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Validity and Reliability Study of Digital Addiction Scale for the Turkish Youth (DASY)

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Abstract

Digital addiction has emerged as one of the major problems faced by individuals in today's world. Accurate identification of this issue is critical to creating effective solutions. Accordingly, this study carried out the validity and reliability process of developing a Digital Addiction Scale for the Youth (DASY). The study consisted of item pool generation, expert review, pilot testing, Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and factor naming. From an initial pool of 42 items, the scale was finalized with 23 items and three sub-factors. The results of the EFA revealed that the scale explains 61.72% of the total variance. The internal consistency coefficient was found to be high ($\alpha_{DASY} = .946$), and the scale demonstrated sufficient validity. CFA results confirmed the structure ($\chi^2/df = 1.72$, $p < 0.001$, RMSEA = 0.044, SRMR = 0.054, NFI = 0.891, CFI = 0.951, GFI = 0.915). The factors were named "Compulsive Use," "Escape-Oriented Use," and "Functional Impairment." DASY provides a valid and reliable tool for evaluating the digital addiction levels of youth in accordance with current and cultural contexts.

Plain Language Summary

Digital addiction has become one of the most pressing social and individual issues affecting today's youth. The widespread use of smartphones, social media platforms, and online games has significantly increased the time young people spend in front of screens, negatively impacting education, social relationships, physical health, and psychological well-being. Accurately identifying this problem and developing effective interventions require valid and reliable measurement tools. To address this need, the Digital Addiction Scale for Youth (DASY) was developed to assess digital addiction levels in a way that reflects cultural and contemporary contexts. The research process was carefully designed and implemented in multiple stages. Initially, a comprehensive item pool of 42 statements was generated and reviewed by field experts to ensure content validity. A pilot study was then conducted to test the clarity of the items and the functioning of the scale. Based on pilot data, Exploratory Factor Analysis (EFA) was carried out, revealing that the scale explains 61.72% of the total variance and should consist of 23 items grouped into three sub-factors. The three sub-factors of the scale are as follows: Compulsive Use: Involves difficulty controlling digital use, constant online engagement, and problems reducing or stopping technology use. Escape-Oriented Use: Refers to turning to digital environments to avoid stress, anxiety, or personal problems. Functional Impairment: Captures the negative effects of digital use on academic success, family interactions, social life, and daily responsibilities. Next, Confirmatory Factor Analysis (CFA) confirmed the three-factor structure with strong fit indices ($\chi^2/df = 1.72$, $p < 0.001$, RMSEA = 0.44, SRMR = 0.504, NFI = 0.891, CFI = 0.951, GFI = 0.915). The internal consistency of the scale was also found to be excellent ($\alpha = .946$), demonstrating that DASY is both valid and reliable for measuring digital addiction.

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Introduction

Today, digitalization has become an indispensable part of everyday life across nearly all contexts and social groups. While it provides significant contributions such as increasing efficiency in daily activities (Reis & Melao, 2023), facilitating access to information, enabling personal expression, saving time (Mendoza-Holgado et al., 2024), and enhancing quality of life (Kiviaho & Einolander, 2023), excessive and uncontrolled use has also brought about a range of psychosocial problems (Aziz et al., 2021; Montag & Walla, 2016; Mustafaoglu et al., 2018). The growing integration of digital tools into daily routines across generations has generated new challenges and has increasingly attracted scholarly attention (Karakose et al., 2022). Despite the rise in research on digital addiction in recent years, there remains no consensus on its definition (Basel Almourad et al., 2020). Initially, digital addiction was defined as the excessive, impulsive, and uncontrolled use of specific sub-tools (e.g., internet addiction, computer addiction, social media addiction) (Griffiths, 1996). However, with technological advances and the ability to stay connected online without requiring multiple devices for different needs, the definition of digital addiction has been revisited.

Digital technologies are used as functional—and even indispensable—tools in many fields, such as education, communication, creativity, and social interaction. In the digital age in particular, the increased use of technology is both expected and often necessary for individuals to meet their academic, professional, and social needs (Lukavska et al., 2022). For this reason, reductionist approaches based on usage duration fall short in explaining the nature of digital addiction (Demetrovics et al., 2026). Indeed, research highlights that digital technologies have become central to daily life and that such use does not always indicate a pathological condition. For technology use to be evaluated as addiction, the individual must be unable to control this behavior, the use must reach a level that causes neglect of other areas of life, and attempts to quit must fail (Throuvala et al., 2019). When these criteria are not met, heavy technology use should be evaluated as "high engagement" or "functional use." The digital addiction term refers to the excessive, impulsive, and uncontrolled use of devices—whether or not connected to the internet—for various purposes such as entertainment, education, or gambling (Gao & Du, 2025; Seema et al., 2021). For instance, internet addiction is defined as the excessive and uncontrolled use of technology that leads to significant functional impairment in an individual's life (Alheneidi & Smith, 2020). Emerging from this framework, gaming addiction is characterized by a loss of control over gaming activities and the persistence of the behavior despite negative consequences (Murray et al., 2022). Smartphone addiction highlights compulsive device use triggered by the need for social interaction and instant gratification (Pivetta et al., 2019). In today's integrated digital ecosystem, these constructs converge under the multidimensional and platform-independent umbrella of "digital addiction," representing the entirety of pathological and dysregulated interactions with digital technologies (Anas et al., 2023; Sirin & Ketrez, 2023). In other words, it functions as an umbrella term encompassing internet, gaming, smartphone, and social media addictions. Evidence suggesting that individuals who excessively and uncontrollably use multiple technological tools are also prone to other behavioral addictions has supported this broader conceptualization (Liu et al., 2016; Zhang et al., 2024). Although digital addiction is not yet recognized as a diagnostic category in major health classification systems, it has become an important research domain because individuals struggle to stop their usage, and excessive engagement negatively affects their social (Mirbabaie et al., 2020; Tateno et al., 2019), academic (Tulubas et al., 2023), and occupational functioning (Ai et al., 2021; Griffiths, 2010). Furthermore, research increasingly shows that digital addiction not only undermines social life but also disrupts psychological (Cerniglia et al., 2019; Karakose et al., 2023) and overall health (Ding et al., 2023; Dresp-Langley & Hutt, 2022; He et al., 2017). The prevalence and frequency of digital addiction vary by culture, socioeconomic status, and level of national development (Al-Mamun et al., 2024; Fineberg et al., 2025; Meng et al., 2022). These factors particularly influence individuals' early access to technological tools, which can lead to varying levels of digital addiction among different demographic groups. At the same time, variation in empirical findings across studies often stems from differences in measurement instruments and operational definitions. In addition, some tools have been developed to target only certain developmental stages (e.g., Bagatarhan, 2023). A review of the literature shows that only a limited number of scales have been developed or adapted in Türkiye. In other words, although 14 scale development or adaptation studies were identified, it was found that these studies were based on only four scales. General information on these scales is summarized in Table 1.

