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Research Article

The Turkish Adaptation Study of the Digital Addiction Scale For Children: A Validity and Reliability Study

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Abstract

Objective: The study was conducted to perform the Turkish validity and reliability study of the Digital Addiction Scale for Children (DASC).

Methods: The study was completed with 259 students (primary school 4th grade, secondary school 5th, 6th, and 7th grades). The research data were analyzed by transferring them to Statistical Package for the Social Science (SPSS) 25 and Amos 22.0 package program. In the validity and reliability analyses of the scale, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), reliability analysis (Cronbach's alpha), and test-retest were performed to determine the internal consistency of the factors.

Results: The Kaiser-Meyer-Olkin value was found to be 0.941 as a result of EFA, and the following fit indices were obtained as a result of CFA; χ^2/sd: 2.258, (RMSEA): 0.07, Comparative Fit Index (CFI): 0.907, Standardized Root Mean Square Residual (SRMR): 0.049. Cronbach's alpha value of the overall 25-item scale was found to be 0.946. As a result of the test-retest, the Intraclass Correlation Coefficient (ICC) was identified as 0.938 for the overall scale.

Conclusion: It was found that the DASC was a valid and reliable measurement tool that could assess the level of digital addiction in Turkish children aged 9-12.

Keywords: Digital addiction, Middle childhood, Scale, Validity, Reliability

1. Introduction

The use of the internet, computers, smartphones, and other electronic devices have increased significantly in recent years (1). As a common feature, the excessive intake of any substance directly activates the reward system in the brain and thus contributes to the reinforcement of behaviors and the formation of memories. This interaction may even lead to the emergence of problems in fulfilling usual responsibilities and duties. Addiction occurs in this way, according to the American Psychiatric Association (APA) (2). In the early 2000s, the individual use of digital tools increased rapidly, and the contents of digital tools also began to form a quality structure. Toys such as Arcade and Tetris began to become much more common than other toys, and this situation increased with the spread of computers and playstations, and their first addicts appeared (3). According to the results of a project carried out with the participation of 25101 children aged between 9 and 16 years from 19 European countries, the frequency of children using smartphones and the amount of internet use increased significantly compared to the results in 2010. Furthermore, less than half of children access the internet via a desktop or laptop computer. On the other hand, 3-15% and 1-18% of children access it through a wearable device and a connected toy, respectively (4). Nowadays, the excessive use of smartphones is considered a "problematic use," although it is not considered an addiction (5). In addition to smartphones, the use of digital devices, such as tablet computers, wearable technology, and game consoles, which the technology world adds to our lives daily, are becoming more common every day (4).

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The use of digital technologies leads to various psychosocial problems in children and adolescents. It was concluded that with the increased internet use, the interaction with the family decreased, the social circle narrowed, and symptoms such as depression and loneliness increased (6). It is stated that individuals with high social anxiety or who need social support turn to the internet to compensate for problems such as loneliness and depression (7,8). It is observed that the use of digital technologies causes negative emotions in children and adolescents.

In today's digital age, there are various metrics used in Turkish literature to measure addiction caused by digital devices such as social media, the internet, and smartphones. It has been found that the nine-item Internet Gaming Disorder Scale Short Form (IGDS9-SF) is a valid and reliable scale that can evaluate internet gaming disorder in Turkish children and young adults aged 13-24 (9). The Smartphone Addiction Scale was developed by Kwon et al. (2013) for adolescents aged ten using Young's Internet Addiction Scale (10) and was adapted into Turkish by Demirci, Orhan, Demirdaş, Akpınar, and Sert (2014) (11). The Digital Addiction Scale for Children is one of the scales developed in this regard.

The DASC was developed by Hawi, Samaha, and Griffiths (2019) in English to evaluate children's overall addiction to digital devices (12). There are studies investigating digital addiction in high school and university students in Türkiye (13-16). However, a scale that is generally used to measure digital addiction in children aged between 9-12 years has not been found. Although it is seen that the problematic use of digital technologies is common among children in our country, there is no scale that evaluates the level of digital addiction. Therefore, it is important to bring the DASC into Turkish in order to define digital addiction in children aged between 9-12 years in Türkiye. Furthermore, it is thought that it will contribute to experts working in Türkiye in terms of providing a scale that they can use both in diagnosis and national and international studies.

