Turkish Adaptation Study of Internet Addiction Scale

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Abstract

The purpose of this study was to adapt the Internet Addiction Scale (IAS) for Turkish-language use and test the validity and reliability of the scale. This study was conducted in four phases: (a) translation, (b) validity and reliability, (c) discriminant validity, and (d) test–retest reliability of the IAS. To examine language equivalence, both Turkish and original versions of the IAS were administered to students studying English-language education. Since the questionnaire has high levels of language equivalence, validity and reliability studies were conducted. To determine construct validity, exploratory and confirmatory factor analyses were employed. To ascertain reliability, internal consistency and test–retest analysis were conducted. Results demonstrate that the Turkish version of the IAS is a valid and reliable measure.

Introduction

THE INTERNET IS ONE of the technologies used most frequently for communication. It is important to use the Internet functionally and in a healthy manner. Unfortunately, some individuals use it in an unhealthy manner. The term *Internet addiction* describes problematic, excessive, or unhealthy use of the Internet,[2–4] a problem that becomes pathological for some individuals.

Derived from substance-dependence criteria of the Diagnostic and Statistical Manual–Fourth Edition (DSM-IV),[5] *addiction* is an apt, commonly understood word to describe excessive appetitive behaviors, but it has the important disadvantage of being identified with drugs that have an effect on the central nervous system. The first definition for an Internet-related disorder, *Internet addiction disorder (IAD)*, is a behavioral addiction, which consists of six core components: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse.[2] Internet addiction has been termed *technological addiction* and has been operationally defined as a nonchemical (behavioral) addiction, which involves human–machine interaction. Internet addiction can be either passive (e.g., television) or active (e.g., computer games) and usually contains inducing and reinforcing features, which may contribute to the promotion of addictive tendencies.[6] Internet addiction is typically defined as an impulse-control disorder that does not involve an intoxicant, and its common symptoms are a preoccupation with Internet use; lying about behavior; psychological withdrawal when offline; jeopardizing significant relationships, job, educational, or career opportunities because of the Internet; and an inability to control use.[7] Besides these common symptoms, Internet addicts experience sleep depravation, moderate physical complaints, back strain, eyestrain, carpal tunnel syndrome, and frequent time distortion. Behavioral addictions feature core components of addiction (i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse).[2] Internet addicts reflect the general symptoms (preoccupation, tolerance, withdrawal, loss of control, life consequences, concealment) of Internet addiction.[8]

Experts who study Internet addiction have developed criteria to determine if an individual is an addict. One criterion is staying online for pleasure averaging 38 hours or more per week.[9] Students use the Internet, on average, 4.2 hours per week for personal or leisure activities, 2.7 hours for academic tasks, and 1.2 hours for professional work; and the total number of hours online for all activities was, on average, 8.1 hours per week.[6] Dependent Internet users report more personal or leisure time online (7.8 hours per week) than do nondependent users (3.7 hours per week).

A cutoff score of 5 criterion[9] to define Internet addiction, in addition to time used online per week, was consistent with the number of criteria used for pathological gambling. However, only 8 of the 10 criteria for pathological gambling were used for this study; 2 were not used for this adaptation because they were not applicable to Internet addiction. Therefore, for this Internet addiction study, meeting 5 of 8 rather than 10 criteria was hypothesized to be a slightly more

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rigorous cutoff score to differentiate normal from addictive Internet use. Seven significant criteria for the diagnosis of Internet addiction were enumerated as withdrawal, tolerance, preoccupation with the substance, heavier or more frequent use of the substance than intended, centralized activities to procure more of the substance, loss of interest in other social, occupational, and recreational activities, and disregard for the physical or psychological consequences caused by use of the substance.[9]

Since some individuals use the Internet to problematic, excessive, or addictive degrees, whether they are addicts or not should be determined. For diagnosis, a functional Internet addiction scale with a strong theoretical structure is required. This scale is the Internet Addiction Scale (IAS), developed on DSM-IV criterion. The purpose of the present study was to adapt the IAS, originally developed in a research study,[1] into Turkish and to conduct validity and reliability studies of the questionnaire.