As seen in Table 1, adaptation studies of international scales are common in the Turkish context, particularly with varying samples. Many of the existing instruments (e.g., Hawi et al., 2019; Seema et al., 2021) were developed abroad and later adapted for Türkiye (e.g., Bagatarhan & Siyez, 2023; Celik et al., 2023; Turk et al., 2024). This highlights the scarcity of original scale development studies reflecting local cultural contexts and current digital use habits. Moreover, the focus of

Table 1. Scales Available in the Literature and Some of Their Statistical Properties

Author(s)	Year	Type	Sample	Item/Factor	Explained variance (%)	Cronbach's alpha
Goncalves et al.	2018	Scale development	State-owned company heads of information and communication technology	17 items under 5 factors	67.8	0.81
Kesici and Tunc	2018	Scale development	University students	19 items under 5 factors	59.51	0.87
Dilci	2019	Scale development	University students	40 items under 5 factors	64.7	0.97
Hawi et al.	2019	Scale development	4-7th grade children	25 items under 9 factors	40.63	0.94
Seema et al.	2021	Scale development	Teenagers	10-item scale	55.95	0.89
Bagatarhan and Siyez	2023	Scale adaptation (Hawi et al., 2019)	9–14-year-old children	25 items under 9 factors	-	0.94
Celik et al.	2023	Scale adaptation (Seema et al., 2021)	5^{th}-12th grade teenagers	10-item scale	-	0.90
Cimke et al.	2023	Scale adaptation (Hawi et al., 2019)	9–12-year-old children	25 items under 9 factors	-	0.95
Durmaz et al.	2023	Scale adaptation (Hawi et al., 2019)	4th grade children	25 items under 9 factors	-	0.95
Oztemel & Tras	2023	Scale adaptation (Hawi et al., 2019)	9–14-year-old children	25 items under 9 factors	66	0.94
Yilmaz et al.	2023	Scale adaptation (Hawi et al., 2019)	9–12-year-old children	25 items under 9 factors	-	0.92
Turk et al.	2024	Scale adaptation (Seema et al., 2021)	4th-7th grade children	10-item scale	41.5	0.87
Zengin et al.	2024	Scale adaptation (Hawi et al., 2019)	4th-7th grade children	25 items under 2 factors	51.05	0.95
Al-Mamun et al.	2025	Scale adaptation (Seema et al., 2021)	12–17-year-old teenagers	10 items under 2 factors	23.1	0.81

most existing scales on specific age groups (primarily children and adolescents) and their differing factor structures create challenges for comparability and hinder comprehensive assessments for youth populations. As emphasized in the literature (Basel Almourad et al., 2020; Gao & Du, 2025), the broadening definition of digital addiction and the rapid changes in digital usage patterns require scale items to remain up-to-date.

Therefore, there is a clear need for a new instrument that can assess youth digital addiction levels in ways that are both culturally relevant and reflective of current digital trends. In this context, the development of the Digital Addiction Scale for the Youth (DASY) and the examination of its psychometric properties constitute the primary aim of this study. Within this overarching aim, the following research questions guided the study:

- What are the components of digital use measured by DASY?
- What are the statistical indicators of the validity and reliability of DASY?

Methodology

This study followed the stages of (1) creating an item pool through a literature review, (2) obtaining expert opinions, (3) testing clarity and comprehensibility through a pilot application, (4) conducting Exploratory Factor Analysis (EFA) to identify the factor structure, (5) conducting Confirmatory Factor Analysis (CFA) to validate the structure, and (6) naming the factors (DeVellis, 2017). In the first stage, items from scales developed and adapted in the national and international literature (summarized in Table 1) were reviewed, along with leading studies on digital addiction (Al-Mamun et al., 2025; Basel Almourad et al., 2020; Cerniglia et al., 2019; Ding et al., 2023; Dresp-Langley & Hutt, 2022; Hawi et al., 2019; Meng et al., 2022; Seema et al., 2021; Tulubas et al., 2023). Based on this review, both existing items and additional items proposed by the research team were included in the item pool. Careful evaluations were carried out to ensure that the items reflected contemporary digital use practices. In addition to the items derived from the literature, the authors developed new items in line with their field of expertise, as well as some parallel items to compare the items' measurement power and control items to assess the sincerity of participants' responses. In this way, an item pool consisting of a total of 68 potential items was constructed.

In the second phase, opinions were gathered from two language experts, three educational technology specialists, and one measurement and evaluation expert regarding the language/expression, contextual inclusivity, and the appropriateness of the measurement tool and scale of the item pool. The entire item pool and measurement scale were sent to the experts via email as an electronic document, and they were asked to process their feedback into these documents and return them via email. All received documents were compiled and reviewed by the research team. Items that the experts suggested removing or adding, as well as any errors in the measurement scale and language/expression, were adjusted. The content validity of the draft scale items was calculated using Lawshe's (1975) formula, taking expert opinions into account. The calculation of the Content Validity Ratio (CVR) is calculated via the $CVR = (n_e - N/2)/N/2$ formula. In this formula, "n_e" refers to the number of experts who evaluated the item as "appropriate," while "N" refers to the total number of experts who provided feedback on the item. The distribution of expert opinions is presented at Appendix 2 (see Appx. 2). Based on this formula, the content validity of each item was determined. As a result of the evaluation, 15 items that were found to have low content validity were completely removed from the item pool. Of the remaining items, 26 items were removed from the pool as they were, while 26 were accepted after minor changes and adaptations. By combining similar items and removing unnecessary repetitions, the scale was organized into a pool of 42 items. In the third phase, in-person applications were conducted with five university students to test the comprehensibility of the items in the item pool. Participants were asked what they understood from each item, and notes were taken if there were discrepancies between the intended meaning and the participants' understanding. For items that were not understood, the intended situation was explained, and suggestions for corrections were solicited from the participants. After this application, the necessary corrections were made, and the item pool was prepared for application. The statistical findings obtained in the fifth, sixth, and seventh phases are presented in the findings section of this study. This section outlines the methodological processes of the last three phases.

Participants

For Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), participants were selected using a criterion-based sampling technique. The criterion for this study was that participants must be aged between 18 and 30 to be defined as young and must be university students to answer questions regarding academic digital usage in the items. Due to the nature of the research, individuals must also possess any digital technology; however, since the data collection process was conducted online, it was impossible for individuals without such technologies to participate in the study, so questions were asked about which technologies they owned. To achieve a diverse and representative sample of university students across various all accessible universities in the region, seeking permission to disseminate the data collection tools link through different communication channels (e.g., email lists and social media groups).

To minimize selection bias and ensure broad participation, the recruitment call emphasized that participation was strictly voluntary and that no academic or financial incentives were provided. Before accessing the questionnaire, all potential participants were presented with a digital informed consent form detailing the study's purpose, data privacy measures, and the right to withdraw at any stage. Data collection took place between 2024/November and 2025/May. This systematic approach allowed for the inclusion of participants from diverse socio-demographic backgrounds, regions and various stages of their academic journey, thereby enhancing the breadth of the findings. The distribution of the participants is presented in Table 2.

In criterion-based sampling, the data collection process was planned according to quota-based sampling. Quota-based sampling is a non-probability technique where researchers first categorize the target population into subgroups based on specific characteristics, such as age or gender, and set an adequate number (quota) for each (Sarfo et al., 2022). The adequacy of the sample size for the study was determined based on the recommended sample sizes in the literature. It is suggested that data be collected from at least 300 participants for Exploratory Factor Analysis (EFA) (Thompson, 2004). Furthermore, the

