The fit indices of the final version of the questionnaire were evaluated. The findings showed that some of the fit indices indicated the desired fit of model data (Table 2).

Table 2) Fitting indices of the two-factor model of Phubbing scale (n= 330)

Indices	Two-factor model
X2	97.54
CFI	0.96
IFI	0.96
NFI	0.94
NNFI	0.95
RMSEA	0.07
RMSEA CI90	0.06-0.09
RMR	0.10
SRMR	0.06
GFI	0.94
AGFI	0.90

In this model, X^2= 97.54, and if df= 41, the X^2 to df ratio is 2.86.
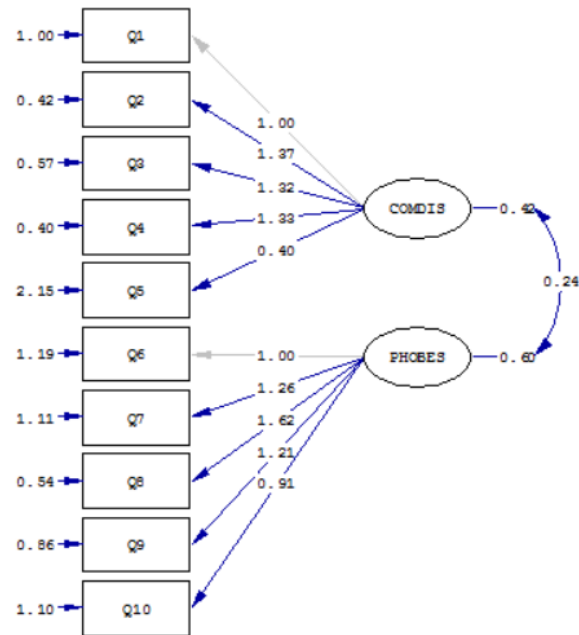
Estimation of parameters
Given the fact that the two-factor model showed a relatively good fit with ten items, standard coefficients, false sentences, and explained variance (R^2) were examined (Figure 1 and Table 3).
All path analyses were significant. In the first factor, item 2 had acceptable reliability (R^2= 0.65). The estimation of the reliability of item 5 was relatively low, thus, the most reliable and strongest indicator of the latent construct of communicative disorder was item 2. For the latent construct of mobile obsession, item 8 had acceptable reliability (R^2= 0.74). The reliability of the other items was also acceptable. The most reliable and the strongest indicator of the latent construct of mobile obsession was item 7.

Convergent and divergent validity
To calculate the convergent and divergent validity of the Phubbing scale, it was simultaneously administered to the participants with the mobile-based social networking addiction scale and Quality of Relationships Inventory (QRI). Regarding divergent validity evidence, findings show that there is a negative relationship between communication disorder and subscales of quality of relationships, parental support, and the depth of relationships between friends and parents. Findings of convergent validity show that there is a positive and significant

correlation between communication disorder and parents' and friends' conflicts subscales (Table 4).

Figure 1) Final measurement model of phubbing (metric coefficients were reported)

Table 3) Standard parameters estimation of phubbing scale (n= 330)

Phubbing subscales	No. items	Standard coefficients	Error variance	R^2
Communication disorders	1	0.64	0.70	0.29
	2	0.88	0.35	0.65
	3	0.85	0.43	0.56
	4	0.85	0.35	0.64
	5	0.25	0.97	0.03
Mobile obsession	6	0.77	0.66	0.23
	7	0.97	0.53	0.46
	8	0.25	0.25	0.74
	9	0.94	0.49	0.50
	10	0.70	0.69	0.31

Besides, the findings of convergent validity indicate that there is a positive and significant correlation between mobile phone obsession and parents and friends conflicts at p<0.01. There is a positive and significant correlation between communication disorder and obsessive-compulsive disorder and all components of social network addiction, individual performance, time management, individual control, and social relationships.

Reliability
The reliability of the Phubbing scale was calculated using internal consistency and Cronbach's alpha coefficient. The results showed that the overall reliability of the scale was 0.82. The reliability coefficients of the components of communication disorder and mobile phone obsession were 0.70 and 0.81, respectively.

Table 4) Correlation phubbing components, social networking addiction, and quality of relationship

Subscales	1	2	3	4	5	6	7	8	9	10	11
1- Communication disorders	1										
2- Mobile obsession	0.47**	1									
3- Parents' support	-0.12*	-0.005	1								
4- Friends' support	-0.12*	-0.01	0.98**	1							
5- Parents' conflict	0.26**	0.22**	-0.78**	-0.07	1						
6- Friends' conflict	0.26**	0.21**	-0.08	-0.07	0.99**	1					
7- Depth of parents' relationships	-0.12*	0.09	0.68**	0.69**	0.07	0.07	1				
8- Depth of friends' relationships	-0.12*	0.10	0.67**	0.69**	0.07	0.08	0.98**	1			
9- Individual performance	0.48**	0.42**	-0.13*	-0.12*	0.43**	0.43**	-0.14*	-0.11*	1		
10- Time management	0.45**	0.51**	-0.10	-0.02	0.32**	0.31**	-0.02	-0.02	0.71**	1	
11- Individual control	0.40**	0.44**	-0.11*	-0.10	0.35**	0.34**	-0.14*	-0.11*	0.63**	0.63**	1
12- Social relations	0.25**	0.41**	-0.12	-0.01	0.26**	0.26**	0.07	0.06	0.43**	0.51**	0.56**

Discussion

Phubbing has been introduced around the world to describe the action of someone who directs his or her attention toward something else by looking at his or her mobile phone. The purpose of the current study was to investigate the validity and reliability of the Phubbing scale among Iranian students. The confirmatory factor analysis findings confirm the fit of the two-factor model. These findings were consistent with study of Karadag *et al.*[8]. Cronbach's alpha coefficient was used to examine the reliability of the Phubbing scale. The results showed that this scale had acceptable reliability. The reliability coefficients for the communication disorder and mobile phone obsession were 0.42 and 0.44, respectively and can be used to measure Phubbing. These findings were consistent with study of Karadag *et al.*[8].

Also, to calculate the validity of the Phubbing scale, it was simultaneously administered to the participants with the mobile-based social networking addiction scale and Quality of Relationships Inventory (QRI). According to the previous studies, they had significant relationships with the Phubbing scale[5, 8]. Divergent validity evidence showed that the Phubbing subscales had a negative relationship with perceived social support and the depth of relationships and they had a positive relationship with interpersonal conflicts. On the other hand, evidence of convergent validity showed that there was a positive and significant correlation between Phubbing subscales and social network addiction.

The first limitation of the present study is that it is unclear how relevant the scores of this instrument are to real behaviors in everyday life, and other limitations of this instrument are related to the time and place. This study was conducted on students at Semnan University. So, caution should be exercised when generalizing the results. Based on these limitations, it is suggested that the Phubbing scores be matched with true behavioral dimensions in everyday life to be able to generalize the scores of this instrument in real-life situations.

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