The questions of the study conducted with this aim are as follows:

a) Is the DASC a valid scale in a Turkish-speaking community?
b) Is the DASC a reliable scale in a Turkish-speaking community?

2. Materials and Method

2.1. Type and aim of the study

This methodological, descriptive, and correlational study aimed to ensure the Turkish validity and reliability of the DASC. ,

2.2. Time and place of the study

The study was carried out with primary school 4th-grade and secondary school 5th, 6th, and 7th-grade students in two public schools (a primary school and a secondary school) affiliated with the Ministry of National Education between November and December 2020.

2.3. Participants

A total of 1201 students studied in the primary school where the study was conducted. There were a total of 1109 students in the secondary school. Primary school 4th-grade and secondary school 5th, 6th, and 7th-grade students (N:1180) constituted the study population. The number of samples in scale development and adaptation studies in the literature is determined in the following way:

5's rule: There should be at least five cases for each item (variable) (17, 18)

The rule of 10s: There should be at least 10 cases for each item (variable) (17-21)

The rule of 100s: The number of individuals should be five times the number of variables, or 100 individuals should be examined. If communality is low and/or a small number of variables are attributed to each factor, a larger number of individuals is required (19).

The rule of 150: There should be at least 150-300 cases (19, 22)

The rule of 200: There are opinions that there should be at least 200 cases without considering B/D (19)

Additionally, the Kaiser-Meyer-Olkin (KMO) value is obtained as a result of exploratory factor analysis in scale development or adaptation studies to determine whether the sample size is suitable for factorization (20). The fact that the KMO value is greater than 0.60 means that the sample is sufficient. Since the KMO value was obtained as 0.941 in this study, it shows that the study sample was quite sufficient (23).

In this context, the study data were collected from 259 students who volunteered to participate in the study by determining the sample size in line with the principle of taking 5-10 times the number of scale items in line with the literature. The scale's test-retest (n: 59) was performed with 10-25% of the sample (23).

2.4. Data Collection Tools

2.4.1. Questionnaire

The questionnaire was used to examine the age, gender, and grade levels.

2.4.2. Digital Addiction Scale for Children (DASC)

The scale developed by Hawi et al. (2019) is a 5-point Likert scale (1= Never, 2=Sometimes, 3= Rarely, 4= Often, 5= Always) and consists of 25 items. The scale has nine criteria (Preoccupation, Tolerance, Withdrawal, Problems, Conflict, Deception, Displacement, Relapse, Mood modification) and two subscales. A score between 25-125 is obtained from the scale. An increase in the score is interpreted as an increase in the digital addiction level. Cronbach's alpha values for the criteria of the original study were found to be between 0.56 and 0.68, and Cronbach's alpha value for the overall scale was found to be 0.936 (12).

2.5. Ethical dimension of the study

After obtaining permission from the scale owner via e-mail to conduct the Turkish validity and reliability study of the scale, Ethics Committee (No: 07/07/2020-E.15739) approval, approval of the Provincial Directorate of National Education, and written permission from school administrators, parents, and students were obtained.

2.6. Data collection

The online questionnaire link created by the researchers via Google Forms was delivered to WhatsApp groups of parents created by primary school teachers and school administrators by a simple random method by skipping one branch for children to fill it out. The questionnaires filled out by students who volunteered to participate in the study on their mobile phones/tablets or computers were gathered in e-tables via Google Drive. It took the participants approximately 10-15 minutes to fill out the questionnaire and the scale. For the test-retest, the scale was resent online from the WhatsApp groups of the school administration to the children of all parents who had previously participated in the study.

2.7. Data analysis

The data of 259 participants were evaluated by transferring them to the IBM Statistical Package for the Social Science (SPSS) 25 packaged software. Descriptive statistics (n, %) were presented for categorical variables. The Content Validity Index and the Content Validity Ratio were calculated by evaluating the scores given by the experts. In the validity and reliability analyses of the scale, exploratory factor analysis (EFA) was first carried out, then confirmatory factor analysis (CFA) was conducted, and finally, the reliability analysis (Cronbach's alpha) and test-retest were performed to determine the internal consistency of the factors. Pearson’s correlation analysis was used for item-total score analysis. The CFA results of the study were obtained with SPSS Amos 22.0 software. The test-retest was conducted with the Intraclass Correlation Coefficient (ICC).