Table 2. Distribution of Participants by Demographic Variables

Variable	Category	EFA		CFA	
		n	%	n	%
Gender	F	386	72,6	223	60,3
	M	146	27,4	147	39,7
Age	18-21	328	61,7	141	38,1
	22-24	93	17,5	144	38,9
	25-27	43	8,1	85	23,0
	27-30	68	12,8	0	0
University	Adıyaman	227	42,7	169	45,7
	Bartın	36	6,8	39	10,5
	Anadolu	63	11,9	47	12,7
	Aksaray	12	2,3	11	3,0
	Canakkale	23	4,3	20	5,4
	Ist. Sabahattin Zaim	21	3,9	5	1,4
	Atatürk	30	5,6	4	1,1
	Inönü	20	3,8	11	3,0
	Erzincan	29	5,5	3	,8
	Other Universities	71	13,3	61	16,5
Faculty	Faculty of Education	228	42,9	181	48,9
	Faculty of Dentistry	88	16,5	33	8,9
	Faculty of Engineering	66	12,4	33	8,9
	Faculty of Economics and Administrative Sciences	35	6,6	13	3,5
	Faculty of Theology	40	7,5	12	3,2
	Faculty of Arts and Sciences	16	3,0	24	6,5
	Faculty of Tourism	10	1,9	12	3,2
	Faculty of Communication	5	,9	3	,8
	Faculty of Fine Arts	5	,9	3	,8
	Other	39	7,3	56	15,1
Year of study	1	244	45,9	149	40,3
	2	89	16,7	33	8,9
	3	51	9,6	24	6,5
	4	129	24,2	81	21,9
	5	19	3,6	83	22,4
Income level	Low	207	38,9	50	13,5
	Medium	180	33,8	98	26,5
	High	104	19,5	129	34,9
	Very high	41	7,7	93	25,1
Duration of Use of Digital Platforms	0-2 hrs.	87	16,4	75	20,3
	3-5 hrs.	318	59,8	182	49,2
	6-8 hrs.	113	21,2	77	20,8
	9+ hrs.	14	2,6	36	9,7
Most Frequently Used Digital Device	Smartphone	506	95,1	307	83,0
	PC	22	4,1	57	15,4
	Tablet	4	,8	6	1,6
Total		532	100	370	100

Measure of Sampling Adequacy (MSA) value being greater than 0.90 indicates that the number of participants in the EFA section of the study (n_{EFA}=532) is sufficient. While EFA is conducted to determine the factor structure of a measurement tool, Confirmatory Factor Analysis (CFA) tests whether the existing structure is valid as hypotheses and whether these hypotheses are confirmed (Goodwin, 1999). In this context, the responses of participants in both analyses may be similar due to recall and tendency to provide similar answers, which can lead to statistical errors in CFA results (Edwards & Bagozzi, 2000; Fokkema & Greiff, 2017). Therefore, data were collected from a different sample that showed similar characteristics to the EFA sample but did not participate in the EFA study. According to Kline (2010), collecting data from 100 to 200 participants is sufficient for the sample size in CFA. Hu and Bentler (1999) state that the sample size should exceed 250. The sample size for this study was kept larger to account for potential data loss (n_{CFA}=370). From this, it can be concluded that the sample obtained is adequate for the validity and reliability studies of the scale (KMO>0.90, Bartlett Sphericity Test (p)<0.05). Additionally, as shown in Table 2, the participants in the study demonstrate a heterogeneous distribution in terms of gender, age, university,

faculty of study, class level, income level, duration of digital use, and number of devices owned. Therefore, it can be said that the necessary steps have been taken to ensure that the sample represents the population adequately.

Data Collection Tools and Process

Data was collected for the study using three different data collection tools. The data collection process was conducted with the approval of the Author's University Social and Humanities Ethics Committee, under the specified number and date, and throughout the entire process, actions were taken in accordance with the World Medical Association's Declaration of Helsinki principles. The entire data collection process was carried out through online forms to create a more heterogeneous data set, avoid paper-based and travel costs, and allow participants to choose the most convenient time to respond. The link to the online form was shared with participants via social media and peer messaging groups, and they were asked to respond on a voluntary basis. participants were first presented with an informed consent form. Only those who provided their consent were directed to the survey items. To ensure data integrity and prevent bias arising from incomplete responses, all survey items were set as mandatory fields. Consequently, the system only permitted the submission of fully completed forms, resulting in a final dataset with no missing values. This technical measure eliminated the need for post-hoc missing data imputation techniques. In addition to this, this mandatory response feature prevented incomplete submissions, we monitored the initial engagement. A total of (f_{EFA}=532; f_{CFA}=370) people consented to the survey, and [f_{TOTAL}=902] participants completed the entire survey (completion rate: 100%). No differences were observed in terms of initial demographic entry between those who completed the survey and those who withdrew, suggesting that attrition occurred at the consent or early instruction stage without biasing the core variable associations.

The first data collection tool is an item pool form consisting of 42 items, organized based on expert opinions and participant feedback. This form includes a demographic information form necessary for sample characterization, the items, and the scale required for answering these items. The measurement scale is a seven-point Likert-type, consisting of "0-Never: I definitely do not experience this situation," "1-Rarely: I very rarely experience this situation", "2-Seldom: I seldom experience this situation", "3-Sometimes: I sometimes experience this situation", "4-Often: I often experience this situation", "5-Very Often: I very often experience this situation" and "6-Always: I always experience this situation". Since the items address habits of using digital technologies in daily and academic life, as well as signs of addiction associated with such use, participants must respond using frequency scales. Semantically, the items should be answered on a frequency scale ranging from problematic use to addictive use. In this way, as response scores increase, an assessment of addiction can be made. The choice of a 7-point Likert scale was intentional and grounded in prior methodological research suggesting that scales with 5 to 7 response categories tend to provide an optimal balance between reliability and respondent discrimination (e.g., increased variance without overburdening respondents). A 7-point scale allows for finer gradation of participants' perceptions compared to shorter scales, which is particularly relevant for capturing nuanced attitudes and experiences in digital addiction. Clear statements were provided in the scale instructions to prevent any confusion for the participants, and frequency expressions were given for marking the items.

The second data collection tool is a data collection instrument consisting of 23 items and 3 factors created as a result of EFA. This data collection tool was used for CFA to verify the obtained structure. Since data needed to be collected from a different sample than the EFA, participants were informed that those who had previously filled out this form should not participate, as this would jeopardize the scientific findings. To avoid this risk, participants were also informed, and student numbers were collected in both data collection tools. The student number is a specific piece of information for each student, and due to the research team's inability to access participant identity within university systems, identity information could not be accessed. Both data sets were compared by student numbers, and it was confirmed that they were not the same, indicating that the participants were different.

To assess the validity of similarity/equivalence of the scale, the Digital Addiction Scale (DAS) developed by Kesici and Tunc (2018) was used. This scale consists of 19 items under five factors: excessive use, relapse, inhibiting the flow of life, emotional state, and inability to quit. The scale is distributed on a five-point Likert-type response scale ranging from completely agree to completely disagree, with a reported Cronbach Alpha internal consistency coefficient of 0.87 and a total explained variance of 59.51%. The decision to use this scale was made due to its similarity to the scale being developed, its frequent use in the national literature, and the similarity of its sample (university students) to the study sample. Data was collected using the same link for CFA, and the similarity with this scale was tested.

Data Analysis

In the fifth and sixth stages of the scale development process, data analysis procedures were conducted. In the fifth stage, the prerequisites for Exploratory Factor Analysis (EFA) were first tested to determine whether they were met, and after confirming that they were, EFA was performed. In the second stage, Confirmatory Factor Analysis (CFA) was conducted to

test the accuracy of the factor structure, and correlation analysis was performed to determine the validity of similarity/equivalence. The relationship between the two scales tested through Pearson product-moment correlation analysis was also examined based on factors after establishing that the data were normally distributed. IBM SPSS Statistics (v.26) was used for descriptive statistics, EFA and Pearson correlation analysis, , while IBM SPSS AMOS (v.24) was utilized for the CFA. In the final stage of the scale development process, which involved naming the factors, opinions were gathered in an online meeting with a team of experts consisting of one from instructional technologies, one from psychology, one from language education, and one from educational sciences. Consensus was reached regarding the factor names, and the factors were named "Compulsive Use", "Escape-Oriented Use" and "Functional Impairment".

Findings

Exploratory Factor Analysis Results

Preliminary Analysis and Data Suitability

The analyses were conducted to test whether the data set met the prerequisites before performing Exploratory Factor Analysis (EFA). First, the frequency distributions of the scale items were examined. As a result of the analyses, it was observed that the data were suitable for normal distribution in terms of skewness and kurtosis values. The average scores for the items ranged from 1.63 (i5) to 3.96 (i24), indicating a diversity in distribution. The standard deviations of the items generally ranged from moderate to high, between 1.25 and 1.85 (see Appendix 1). These statistical values indicate diversity in individual responses.

