Developing the Social Media Addiction Scale: Validity and Reliability Studies*

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Abstract

The aim of this research is to develop a measurement tool with a high level of reliability and validity for determining the social media addiction levels of university students. The researcher created 54 items related to its structure through a literature review, and seven experts were consulted for their opinions of the form prepared by the researcher. The scale, graded in five categories using 41 items in line with the experts’ opinions, has been applied to 523 university students. Exploratory factor analysis was performed, and as a result, the scale is found with three factors. Of these three, the factor of Functional Deterioration by itself accounts for 42.626% of the covariance, the factor of Control Difficulty and Deprivation for 9.517% of the covariance, and finally the factor of Social Isolation for 5.608% of the covariance. The factor loadings for the 26-item scale range from 493 to 792. The correlation between the scale developed for criterion validity and the Problematic Internet Usage Scale is 0.75. The Cronbach alpha of internal consistency has been calculated as .95 for the scale, .92 for the sub-dimension of control difficulty and deprivation, .91 for the sub-dimension of functional deterioration, and .81 for the sub-dimension of social isolation. In the light of these results, the Social Media Addiction Scale can be said to be a valid and reliable measurement tool.

Keywords
Social media • Addiction • Validity • Reliability

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One of the most basic indicators of the technology age, social networks draw the attention of everyone in every age group, and the virtual world runs ahead of real life through the applications it presents. Known as an extension of Internet technology, social media attracts young people in particular. Social media addiction has gradually been increasing in Turkey and the world (Kırık, Arslan, Çetinkaya, & Gül, 2015). For this reason, the aim of this research is to develop a measurement tool for determining the extent of the increased use of social media.

**Method**

**Study Group**

The study group of this research is comprised of 523 university students studying at Mersin University in the 2016-2017 academic year. The study group has been identified using the simple random sampling method. A second sample of 116 university students has been employed to verify the scale’s validity.

**Data Collection Tool**

The Problematic Internet Usage Scale (PIUS). PIUS, which has been used for criterion validity in this study, was developed by Ceyhan, Ceyhan, and Gürcan (2007) to determine university students’ problematic internet usage levels. It is a five-point Likert-type measurement tool with 33 items. Two items (7 and 12) in the scale are reverse-scored. The alpha internal consistency coefficient of the scale is .94. The alpha internal consistency coefficient for the data collected from the study group in this study has been found as .93.

**Scale Development Process**

While creating items for the social media addiction scale, the Internet, Game, and Television Addiction Scales were benefited from in relation to this subject and the DSM-5 addiction criteria (Ceyhan et al., 2007; APA, 2013; Günc & Kayri, 2010; Horzum, Ayas, & Çakir Balta, 2008; Kaya, 2013); 54 items on social media addiction have been written in light of the literature. The test form, which had been planned and organized with these items, was submitted to seven experts, three in the field of measurement and evaluation and four in the field of guidance and psychological counseling. After considering the expert opinions, some items were removed from the scale while others were revised. A detailed expert opinion form was drawn up for receiving expert opinions. A qualitative analysis was performed on the form, and a test form was developed. As a result, a 41-item form was created. Answers to these items are scored using a five-point Likert scale where “always” is worth 5 points; “often,” 4; “sometimes,” 3; “rarely,” 2; and “never,” 1.
Data Analysis

Data obtained from the study has been analyzed using the program, SPSS 20.0. An exploratory factor analysis (EFA) was conducted to reveal the scale’s structure. As a result of the analysis, total-item correlations, Cronbach’s alpha reliability coefficient, common factor variances, factor loadings, and post-rotation factor-load values for the items in the scale have been calculated.

Because exploratory factor analysis has highly multivariate statistics, basic assumptions (missing data issues, single and multiple outliers, single and multiple normal distributions, $R$-factoring, multicollinearity problems, error independence, etc.) have been examined prior to carrying out these analyses, thus preparing the data for analysis.

When determining the structure of the measurement tool, having a covariance greater than 0.40, factor loadings greater than .45, and each item’s factor-loading between factors less than .10 were taken into consideration, in addition to the scree plot and the total explained variance (Tavşancıl, 2006; Tabachnick & Fidell, 2015).

Findings

As stated in the data analysis section, the assumptions of exploratory factor analysis were first examined. In this respect, the missing data were looked for and seen to not be a problem. Missing data for each cell is less than 5%. $Z$ values and Mahalanobis distances were examined for univariate and multivariate outliers, respectively. Three pieces of data were determined as univariate outliers out of the $Z$ value between +3 and -3, and based on the chi-square distribution, 42 data above the value of $\chi^2_{(41, 0.05)} = 74.752$ were also specified as multivariate outliers. At this stage, these values were not included in the analysis because they violate single and multiple normal distributions (Tabachnick & Fidell, 2015). Tolerance and $VIF$ values were examined for multicollinearity issues. When examining the items, no multicollinearity issue was seen due to tolerance values being greater than 0.20 and $VIF$ less than 5. The Durbin-Watson statistic for independence of error was found as 2.185. The Durbin-Watson statistic calculated in a data set should be close to 2 (Tabachnick & Fidell, 2015), therefore the errors are independent of each other. A sufficient number of sampling needs to be achieved in order to be able to conduct factor analysis (Çokluk et al., 2014; Guilford, 1954; Tabachnick & Fidell, 2015). The number of data in the group was determined to be sufficient for developing the scale. The Kaiser-Meyer-Olkin ($KMO$) coefficient was also examined in order to determine whether the data are appropriate for factor analysis. $KMO$ was calculated as 0.96 for the purpose of evaluating the adequacy of the sample. For the correlation matrix in the study, Bartlett’s sphericity test was found to be statistically significant ($\chi^2 = 7,945.070, p <$
.01), which shows the matrix to be suitable for factor analysis. Whether a relationship exists between the factors was examined in order to be able to decide on the rotation technique. Varimax technique, one of the orthogonal rotation techniques, was used, as binary relationships between factor scores obtained from factor analysis were not significant ($p < .05$; Çokluk et al., 2014; Tabachnick & Fidell, 2015).