2.8. Content validity of the scale

The scale, translated from English into Turkish, was sent to nine experts in the fields of Pediatric Nursing, Psychiatric Nursing, Women's Health and Diseases Nursing, Psychological Counseling and Guidance, and Family Medicine for content validity. The experts were asked to evaluate the suitability and intelligibility of each item. They were asked to rate each statement between 1-4 points (1 point: inappropriate, 2 points: somewhat appropriate, 3 points: appropriate, 4 points: completely appropriate) and clearly write their opinions and recommendations for each item. In line with the experts' opinions, the items were reviewed, and necessary changes were made.

The Content Validity Ratio (CVR) was calculated using the formula (Ne= Total number of experts divided by the number of experts saying that the item is essential, N = the total number of experts on the panel). Since the number of experts was 9, the CVR was determined as 1.0 (23, 24).

For all 25 items, nine experts gave the answers "The item is appropriate" and "The item should be slightly revised." Since the number of experts was nine, it can be said that the content validity of the items with a CVR equal to 1 was achieved at a significance level of 5% (11). Our study found the average of the content validity index (CVI) and CVR as 1.0. Since the result CVI≥CVR was reached, the content validity of the scale was statistically significant.

3. Results

3.1. Descriptive characteristics of the participants

The participants comprised 145 (56%) females and 114 (44%) males. The participants' mean age (n: 259) was 10.926 ± 1.09 (Min: 9, Max: 13). While 32 (12.4%) of the students were 4th graders, 96 (37.1%) were 5th graders, and 60 (23.2%) and 71 (27.4%) were 6th graders and 7th graders, respectively.

3.2. Construct validity

EFA and CFA were performed to determine the construct validity of the scale.

3.2.1. Exploratory Factor Analysis (EFA)

EFA was first performed, and the "Principal Components Method" was preferred as a factor extraction method. The Kaiser-Meyer-Olkin (KMO) test was used to determine the sample adequacy to examine the factor structure, while Bartlett's test was used to determine whether factor analysis could be applied to the scale. As seen in Table 1, the KMO value was found to be 0.941 as a result of the EFA applied to the structure consisting of 25 items. Thus, it was revealed that the sample size was adequate to apply factor analysis to the data. According to the results of Bartlett's test of sphericity, significantly high correlations were found between the variables (23). It was concluded that the scale was suitable for applying the factor analysis ($p<0.01$). The exploratory factor analysis was performed to reveal the scale's factor pattern. All items were conceptually loaded into two subscales. Factor-1 subscale explains 45.234% of the total variance, and Factor-2 subscale explains 5.819%. These two subscales together explain 51.052% of the total variance (Table 1).

Table 1. Results of the Exploratory Factor Analysis Regarding the DASC

Items	Factor Loadings "F1"	Factor Loadings "F2"
item8	0.726	
item3	0.706	
item7	0.696	
item1	0.672	
item15	0.664	
item13	0.652	
item9	0.649	
item17	0.640	

item5	0.621	
item14	0.615	
item21	0.610	
item6	0.607	
item24	0.592	
item2	0.565	
item11	0.537	
item19	0.496	
item16		0.817
item4		0.704
item25		0.621
item22		0.614
item12		0.570
item18		0.569
item23		0.476
item10		0.462
item20		0.440
	Variance Explained (%)	**Self-Value (Λ)**
F1	45.234	11.308
F2	5.819	1.455
Total Scale	51.052	
Kaiser-Meyer-Olkin (KMO) test= 0. 941 **χ2** (300)= 3787.984 **Bartlett's test of sphericity (p) =**0.000*		

In the process of developing a scale, CFA should be run using a different data set from the EFA data set (21, 25). However, since EFA and CFA were performed on the same sample in the original study (12), a single sample was studied in this study in accordance with the scale's original study of the scale.

3.2.2. CFA results

The measurement model was established to confirm the structure consisting of 25 items and two factors were analyzed. As a result of the analysis, model improvement studies were performed since it was found that the model did not fit adequately. First, chi-square reduction values ("M.I." values) were examined for possible changes (e3-e13, e6-e14, e4-e8, e5-e14, e7-e11, e19-e25, and e24-e25) to be made in the model by examining the table of modification indices. The model was run by linking the modification with the highest "M.I." value when it was conceptually appropriate. As modifications were made, the model was retested and accepted if appropriate fit indices were obtained. Otherwise, the operations were repeated by making modifications according to other recommended situations in the modification output. The model was accepted or rejected according to the fit index values obtained with the last modification (26). The CFA analysis found that the whole model was validated with 25 items and two subscales. The validated measurement model is shown below (Figure 1).