To determine the suitability of the data for factor analysis, the Kaiser-Meyer-Olkin (KMO) sample adequacy test and Bartlett's Test of Sphericity values were also examined. The KMO value for DASY was found to be 0.952. Additionally, the result of Bartlett's Test of Sphericity was also significant ($X^2 = 7688.896$; $p < 0.01$). According to Tabachnick and Fidell (2012), a KMO value of 0.60 or above is sufficient for performing factor analysis with the data. The suitability of DASY data for factor analysis in EFA was also verified using the Anti-Image Correlation Matrix. An Anti-Image Diagonal value of 0.50 or above for the items indicates that the item is suitable for factor analysis, according to Sarstedt and Mooi (2014). Based on the findings obtained, all Anti-Image diagonal values for DASY were greater than 0.90. According to the Anti-Image correlation matrix, all items had diagonal MSA values above 0.90. This finding indicates that each item is suitable for EFA and that the sample adequacy is high (Cerny & Kaiser, 1977; Lorenzo-Seva & Ferrando, 2021). This suggests that factor analysis can be performed with DASY data.

In the EFA process, item-total score correlations were also calculated to further support the validity of the scale. It was determined that the item-total correlations for all items ranged from 0.525 to 0.738. All these values are well above the threshold of 0.30, indicating that each item works in harmony with the overall scale and has high discriminative power. According to Petrillo et al. (2015), values of ≥ 0.30 are considered acceptable levels. In this study, the item-total score correlations are well above this threshold, showing that each item is consistent with the overall structure of DASY and possesses strong discriminative features.

Factor Extraction and Explained Variance

In this study, item reviews were conducted based on the factor structure determined by EFA carried out with the data collected from the item pool of DASY. The factor loading threshold was set at an absolute value of 0.40, and the item overlap was set at 0.1 (Costello & Osborne, 2005). The threshold value for item-factor loading was determined to be 0.40, as recommended by Costello and Osborne (2005). The rationale for setting the acceptable limit for item-factor loading values at 0.40 in this study is based on methodological recommendations found in the literature. While Tabachnick and Fidell (2012) suggest 0.32 as the minimum acceptable value, they recommend higher thresholds for more robust and reliable factor structures. In fact, an item with a factor loading of 0.40 indicates that it shares at least 16% of its variance with the explained factor ($0.40^2 = 0.16$). Additionally, Maskey et al. (2018) state that loading values below 0.40 should be suppressed and not reported. Therefore, adopting the 0.40 threshold for item-factor loading values in this study is a reasonable choice that aligns with the recommendations in the literature and contributes to improving the psychometric properties of the scale.

To determine the factor structure more reliably in EFA, the oblique rotation method was preferred. The oblique rotation technique is a method that accepts the possibility of interrelated factors within a scale and is preferred for making the data clearer and more interpretable (Finch, 2006; Lorenzo-Seva et al., 2009). Based on factor loadings and the significance of the factors, it was decided to remove certain items from the scale after four iterations.

Initially, item 39, which was a control item, was removed in the first iteration due to low factor loadings and significant loading on multiple factors, meaning it was overlapping. Items 8, 11, 12, 13, 14, 16, 17, 22, 29, and 30 were also removed for the same reasons. In the second iteration, items 5, 9, and 42 were removed because their factor loadings fell below the established threshold and due to overlap issues. In the third iteration, items 18 and 27 were removed due to low factor loadings and excessive overlap. According to Huck (2012), each factor of a scale should consist of at least three items. In the fourth

iteration, items 24 and 25 were removed despite having factor loadings above the established threshold because they remained as single items under their factor and exhibited singular loading, which was not suitable for the scale structure. Thus, a structure consisting of 23 items grouped under three sub-factors was obtained.

The factors determined as a result of EFA, the variance explained by the factors, the eigenvalues of the factors, and the factor loading values for the scale items are presented in Table 3. In determining the number of factors for DASY, eigenvalues greater than 1 were considered. Additionally, the number of factors was confirmed using a scree plot (see Figure 1) (Horn, 1965). The scree plot was checked during the removal of each of the aforementioned items, confirming that the factor structure was not disturbed.

As seen in Table 3, the corrected item-total correlation values for each item being greater than 0.50 indicates a high-level of consistency, meaning that each item is compatible with the overall scale, contributes to the explained variance, and is consistent with the other items (Field, 2018). However, this criterion alone is not sufficient to explain the factor structure. Therefore, factor loading values were examined. The EFA results indicate that the scale has a three-factor structure, with item loading values ranging from 0.566 to 0.814. It is observed that the 42-item scale consists of three sub-dimensions, and these three factors explain a total variance of 61.72%. In multi-factor designs, it is considered sufficient for the explained variance to exceed 50%. Additionally, it is noted that the factor loadings of the items are above 0.40 and are at an acceptable level (Hair et al., 2019).

The first factor explains 46.22% of the variance, with factor loadings ranging from 0.782 to 0.566. The items contributing to this factor (Item1, Item2, Item3, Item4, Item6, Item7, Item10, Item20, Item21, Item23, Item26, Item31) focus on the time individuals spend on digital platforms, the planned nature of this usage, and the feelings of compulsion regarding the use of digital tools. The contents of the items aim to measure individuals' perceptions of obligation towards digital technologies and the role of these tools in daily life. Therefore, this sub-dimension is labeled "Compulsive Use."

The second factor explains 9.74% of the variance, with factor loadings ranging from 0.707 to 0.814. The four items in this factor (Item15, Item36, Item37, Item38) emphasize the tendency to turn to digital usage to escape social interactions or

Table 3. Factor Loadings and Explained Variance Following Factor Extraction (PCA & Oblique Rotation)

Numbers at item pool (numbers after EFA)	Corrected item-total r	Factor1	Factor2	Factor3	Explained variance (%)
i7 (item1)	,545	,782			46.22
i3 (item2)	,604	,770			
i21 (item3)	,684	,768			
i20 (item4)	,578	,740			
i1 (item5)	,546	,712			
i4 (item6)	,619	,696			
i23 (item7)	,695	,685			
i2 (item8)	,662	,678			
i6 (item9)	,613	,648			
i26 (item10)	,700	,614			
i31 (item11)	,684	,607			
i10 (item12)	,712	,566			
i36 (item13)	,518		,814		9.74
i37 (item14)	,634		,778		
i38 (item15)	,650		,723		
i15 (item16)	,520		,707		
i28 (item17)	,692			-,823	5.69
i40 (item18)	,642			-,791	
i32 (item19)	,702			-,686	
i34 (item20)	,744			-,665	
i19 (item21)	,608			-,662	
i41 (item22)	,739			-,653	
i33 (item23)	,633			-,641	
Total explained variance					61.65
Initial Eigenvalue (Λ)		10.63	2.24	1.31	
KMO= 0.952; $\chi 2(253)$ =7688,896					
Bartlett Sphericity Test (p) = 0.000					