Validity and Reliability Studies of the Internet Addiction Scale

The questionnaire assesses the characteristics of Internet addiction. Construct responses were given on a 4-point Likert-type scale, ranging from 1, *very unlike me* to 4, *very like me*, to evaluate how often participants act in the manner stated in each of the items. This 26-item scale included 5 subscales: compulsive use, withdrawal, tolerance, time management problems, and interpersonal and health problems. The Turkish adaptation study of the IAS was conducted in four phases: (a) translation, (b) validity and reliability, (c) discriminant validity, and (d) test–retest reliability. Statistical analyses are conducted using SPSS (Statistical Package for Social Sciences) and STATISTICA software.

The DSM-IV criteria included substance abuse and dependence. The subscale of interpersonal and health problems in IAS were related to the core criterion of substance abuse. The subscale for withdrawal and tolerance in IAS was related to the core criterion of substance dependence. The scores for each subscale represent the severity of different problematic Internet behaviors, and the total score of the IAS represents the severity of the overall Internet addictive behavior.[10]

Phase 1: IAS translation

Participants. The participants in the first phase were students studying English-language education at Selcuk University. The original form of the IAS and its Turkish version were administered to 96 volunteer students to check language equivalence of the IAS. Since the English students may have remembered their answers on the first administration, a 2-week interval was used between the two administrations.

Procedures. Phase 1 involved translation of the IAS into Turkish. Following the procedure suggested in the literature,[11,12] the validation of the translation was made by translation and countertranslation. The IAS was translated from English to Turkish independently by the authors and the professional translators, three faculty members who work in the Department of English Language Education at Selcuk University. Also, the Turkish version was back-translated to English by a bilingual person for crosschecking. Then, the

TABLE 1. RESULTS RELATED TO FACTORS

Factor	Variance	Variance (%)	Total variance (%)
1	10.39	39.99	39.99
2	2.34	9.03	49.03
3	1.66	6.40	55.44
4	1.13	4.35	59.79
5	1.03	4.03	63.83

two translated forms were compared and modifications made accordingly. The changes were mainly related to different alternatives of synonymous words. The structure or the meaning of the scale items was not changed.

Results. A significant positive relationship was found between the scores from the Turkish and English forms of the IAS administered over a 2-week period ($r = 0.96$, $p < 0.001$). Therefore, the translated version was accepted as equivalent to the original.

Phase 2: IAS validity and reliability

Participants. Validity and reliability studies of the IAS were conducted with 146 (42% female; 58% male; $M = 21.48$ years; $SD = 1.83$) university students.

Procedures. Phase 2 involved testing the construct validity of the Turkish IAS. The factor validity of the five subscales was examined using confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett Test of Sphericity (BTS) were applied to the data prior to factor extraction to ensure the characteristics of the data set were suitable for exploratory factor analysis. Since the KMO and BTS results indicated the data satisfied the psychometric criteria for factor analysis, the EFA was performed. CFA was conducted to determine whether the 5-factored constructs in the original IAS achieved a good fit with the data collected in the current study. Furthermore, item-total correlations and Cronbach's alpha internal consistency coefficient were calculated.

Results. Before conducting factor extraction, the KMO and BTS were applied to ensure characteristics of the data set were suitable for factor analysis. KMO analysis yielded an index of 0.893, and BTS yielded 2,125.673, $p < 0.001$. Five factors with eigenvalues greater than 1 emerged from the analyses of the IAS.

All 5 factors explain 63.83% of the total variance (see Table 1). This variance rate suggests this scale might be eval-