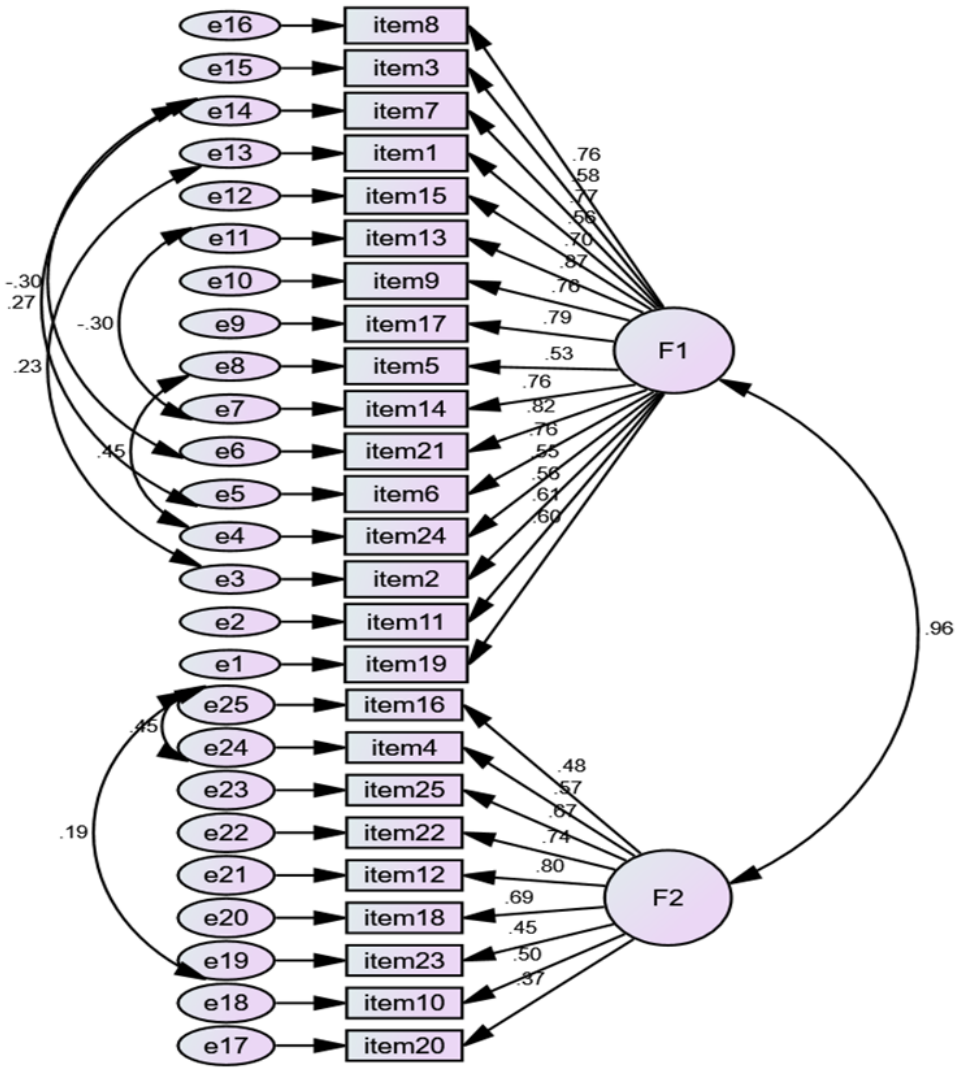

Figure 1. CFA Measurement Model of the DASC

According to the measurement model in Figure 1, the items of the measurement model validated with 25 items and the standardized regression coefficients of the paths on the one-way arrows, in other words, factor loadings are seen. In the model, it was determined which items were included in the subscales, and it was revealed that the scale items had factor loadings between 0.37– 0.87 (Figure 1).

The second-level multi-factor model is defined as the model in which the observable variables are gathered under more than one independent factor, and then these factors are combined under a more inclusive factor (27). In the scale adaptation study, the establishment of the second-level multi-factor model is not mandatory for the additiveness of the scale. Since the additive analyses of the scale can be performed with ANOVA Tukey's test within the scope of reliability analyses, CFA was performed on a first-level multi-factor model. Table 2 contains the CFA fit index results of the scale.