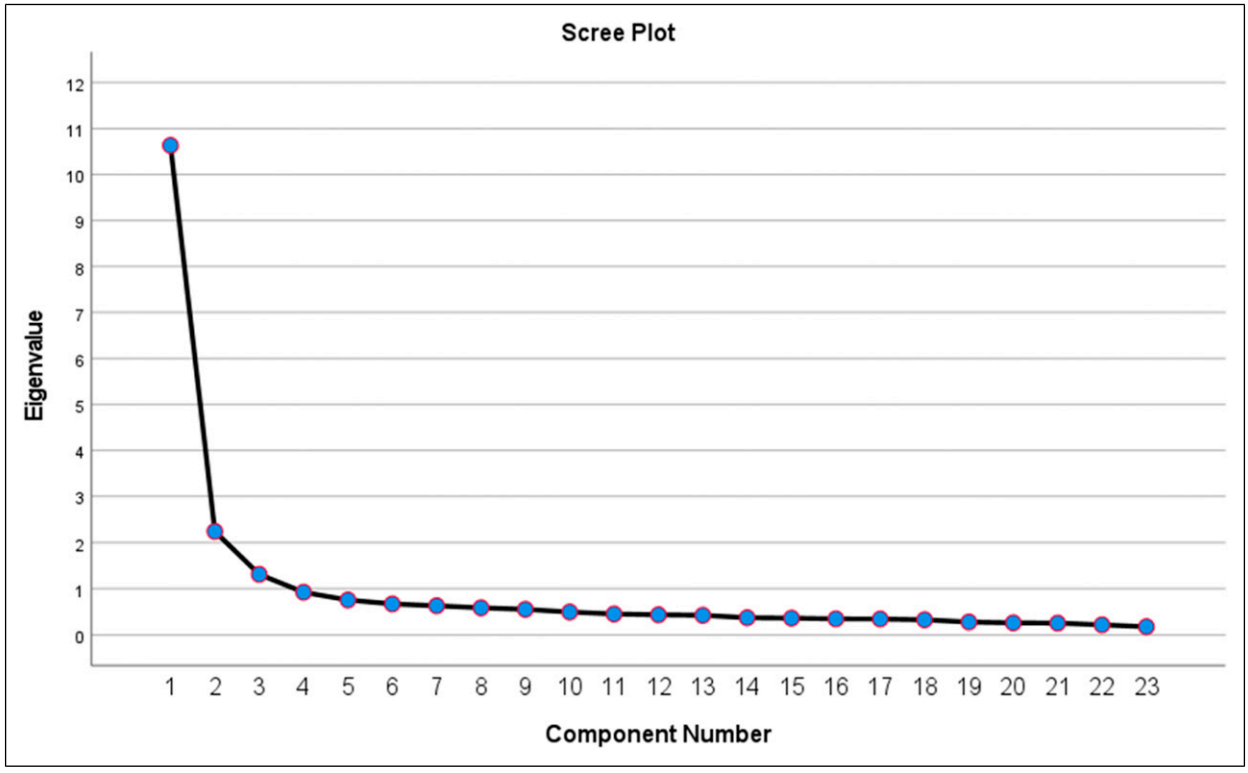

Figure 1. Scree plot depicting the number of factors retained based on eigenvalues

emotional situations. This process explains the avoidance of facing real situations by resorting to digital means. Hence, this sub-dimension is labeled "Escape-Oriented Use."

The third factor explains 5.69% of the variance, with factor loadings ranging from 0.641 to 0.823. The seven items in this sub-dimension (Item19, Item28, Item32, Item33, Item34, Item40, Item41) evaluate the restrictive effects of using digital platforms on individuals' social relationships and academic performance. The items relate to feelings of inadequacy when offline, difficulties in disconnecting from the digital environment, and the reflections of this situation on daily life. In other words, the items in this factor emphasize that the function of digital usage has begun to cause harm beyond its intended purpose. Thus, the third sub-dimension is labeled "Functional Impairment."

As a result of EFA, a more consistent factor structure and a scale with high measurement validity were obtained. The remaining items in the scale were structured to represent the core dimensions associated with digital addiction. Consequently, from a pool of 42 items, 19 items were removed through EFA analyses, resulting in a structure consisting of 23 items across 3 factors.

Structural Validity and Internal Consistency Evidence

The structural validity and internal consistency values of DASY indicate that the scale has a distinct factor structure and a high-level of reliability. According to Ozdamar (2013), if the Cronbach alpha coefficient is between 0.70 and 0.90, the data collection tool has high reliability, and if it is greater than 0.90, it has very high reliability. Based on this information, it can be seen that all factors have high reliability ($\alpha_{factor1} = .925$; $\alpha_{factor2} = .865$; and $\alpha_{factor3} = .900$), and the overall reliability of the scale is very high ($\alpha_{overall} = .946$). The internal consistency coefficients of the factors fall within the specified range. These values, which demonstrate that internal consistency has been achieved, are presented in Table 4.

Confirmatory Factor Analysis Results

Model Fit Indices and Evaluation of CFA Results

As previously mentioned, data were collected from a new sample that has similar characteristics to the EFA sample to test the accuracy of the structure obtained from EFA. This approach helps prevent the analysis from producing biased findings due to the likelihood of the sample providing similar responses. The fit indices calculated from this analysis are presented in Table 5.

When examining the CFA fit indices, it is observed that the scale structure is confirmed within the ranges presented in the literature (χ^2/df = 389.335/227 = 1.72). The χ^2/df ratio indicates that there is a good-level of fit between the model and the data. According to the absolute fit indices, the values of RMSEA (Root Mean Square Error of Approximation), GFI (Goodness-of-Fit Index), AGFI (Adjusted Goodness-of-Fit Index), CFI (Comparative Fit Index), IFI (Incremental Fit Index), PNFI (Parsimonious Normed Fit Index), and PGFI (Parsimonious Goodness of Fit Index) demonstrate excellent fit. The values of SRMR (Standardized Root Mean Square Residual), TLI (Tucker-Lewis Index; also known as the Non-normed Fit Index, NNFI), NFI (Normed-Fit Index), and RFI (Relative Fit Index) also show acceptable levels of fit. Additionally, the Hoelter Critical N value was calculated as 250 at the 5% significance level and 265 at the 1% level. These values indicate that the sample size is adequate for the model to be predicted validly (Schermelleh-Engel et al., 2003). The findings reveal that the structural validity of the tested model is strong and that the fit indices meet the proposed threshold values. In parallel with the CFA results, parameter estimates for each item were presented, allowing for the evaluation of the magnitude and significance of the item-factor relationships.

Parameter Estimates and Factor Loadings of the DASY

The purpose of CFA is to determine the structural validity of the scale by testing whether the items reliably measure the underlying (latent) constructs to which they belong. The strength and statistical significance of the relationships between each item and the relevant factors were evaluated by examining the unstandardized regression coefficient (β), standard error (SE), critical ratio (C.R.), and significance level (p) for each item. The relevant values are presented in Table 6.

According to CFA, the 12 items belonging to the first factor load significantly and strongly onto the factor structure. The first item in this factor was fixed as a reference item to ensure the model's identifiability ($\beta = 1.000$). Hair et al. (2019) suggest that when $\beta \geq 0.70$, the item loads very strongly under the factor, meaning it represents the factor very well. In this context, it is observed that all items have a very strong representation of the statistically significant factor ($0.715 \leq \beta \leq 1.284$). Additionally, $|C.R.| \geq 2.58$ indicates that the relevant item is significant at the 99% confidence interval (Arbuckle, 2007). It can be seen in Table 6 that all absolute values of the critical ratio (C.R.) are significant at the 99% confidence interval ($6.184 \leq |CR| \leq 19.253$). In light of these findings, it is evident that all items provide statistically significant contributions consistent with the theoretical structure of the scale, serving as strong indicators of DASY's reliability and validity as a measurement tool. Moreover, for the analysis of discriminant validity and reliability, the Fornell-Larcker criterion, composite reliability (CR), average variance explained (AVE) for explanatory level, maximum shared variance (MSV) for assessing shared explanatory variance among factors, and maximum reliability (MaxR(H)) for evidence of internal consistency were analyzed and presented in Table 7.