In order to test the construct validity of the Social Media Addiction Scale and to reveal its structure in the applied group, principal component analysis was carried out with the remaining 523 units of data as a result of the assumptions.

In the first stage, the communalities of the items were examined as the result of the un-weighted least-squares method, which was made to minimize the total square of the difference between the observed and estimated correlation matrices. Four items with a covariance of less than 0.40 were excluded from the analysis. Factor loads were then examined, and four items with factor loads less than 0.45 were excluded from the analysis. Finally, the factor loads of the items between factors were examined, and six items with values less than 0.10 were excluded from the analysis. Upon examining the final state of the factor loads, the only item left with a factor load under a sub-factor was removed from the analysis. After this process, the exploratory factor analysis was repeated (Çokluk et al., 2014; Tabachnick & Fidell, 2015).

When determining the factor number of the scale, the scree plot, amount of total variance, and eigenvalues of the total variance were taken into account. The total variances explained for the scale are given in Table 1.

<table>
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<tr>
<th>Component</th>
<th>Initial eigenvalues</th>
<th>Total subtraction of squared loads</th>
<th>Rotation sum of squared loads</th>
</tr>
</thead>
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<td>Cumulative %</td>
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<td>42.626</td>
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<tr>
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<tr>
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</table>

Table 1 shows the scale to have a 3-factor structure. When examining the total variances, the eigenvalues of these three factors are 11.509, 2.570, and 1.514 for the 1st, 2nd, and 3rd factors, respectively. The total variance explained by these three factors is 57.751%. The scree plot for these factors is shown in Figure 1.
When the sharp declines in the scree plot in Figure 1 are examined, it is considered that the scale has a 3-factor structure. These factors and the distribution of the items in these factors, the communality of the items, the factor loadings of the items, the item-test and the item-subtest correlations are given in Table 2 below.

Table 2

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<th>Factor 2</th>
<th>Factor 3</th>
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<th>Item-Subfactor 2 Score</th>
<th>Item-Subfactor 3 Score</th>
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</table>

F1: Factor 1 (Functional Deterioration), F2: Factor 2 (Control Difficulty and Deprivation), F3: Factor 3 (Social Isolation).
When examining Table 2, items’ covariance values range from 0.424 to 0.696. The Social Media Addiction Scale is seen to consist of 26 items and has a 3-factor structure. Ten items are found in the sub-dimension of functional deterioration, 12 items in the sub-dimension of control difficulty and deprivation, and four items in the sub-dimension of social isolation. The factor loadings of the items in functional deterioration range from .572 to .752; for control difficulty and deprivation, from .493 to .792; and for social isolation, from .657 to .771.

As seen in Table 2, item correlations for the sub-factor of functional deterioration with their total score are between .610 and .742; while the correlations with the sub-factor scores of functional deterioration vary between .679 and .813. The item correlations for the sub-factor of control difficulty and deprivation with their total score are between .643 and .748, while the correlations for this sub-factor’s scores vary between .650 and .815. Lastly, item correlations for the sub-factor of social isolation with their total score range between .495 and .650, while the correlations with the sub-factor’s scores vary between .668 and .791.

Correlation coefficients for the Problematic Internet Usage Scale (PIUS), which was developed by Ceyhan et al. (2007) on Internet addiction to identify another type of addiction, have been examined to provide evidence for the criteria validity of the Social Media Addiction Scale. The study has been conducted over 116 university students. The standard values of skewness and results of the Kolmogrov-Smirnov normality test have been examined with the total scores of the PIUS and the Social Media Addiction Scale to determine whether it has normal distribution. The Pearson correlation coefficient for the total PIUS score with the total score from the Social Media Addiction Scale has been found as 0.75 ($p < .000$). The existence of a significant relationship between these two scales has been able to verify the validity of the Social Media Addiction Scale.

Internal consistency coefficients for the reliability of the social media addiction scale have been calculated. Cronbach’s alpha coefficient for the scale’s internal consistency has been calculated as .95 for the whole scale, .92 for the sub-dimension of control difficulty and deprivation, .91 for the sub-dimension of functional deterioration, and .81 for the sub-dimension of social isolation.

**Results**

The scale consists of 26 items. As a result of the exploratory factor analysis, a 3-factor structure emerged from examining the scree plot and item-load values. The first factor consists of 12 items and has been called *functional deterioration*; the second factor is composed of 10 items and has been called *control difficulty and deprivation*; and the third factor is comprised of four items and has been called *social isolation*. The
scale has no reverse-scored items. The score for social media addiction is obtained by adding the items from all three sub-dimensions. The minimum obtainable score from the Social Media Addiction Scale is 26, while the maximum score is 130. As the score on the scale increases, the level of addiction to social media also increases.

Kaynakça/References