Table 2. Fit Index Values and Good Fit Values of the Measurement Model

Fit Index	Fit Index Values	Perfect Fit Values	Acceptable Values	Compliance
χ^2/sd	2.258	≤3	≤5	
CFI	0.907	≥ 0.97	≥ 0.85	
RMSEA	0.070	≤ 0.08	≤ 0.10	
SRMR	0.049	≤ 0.05	≤ 0.10	

CFI: *Comparative Fit Index,* ***RMSEA:*** *Root Mean Square Error of Approximation,* ***SRMR:*** *Standardized Root Mean Square Residual*

3.2.3. Scale reliability studies

Cronbach's alpha reliability coefficient in terms of internal consistency

The alpha coefficient is a measure of the homogeneity of the scale items. It can be explained that with the increase in the alpha coefficient of the scale, "the scale items consist of items that are consistent with each other and that examine the elements of the same feature, or all items work together." In conclusion, if the alpha coefficient is high, respondents' answers to the scale items are consistent to that extent and consist of items that do not leave the conceptual structure of the scale (23).

The reliability analysis found that Cronbach's alpha coefficient was 0.935 for factor 1 subscale consisting of 16 items, 0.830 for factor 2 consisting of 9 items, and 0.946 for the overall scale, and reliability levels were high (α>0.700) (Table 3).

Table 3. Results of the Reliability Analysis Regarding the DASC

Criteria	**Cronbach's Alpha**	**N of Items**
Deception	0.733	2 (items 4, 16)
Conflict	0.694	2 (items 9, 22)
Displacement	0.611	3 (items 6, 18, 20)
Problems	0.713	4 (items 10, 13, 23, 25)
Preoccupation	0.656	3 (items 1, 11, 14)
Relapse	0.686	2 (items 17, 19)
Mood modification	0.763	3 (items 5, 15, 24)
Withdrawal	0.852	4 (items 3, 8, 12, 21)
Tolerance	0.656	2 (items 2, 7)
Factor 1	0.935	16
Factor 2	0.830	9
Total Scale	0.946	25

Test-retest reliability

The scale was applied again to 59 of 259 individuals who participated in the study two weeks later to measure the scale's stability. A high fit was revealed between the retest and the first test for the overall scale (ICC=0.938, p=0.000) (Table 4).

Table 4. Test-Retest Results of the DASC

	ICC *	**ICC Values at the 95% Confidence Interval**	**P**
Factor 1	0.930	(0.917-0.942)	
Factor 2	0.819	(0.783-0.851)	**0.000***
Total Scale	0. 938	(0.925-0. 949)	

*p<0.001

Item–total score analysis of the scale and its sub-dimensions

The item–total score analysis explains the relationship between the scores obtained from each item and the scale's total score (28-30). This value should be >0.20, positive, and as close to 1 as possible (31). In this study, the correlation of the items with the scale's total score was 0.34–0.83, and the correlation of the items with the total score of the subscales was 0.53–0.83. The correlation coefficients of the item–total score and the item–subscale total score were positive and >0.20 (Table 5).

Table 5. Correlations of the Item–Total Score and Subscale Total Score (n = 259)

Items	X	SD	Item–total score correlation (r)*	Item–subscale total score correlation (r)*
Item 1	2.76	1.11	0.622**	0.622**
Item 2	2.25	1.19	0.617**	0.617**
Item 3	2.03	1.22	0.638**	0.638**
Item 4	1.31	0.81	0.484**	0.644**
Item 5	2.22	1.47	0.636**	0.636**
Item 6	1.76	1.09	0.760**	0.760**
Item 7	2.13	1.22	0.774**	0.774**
Item 8	2.06	1.31	0.793**	0.793**
Item 9	1.91	1.28	0.771**	0.771**
Item 10	1.52	0.99	0.451**	0.588**
Item 11	2.00	1.27	0.666**	0.666**
Item 12	1.66	1.08	0.735**	0.765**
Item 13	2.01	1.30	0.835**	0.835**
Item 14	1.59	0.96	0.752**	0.752**
Item 15	1.99	1.18	0.730**	0.730**
Item 16	1.22	0.66	0.378**	0.654**
Item 17	1.95	1.27	0.790**	0.790**
Item 18	1.62	1.07	0.627**	0.715**
Item 19	2.20	1.26	0.635**	0.635**
Item 20	1.93	1.28	0.349**	0.551**
Item 21	1.81	1.26	0.785**	0.785**
Item 22	1.59	1.04	0.670**	0.746**
Item 23	1.29	0.74	0.419**	0.536**
Item 24	2.23	1.34	0.638**	0.638**
Item 25	1.51	0.96	0.589**	0.738**