When examining all the values presented in Table 7 within the context of the values proposed by Fornell and Larcker (1981), it is evident that the scale demonstrates high levels of psychometric adequacy in terms of both reliability and validity. The CR values for all three factors are significantly above the threshold of 0.70. This indicates that each item consistently measures the structure to which it is associated (Fornell & Larcker, 1981). The MaxR(H) values are interpreted in the same manner. In this study, the smallest MaxR(H) value found was 0.917. Based on the CR and MaxR(H) values, it can be stated that the reliability level of the study is good.

The Fornell-Larcker Criterion is met when the square roots of the AVE values of the factors are greater than the correlation coefficients with other factors (Fornell & Larcker, 1981). The bold values in the Fornell-Larcker Criterion columns presented in Table 7 represent the $\sqrt{AVE}$ values of the relevant factors. The other values indicate the correlation values between the factors. In clearer terms, the correlation between Factor 1 and Factor 2 is -0.317, the correlation between Factor 1 and Factor 3 is 0.345, and the correlation between Factor 2 and Factor 3 is -0.009, with all $\sqrt{AVE}$ values being greater than the corresponding correlation values. These findings indicate that the Fornell-Larcker criterion has been met for all factors, and discriminant validity has been established in the model. The validated model is presented in Figure 2.

As shown in Figure 2, all the paths defined between each item and the associated factors are significant. From this, it can be concluded that the three factors identified through EFA and the structure consisting of 23 items have been validated, proving

Table 4. Cronbach's Alpha Values for the Scale and Subscale

Structure	Cronbach's alpha	Standardized alpha	Number of items
Factor 1	0.925	0.925	12
Factor 2	0.865	0.866	4
Factor 3	0.900	0.901	7
Scale Overall	0.946	0.946	23

Table 5. CFA Model's Goodness of Fit

Criteria	Observed values	Thresholds		Reference
		Acceptable	Excellent	
χ^2/df	1.72	2< χ^2/df≤4	0≤ χ^2/df≤2	(Tabachnick & Fidell, 2012)
RMSEA	0.044	.50<RMSEA≤0.80	0≤RMSEA≤.05	(Schumaker & Lomax, 2004)
SRMR	0.054	.05<SRMR≤.08	0≤SRMR≤.05	(Kenny et al., 2015)
GFI	0.915		GFI>AGFI	(Blunch, 2008; MacCallum & Sehee, 1997)
AGFI	0.896			
CFI	0.951	.90≤CFI<.95	.95≤CFI≤1	(Hu & Bentler, 1999)
TLI	0.946	.90≤TLI<.95	.95≤TLI≤1	(Hu & Bentler, 1999)
NFI	0.891	.80≤NFI<.95	.95≤NFI≤1	(Kenny et al., 2015)
RFI	0.879	.80≤RFI<.95	.95≤RFI≤1	(Hu & Bentler, 1999)
IFI	0.952		IFI>0.80	(Hu & Bentler, 1999)
PNFI	0.800		PNFI>0.5	(Hu & Bentler, 1999)
PGFI	0.752		PGFI>0.5	(Hu & Bentler, 1999)

χ^2=389.335; df=227.

that the model is appropriate. To demonstrate that DASY shows similarities with the literature in a theoretical context, the relationship between the data collected using a similar scale was also tested.

Convergent Validity

For convergent validity, variables should show a high-level of correlation with each other; however, if this correlation is too high, it may indicate a lack of discriminant validity, meaning that the variables behave as a single variable or produce identical results. Therefore, it is suggested that the correlation be evaluated within the range of $0.50 \leq r \leq 0.90$ (Hair et al., 2019). In this study, due to the normal distribution of the data, Pearson product-moment correlation coefficient analysis was conducted for convergent validity. The analysis findings are presented in Table 8.

Table 6. Unstandardized Regression Weights, Standard Errors, and Critical Ratios for the Digital Addiction Scale

Item	Factor	Beta (β)	Standard error (SE)	Critical ratio (C.R.)	p
item1	F1	1.0			
item2	F1	1.121	0.114	9.844	***
item3	F1	1.228	0.135	9.087	***
item4	F1	1.284	0.145	8.839	***
item5	F1	0.956	0.119	8.024	***
item6	F1	1.028	0.131	7.822	***
item7	F1	0.958	0.132	7.247	***
item8	F1	1.111	0.123	9.04	***
item9	F1	1.151	0.131	8.779	***
item10	F1	0.944	0.113	8.385	***
item11	F1	0.715	0.116	6.184	***
item12	F1	1.084	0.116	9.316	***
item13	F2	1.0			
item14	F2	0.757	0.04	19.021	***
item15	F2	0.761	0.04	19.253	***
item16	F2	0.699	0.038	18.273	***
item17	F3	1.0			
item18	F3	1.049	0.078	13.459	***
item19	F3	1.042	0.084	12.426	***
item20	F3	0.837	0.074	11.328	***
item21	F3	0.908	0.075	12.051	***
item22	F3	0.932	0.078	11.983	***
item23	F3	0.911	0.081	11.233	***

Table 7. Reliability and Validity

	CR	AVE	MSV	MaxR(H)	Fornell – Larcker criterion		
					Factor 1	Factor 2	Factor 3
Factor 1	.902	.506	.119	.917	0.711		
Factor 2	.918	.740	.101	.931	-0.317	0.860	
Factor 3	.905	.565	.119	.917	0.345	-0.009	0.752

DASY consists of three sub-factors, while DAS consists of five sub-factors. To test whether the psychometric sub-factors are related or form a pattern, the relationships among total scores and the sub-factors were also examined. Cohen (1988) considers relationships of 0.50 and above as high-level. However, while a correlation above 0.50 is expected for convergent validity, correlations above 0.90 indicate similarity, excessive overlap, and a weakness in conceptual distinctions (Campbell & Fiske, 1959; Hair et al., 2019). In this regard, it has been observed that DASY demonstrates convergent validity and that this relationship does not threaten discriminant validity ($r_{DASY\text{-}DAS} = 0.504$; $p < 0.001$). No relationship was found among the values determined between the sub-factors. In fact, some relationships are not statistically significant ($p > 0.05$). This indicates that when considered as separate variables, the sub-factors do not measure similar constructs, meaning that the latent variables identified as sub-factors are distinct from each other.