TABLE 2. RESULTS RELATED TO ITEMS IN THE FACTOR ANALYSIS

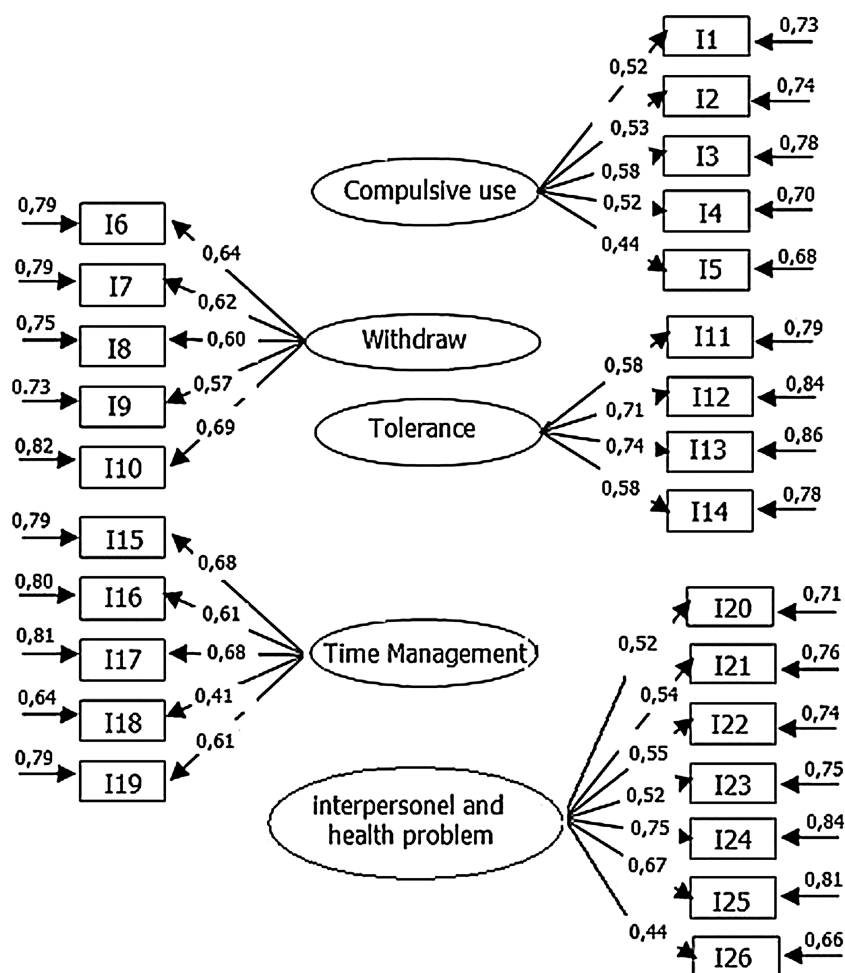| Item no.	F1	F2	F3	F4	F5
1	0.59	0.68	0.77	0.48	0.75
2	0.49	0.75	0.79	0.52	0.77
3	0.73	0.68	0.80	0.50	0.71
4	0.44	0.69	0.52	0.65	0.60
5	0.59	0.70	—	0.55	0.68
6	—	—	—	—	0.65
7	—	—	—	—	0.72

FIG. 1. Factor-item relations.

uated as a scale formed from the 5 factors. Variance rotation was made again for the questions to be distributed into 5 factors. The KMO and BTS results indicate the data satisfied the psychometric criteria for a factor analysis to be performed.

As seen in Table 2, the factor loads related to the 26 questions on the trial scale ranged from 0.44 to 0.80. From this point, it was determined these questions were qualified sufficiently to be included in the scale. The distributions of the survey items to the factors, which remained on the scale at the end of the factor analysis and factor loads, are shown in Table 2. The first 5 questions on the scale are in the first factor, the next 5 questions are in the second factor, the next 4

questions are in the third factor, the next 5 questions are in the fourth factor, and the last 7 questions are in the fifth factor.

To determine the factor structure of the IAS, CFA was employed. The fit indexes of CFA were χ^2 ($df = 299$, $p = 0.000$) $= 906.26$, $\chi^2/df = 3.03$, *SRMR* (standardized root-mean-squared residual) $= 0.08$, *GFI* (goodness-of-fit index) $= 0.66$, *AGFI* (adjusted goodness-of-fit index) $= 0.61$, and *RMSEA* (root-mean-squared error of approximation) $= 0.11$. Analysis results of CFA demonstrate the model is coherent (see Fig. 1).

As seen in Figure 1, the factor loadings of the items changed between 0.41 (item 18) and 0.75 (item 24), and all loadings were statistically significant ($p < 0.05$). The mean and

TABLE 3. PEARSON CORRELATION COEFFICIENTS AMONG INTERNET ADDICTION SUBSCALES

	Pearson coefficients				
Factors	*1*	*2*	*3*	*4*	*5*
1. Compulsive use	—	0.69*	0.55*	0.64*	0.58*
2. Withdraw		—	0.55*	0.54*	0.51*
3. Tolerance			—	0.61*	0.55*
4. Time management problem				—	0.79*
5. Interpersonal and health problem					—
Total score of the scale	0.82*	0.79*	0.77*	0.87*	0.86*

*$p < 0.001$.

standard deviation values of the factors of IAS, and also the interfactors and factor-total point correlations, are given in Table 3.