Hotelling's T-squared analysis is an analysis that provides information about whether the phenomenon to be measured can be measured effectively with the existing measurement tool. (32). According to Table 6, Tukey's additivity test was applied to obtain a total scale score by summing the scale items. Considering the results, it can be said that the questions constituting the scale are homogeneous and related to each other ($p<0.05$). When the additivity line was examined, it was determined that the options included in the test did not show the Likert-type additive scale quality since the p-value was not >0.05 (32).

Table 6. Information about the DASC ANOVA Tukey's nonadditivity analysis

			Sum of Squares	df	Mean Square	F	p
Between People			3751.001	258	14.539		
Within People	Between Items		798.189	24	33.258	42.352	0.000
	Residual	Nonadditivity	74.923[a]	1	74.923	96.887	0.000
		Balance	4787.528	6191	0.773		
		Total	4862.451	6192	0.785		
	Total		5660.640	6216	0.911		
Total			9411.641	6474	1.454		
Grand Mean = 1.8659							
a. Türkiye's estimate of power to which observations must be raised to achieve additivity = .249.							

In the original article of the scale, it was stated that people who approved criteria four and below were defined as 'nonaddicts,' and people who approved criteria five and above were defined as 'addicts', and it would be appropriate to evaluate the scale in this way (12).

The Hotelling T-value was at a significant level ($p<0.05$). In this context, it was shown that the scale could measure the desired quality at a significant level (32) (Table 7).

Table 7. Results on the DASC Hotelling's T-Squared Analysis

Hotelling's T-Squared	F	df1	df2	p
690.226	26.196	24	235	0.000

The Intraclass Correlation Coefficient test is an analysis that provides information about the validity and reliability of the scale in terms of the order of questions and structure characteristics. According to the results, it was found to be a reliable structure both in terms of individual questions and average measurements ($p<0.05$) (Table 8).

Table 8. The results of the Intraclass Correlation Coefficient analysis of the DASC

	Intraclass Correlation[b]	95% Confidence Interval		F-Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	p
Single Measures	0.412[a]	0.369	0.459	18.514	258	6192	0.000
Average Measures	0.946[c]	0.936	0.955	18.514	258	6192	0.000
Two-way mixed effects model where people effects are random and measures effects are fixed.							
a. The estimator is the same whether the interaction effect is present or not.							
b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance are excluded from the denominator variance.							
c. This estimate is computed assuming that the interaction effect is absent because it is not estimable otherwise.							

4. Discussion

In the Turkish literature, studies conducted in different age groups were not found in the reviews as an "internet addiction or digital addiction scale." The "Digital Addiction Scale" for university students (15, 33) and another "Digital Addiction Scale" were developed by different researchers to measure digital addiction in high school and university students (14, 16). The Digital Game Addiction Scale was developed to determine problematic digital game-playing behaviors of adolescents aged between 12-18 years (34). The Smartphone Addiction Scale was developed by Kwon et al. (2013) for adolescents aged ten years (10) and is used for secondary school students (35). This study is important since no measurement tool that measures digital addiction in children from the age of nine and whose validity and reliability in Turkish was studied was found.

Factor analysis, one of the common methods in evaluating construct validity, examines whether the scale items are gathered under different dimensions (36). In this study, EFA and CFA were conducted in the construct validity part of the scale. The Kaiser-Meyer-Olkin (KMO) test, showing whether the sample size of the scale is adequate, and Bartlett's test, determining whether the scale is suitable for factor analysis, were first carried out. The adequacy of the sample size is evaluated by examining the KMO value. KMO value between 0.90-1.00 indicates a perfect sample size (23). The fact that the KMO value was 0.941 in this study showed that the sample size was at a "very good" level in terms of adequacy. Furthermore, the result of Bartlett's test of sphericity, performed to evaluate the suitability of the sample for factor analysis, should be statistically significant (23). In the study by Hawi et al. (2019), the KMO value (0.960) and Barlett's test of sphericity results were similar to our study (12). These results showed that the sample size was appropriate for factor analysis.