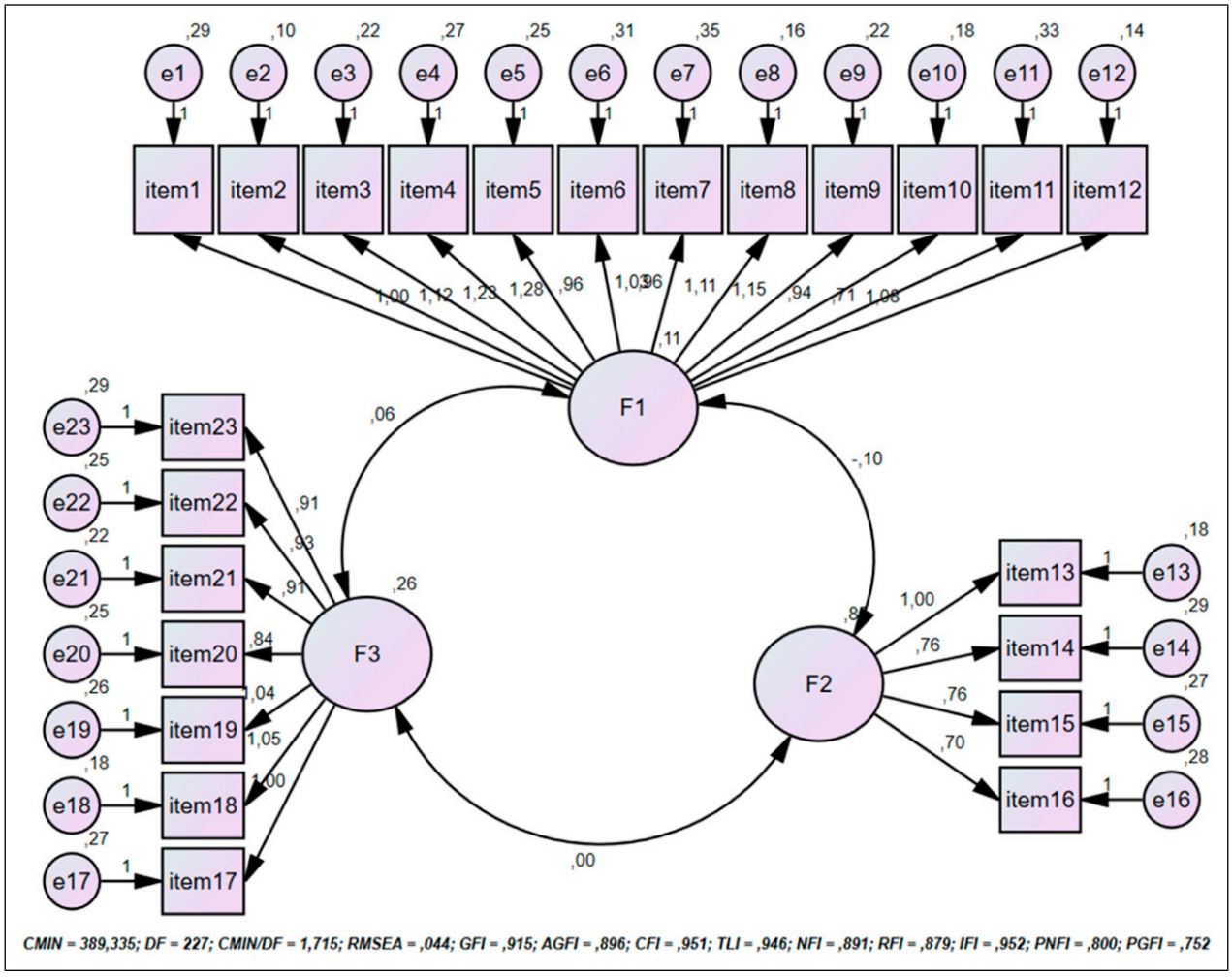

Figure 2. Path diagram

Table 8. Correlation Results Between the DAS and DASY Scales

	DAS_1	DAS_2	DAS_3	DAS_4	DAS_5	DAS
Factor_1	0.404**	0.078	0.130*	0.224**	0.272**	
Factor_2	-0.006	0.069	0.069	0.133*	0.311**	
Factor_3	0.238**	0.144**	0.214**	0.115*	0.175**	
DASY						0.504***

Results and Discussion

The DASY developed in this study is a self-reported scale consisting of 23 items under three factors, using a 7-point Likert type scale. Factor 1 explains 46.22%, Factor 2 explains 9.74%, and Factor 3 explains 5.69%. The entire scale accounts for 61.65% of the total variance. This structure has also been validated in a new sample consisting of different participants (χ^2/df = 1.72, $p < 0.001$, RMSEA = 0.044, SRMR = 0.054, NFI = 0.891, CFI = 0.951, GFI = 0.915). The internal consistency is high ($\alpha_{DASY} = .946$), and the scale has demonstrated discriminant validity, explanatory power, and reliability in the context of factors and structure (see Table 3). The similarity of this scale to the literature has been attempted to be determined through its relationship with another scale it may correspond to. It can be stated that DASY shows a statistically significant and high-level correlation of 0.504 with the study by Kesici and Tunc (2018), suggesting that it can produce findings parallel to the literature but unique to its own context. These findings are obtained by taking the total score from the scale or by scoring based on factors. The scale consists of 23 items, with each item scored on a 7-point Likert scale ranging from 0 to 6. There are no negatively scored items in the scale, so reverse coding is not necessary when obtaining the total score. The total score is obtained by summing the point values of the responses given to each item (DeVellis, 2017). Therefore, the range of total scores that participants can obtain from the scale varies between 0 and 138. The scale measures the concept of digital addiction, and due to the negative nature of this variable, higher total scores indicate a higher level of digital addiction. If the total score obtained needs to be treated as a discrete variable, it is considered appropriate to interpret the score ranges of 138-93 as high, 92-47 as medium, and 46-0 as low. This measurement range is deemed suitable in social sciences since zero does not express an absolute absence. The scoring and leveling of the sub-factors should also be calculated similarly.

In the literature, there are scales to measure the variable of digital addiction in a self-reported manner. The scales presented in Table 1 differ based on various contexts. Among these scales, the one developed by Kesici and Tunc (2018) shows a high correlation ($r_{DASY\text{-}DAS} = 0.504$; $p < 0.001$). In this context, it can be said that the developed scale is valid and reliable on its own, and when compared to another valid and reliable study in the literature, it is also valid and reliable. However, it appears to be statistically better in terms of explained variance and reliability compared to the compared scale. When examining another scale developed by Dilci (2019) that has a Turkish version, it is found to have higher explained variance and internal consistency than DASY. Although it shows similar characteristics in terms of the sample context, the scale is longer, consisting of 40 items, and is limited to the context of computer/mobile phone/TV/Internet. DASY includes items related to digital technologies and platforms, which differentiates it from Dilci (2019) in the context of academic use. When examining other studies conducted for Turkish usage purposes (Bagatarhan & Siyez, 2023; Durmaz et al., 2023; Oztemel & Tras, 2023; Turk et al., 2024; Yilmaz et al., 2023; Zengin et al., 2024; Çelik et al., 2023; Çimke et al., 2023), it is observed that the studies by Hawi et al. (2019) and Seema et al. (2021) are adaptation studies in various years and samples. In terms of explained variance and internal consistency, DASY is statistically in a good position compared to both the original scales and all adaptation scales. Therefore, it can be stated that a more valid and reliable scale is presented in the literature.

When examining other scales in the literature, it is observed that they particularly diversify in terms of sample context. While there are two scales developed with university students and young individuals that are similar to DASY, all other scales clearly differ in terms of sample context. The two scales that are similar in sample context (Dilci, 2019; Kesici & Tunc, 2018) are temporally disadvantaged. The main reason for the differentiation of the factors in the scale developed by Kesici and Tunc (2018) may be that it contains items that may not be current temporally. When examining the items of the scale developed by Dilci (2019), it is seen that they are device-based. However, nowadays, individuals' technology usage is more oriented towards platform use rather than device use (Meier, 2021). Therefore, it can be said that DASY is more advantageous than the previous scales in both temporal and contextual aspects.

The digital world is rapidly changing. From this perspective, the relevance of currency in measuring digital addiction has become quite important. It is known that individuals transfer their experiences in various categories such as academic, daily, social, and psychological to digital formats, especially in today's context where artificial intelligence tools are becoming widespread (Daniel et al., 2025; Pandey, 2024). At this point, it can be said that digital use has increased compared to the past, and situations of reliance on or dependence on digital technologies have also become more common. In this way, individuals

have opinions not only about taking digital notes and not needing to remember this information or finding non-digital content more cumbersome, but also about shifting their research and problem-solving methods to digital, not trusting unverified information from digital sources, and finding digital promotions more reliable (Baek et al., 2024; Daniel et al., 2025). From this perspective, it is not possible to call any digital use an addiction. Given today's conditions, which necessitate the use of digital technology, a person who uses technology for approximately five hours a day for academic or educational purposes cannot be described as addicted (Demetrovics et al., 2026; Throuvala et al., 2019). Or, digital usage time may be longer than in the past for purposes such as keeping up with current events, listening to music, attending meetings, or chatting to socialize (Kurtunlu & Buyukbaykal, 2025; Seema et al., 2021). Even for exploring a new place, virtual options are quite common today (Feher et al., 2023). In this context, it is clear that the indicators considered as addiction must also change. More explicitly, as the context of use has expanded, there is a necessity to broaden the context of previously developed measurement tools. It is obvious that up-to-date measurement methods and definitions are necessary to properly identify such uses and distinguish them from addiction. The literature review shows that the most recent scale was developed by Seema et al. (2021), and subsequent studies are adaptations of this work and previous studies. Based on the necessity to change the indicators of this scale, this scale development study was conducted, and a more current data collection tool has been introduced to the literature.