For validity of the scale, Cronbach's alpha coefficient was used. The internal reliability score of the scale was 0.94. The internal consistency scores for each subscale calculated were found to be 0.86 for compulsive use, 0.90 for withdraw, 0.91 for tolerance, 0.89 for time management problem, and 0.91 for interpersonal and health problems. Item-total correlations ranged from 0.64 to 0.86 for the 26 items. When the correlations between the factor scores were examined, highly positive and strong relationships were seen among all 5 factors of the scale. Also, a positive correlation was determined between the subscales and the total score of the scale.

Phase 3: Discriminant validity

Participants. Discriminant validity studies of the IAS-Turkish form were conducted with 240 (57.1% female; 42.9% male; $M = 22.17$ years; $SD = 2.88$) university students.

Procedures. In this phase, a research study was carried out for the criterion-related validity. The correlation between the Internet Addiction Scale and the Internet Diagnostic Questionnaire was determined.

Instruments. The Internet Diagnostic Questionnaire (IDQ)[4] is based on the definition of pathological gambling used by DSM-IV.[13] Individuals who answered yes to 5 or more of the 8 questions were classified as Internet addicts, while those who answered yes to fewer than 5 questions were considered nonaddicts.[4]

Results. Evidence of convergent and discriminant validity was provided by correlating scores on the Internet addiction subscales with the IDQ. Each of the subscales was statistically significantly related to the IDQ. Correlations with the IDQ were 0.40 ($p < 0.01$) for the compulsive use subscale, 0.27 ($p < 0.01$) for the withdraw subscale, 0.31 ($p < 0.01$) for the tolerance subscale, 0.32 ($p < 0.01$) for the time management problem subscale, and 0.33 ($p < 0.01$) for the interpersonal and health problems subscale.

Phase 4: Test–retest reliability

Participants. Test–retest reliability analysis was conducted with 62 students (56.5% female; 43.5% male) ($M = 20.79$ years; $SD = 1.46$) studying in the Department of Computer and Educational Technologies Education, Ahmet Kelesoglu Education Faculty, Selcuk University.

Procedures. In Phase 4, the test–retest reliability of the Turkish IAS was checked. The questionnaire was administered twice with an interval of 3 weeks between the two stages of administration.

Results. After the Turkish version of the IAS was administered twice, a reliability coefficient of 0.88 was determined.

Discussion

When the studies regarding the scale development[14,15] and adaptation[11,12,16] were examined, a systematic and step-by-step approach was followed for the validity and reliability of the scale. In this study, a similar process was completed, and the validity and reliability of the IAS were checked with a group of university students. First, the original scale, composed of 26 items, was translated into Turkish. A significantly positive correlation was determined between the scores obtained from the English form and the Turkish form of the scale. This shows that the language equivalence was obtained and the scale was appropriate for the Turkish culture. The correlation between the language equivalences of English and Turkish applications of the IAS was statistically significant.

EFA and CFA were conducted to examine the construct validity and the factor structure of the IAS. Based on the EFA result, the scale shows a 5-factored structure. Since there are no statistical data available related to construct validity of the IAS, with this adaptation study and the EFA and CFA, construct validity of the scale was checked and found to statistically confirm the scale shows a 5-factored structure. CFA indicated a 5-factor model of the IAS has good psychometric properties and fits the data well.[17,18] Although there is a sudden decrease in the scree plot line graphic and eigenvalues between the first and second factors are five times greater, CFA of IAS show a 5-factored structure because the term *Internet addiction* has a very strong theoretical structure based on DSM-IV. At the same time, experts have included the factors similar to the 5-factored structure and confirmed by CFA among the Internet addiction criteria.[2,7–9]

For scales used in research, the level of an acceptable Cronbach's alpha coefficient is suggested as 0.70.[19,20] In a previous study, the IAS scale showed a high internal consistency reliability (Cronbach's α between 0.78 and 0.81) and fitting factor structure.[10] In the present study, Cronbach's alpha coefficient of the subscales of the measure shows the internal consistency of the scale and also shows that item-total correlations of the scale items are quite high. Each of the IAS subscales is statistically and significantly related to its corresponding IDQ. Briefly, the number of Internet addicts has been increasing. Therefore, measures that are valid and reliable and also based on a theoretical structure are required to determine the level of addiction. Although the Internet globalizes the world rapidly, these measures should have language equivalence and also construct-discriminant validity.

Disclosure Statement

No competing financial interests exist.

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