EFA evaluates whether the relationship of the items making up a factor with the factor is sufficient (23). In the literature, it was indicated that in EFA, the ratio of explaining the total variance of the factor loadings created between 40% and 60% would be considered sufficient, and the items with a factor loading value below 0.32 should be excluded from the analysis (37). According to the EFA results of the DASC in this study, it was determined that the scale, together with its subscales, explained 51.052% of the total variance, and factor loadings were over 0.40. In the original study of the scale, the total variance of the whole scale was 46.32% (12). Both our study and the original scale study are similar to the literature.

In the study by Hawi et al. (2019), thirteen items were loaded on component 1, including the complete item sets of conflict, displacement, and problems criteria. Twelve items were loaded on component 2, including the complete item sets of mood modification, withdrawal, and tolerance criteria (12). However, in this study, 16 items were loaded into component 1, and nine items were loaded into component 2. It can be said that this situation originates from cultural differences, which are wrong equivalent of the psychological terms used (38, 39). Therefore, it is usual that the validity and reliability values are different in scale adaptation studies from different cultures.

After EFA, CFA was performed to confirm the structure. It was found that the model was validated with 25 items and two subscales, and the factor loadings of the items varied between 0.37– 0.87. In CFA, the value of the factor loading is required to be at least 0.30, and it is emphasized that the items below this value should be removed from the scale (22). As a result of the CFA conducted to determine whether the structure in the original scale was confirmed for Turkish children, the values of $\chi 2/sd<3$, RMSEA≤ 0.08, and SRMR≤ 0.05 among the fit indices showed a perfect fit according to the criteria specified in the literature, and the value CFI≥≥ 0.85 was acceptable (χ^2/sd: 2.258, RMSEA: 0.07, CFI: 0.907, SRMR: 0.049) (9, 23, 26, 37). In the original study of the scale, similar results, χ^2/sd: 2.434, RMSEA: 0.0418, CFI: 0.959, and SRMR: 0.0337 (12), were obtained with our study.

Cronbach's alpha reliability coefficient and test-retest method were used to calculate the scale's reliability. The literature emphasizes that Cronbach's alpha value should be 0.60 and above (23). As a result of Cronbach's alpha analysis, the overall reliability coefficient of the DASC consisting of 25 items was found to be 0.946, and Cronbach's alpha internal consistency coefficient of the subscales and criteria was found to be between 0.611 and 0.935. In the original study of the scale (12), Cronbach's alpha value of the overall scale was 0.936, and the value of the criteria was found to be between 0.56 and 0.68, which is similar to our result. Furthermore, the results support that the overall scale is highly reliable.

The test-retest analysis is also among the most commonly used reliability methods. The test-retest analysis examines the scale's consistency in repetitive applications and its invariance over time (36). In this study, the scale was applied to 59 individuals at two-week intervals. A high fit was observed between the retest and the first test (ICC= 0.938), which indicated no variance over time in the DASC and its subscales and that the DASC was reliable.

5. Conclusions and Recommendations

Based on the content validity, construct validity and reliability values of the scale, it was found that the DASC was a reliable measurement tool to measure digital addiction in children studying in grades 4 - 7 of primary and secondary schools (9-12 years old) in the Turkish literature. It is recommended to apply the scale to clinically diagnosed individuals and examine whether it can distinguish between digital addicts and non-addicted individuals. It is necessary to test the scale's measurement invariance in terms of gender and different cultures. To this end, the scale should be used by Turkish researchers in international studies, and measurement invariance should be examined by multi-group confirmatory factor analysis. Only when these studies are completed, it may be possible to use the scale more reliably in international studies. Furthermore, the scale may help develop programs to prevent digital addiction in children. In future studies, it may be recommended to repeat the validity and reliability of the scale in different groups of children, conduct studies that reveal the effects of individual and dynamic variables on the occurrence of the problem, and use it in prevalence studies in the community.

Limitations

Our study has some limitations. First, our sampling technique was not random, and the participants were selected by the convenience sampling technique, significantly limiting the sample's representativeness. In future studies, determining participants by the random sampling technique as much as possible will ensure the representativeness of the sample. The second important issue was that research was conducted with individuals not diagnosed with digital addiction while collecting the data. It was considered that this situation caused the scale to lack clinical validity.

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