In summary, access to digital technologies or social, economic, and cultural opportunities at the national level are factors that can influence addiction (Wang et al., 2019). Therefore, criteria and parameters may vary at the national level (Dhir et al., 2015). Scales that have undergone validity and reliability studies in the national literature are adaptation studies conducted with higher education student samples. Scales developed through item writing are studies conducted with different sample groups. From this perspective, the validity of international scales in the national context has been questioned, and the development of new scale items and the production of alternatives to existing scales are seen as necessary.

Limitations and Suggestions

A three-factor scale was developed in this study. Given that the scale produces self-reported data, the lack of precise measurements and the limited variance explained by this scale constitute a limitation of this study, as with all social science measurements. Although digital addiction is measured with this scale, an inaccessible portion should be considered as unexplained variance. The DASY is limited to university students aged 18-30 and their experiences. Different findings may be produced on populations with different digital capabilities. Therefore, if used with a different sample, a CFA process is recommended. Furthermore, the data collected is limited to 2025, and evolving technologies may affect this measurement. Another limitation is that the scale was developed in Turkish. Because it may produce different findings in different cultures or languages, it is limited to the national context.

Today, digital addiction is rapidly increasing among young people, negatively affecting their social, academic, and psychological functionality (Kuss & Griffiths, 2017). Digital addiction is associated with psychological issues such as anxiety, depression, and stress, which threaten mental health (Andreassen, 2015), and can also lead to physical health problems. Long-term screen use results in eye strain, headaches, and sleep disorders, reducing the quality of life for young individuals (Wang et al., 2019). Therefore, preventing and controlling digital addiction is vital for protecting both the mental and physical health of young people. Early interventions and awareness-raising programs are seen as effective strategies for mitigating the negative effects of this addiction (Young, 2017).

Considering that the scale was developed with university students, testing it in diverse samples and conducting validation studies is expected to make a significant contribution to the literature. The scale comprises self-reported indicators of digital addiction, framed within psychometric properties as well as general academic and daily life contexts. It is well established that human physiology exhibits physical responses to addiction (Lyvers, 1998; Sezer Efe et al., 2023). Therefore, future research could enhance the findings by incorporating physical response measurements, such as EEG and eye-tracking, in conjunction with the data obtained from the scale. While this study builds on items from previous scales, it also introduces new items, making it essential to conduct adaptation studies in various cultural and contextual settings at the national level.

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Ethical Considerations

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. The study was approved by the Ethics Committee of Adiyaman University (Ethics approval number: 20/05/2025-2025/129).

Consent to Participate

Informed consent was obtained from all individual participants included in the study. Since the data were collected via an online survey, an electronic informed consent form was presented on the first page of the survey, detailing the study's purpose, data privacy, and the voluntary nature of participation. Only those who selected the "I agree to participate" option were granted access to the survey instruments.

Author Contributions

Derya Orhan Göksün: Conceptualization, Methodology, Software, Validation, Formal Analysis, Investigation, Resources, Data Curation, Writing (Original Draft/Review), Visualization, Supervision, Project Administration.
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Declaration of Conflicting Interests

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Data Availability Statement

This study adheres to Open Science principles regarding transparency and replicability. All measurement items, factor loadings, and model fit indices are explicitly reported within the manuscript to allow for scientific verification. The raw dataset supporting the conclusions of this study is not publicly available due to ethical restrictions and participant privacy. However, the data can be made available from the corresponding author upon reasonable request.

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Appendix

Appendix 1. Frequency Distribution of Scale Items Prior to Exploratory Factor Analysis

I	Never		Very rarely		Rarely		Sometimes		Frequently		Very frequently		Always		Mean	Sd	Skewness	Kurtosis
	n	%	n	%	n	%	n	%	n	%	n	%	n	%				
i1	11	2,07	40	7,52	63	11,84	174	32,71	174	32,71	50	9,40	20	3,76	3,30	1,25	-,309	,205
i2	60	11,28	72	13,53	104	19,55	185	34,77	62	11,65	31	5,83	18	3,38	2,53	1,48	,111	-,266
i3	26	4,89	59	11,09	70	13,16	184	34,59	129	24,25	36	6,77	28	5,26	3,04	1,42	-,123	-,120
i4	46	8,65	60	11,28	71	13,35	204	38,35	92	17,29	39	7,33	20	3,76	2,81	1,46	-,128	-,222
i5	173	32,52	85	15,98	116	21,80	105	19,74	35	6,58	11	2,07	7	1,32	1,63	1,48	,564	-,362
i6	18	3,38	58	10,90	56	10,53	165	31,02	128	24,06	64	12,03	43	8,08	3,30	1,49	-,156	-,377
i7	16	3,01	47	8,83	36	6,77	115	21,62	138	25,94	86	16,17	94	17,67	3,78	1,61	-,426	-,472
i8	96	18,05	79	14,85	95	17,86	131	24,62	67	12,59	28	5,26	36	6,77	2,42	1,73	,305	-,657
i9	135	25,38	87	16,35	100	18,80	119	22,37	50	9,40	25	4,70	16	3,01	2,00	1,64	,448	-,570
i10	83	15,60	96	18,05	84	15,79	131	24,62	83	15,60	31	5,83	24	4,51	2,42	1,66	,218	-,727
i11	109	20,49	68	12,78	82	15,41	147	27,63	76	14,29	31	5,83	19	3,57	2,34	1,67	,136	-,785
i12	109	20,49	74	13,91	97	18,23	128	24,06	73	13,72	33	6,20	18	3,38	2,29	1,66	,216	-,770
i13	70	13,16	91	17,11	104	19,55	147	27,63	76	14,29	30	5,64	14	2,63	2,40	1,52	,156	-,563
i14	115	21,62	89	16,73	80	15,04	101	18,98	74	13,91	32	6,02	41	7,71	2,36	1,85	,356	-,883
i15	71	13,35	67	12,59	55	10,34	138	25,94	90	16,92	50	9,40	61	11,47	2,95	1,84	-,023	-,917
i16	108	20,30	111	20,86	83	15,60	132	24,81	59	11,09	25	4,70	14	2,63	2,10	1,60	,365	-,640
i17	136	25,56	122	22,93	82	15,41	115	21,62	35	6,58	25	4,70	17	3,20	1,88	1,63	,644	-,328
i18	124	23,31	102	19,17	81	15,23	109	20,49	67	12,59	32	6,02	17	3,20	2,11	1,70	,391	-,795
i19	172	32,33	96	18,05	72	13,53	95	17,86	48	9,02	30	5,64	19	3,57	1,84	1,75	,631	-,620
i20	34	6,39	75	14,10	66	12,41	106	19,92	129	24,25	61	11,47	61	11,47	3,22	1,72	-,131	-,851
i21	97	18,23	90	16,92	70	13,16	118	22,18	91	17,11	33	6,20	33	6,20	2,46	1,77	,204	-,894
i22	98	18,42	99	18,61	99	18,61	116	21,80	67	12,59	34	6,39	19	3,57	2,25	1,65	,337	-,693
i23	38	7,14	50	9,40	67	12,59	130	24,44	117	21,99	75	14,10	55	10,34	3,28	1,67	-,229	-,648
i24	13	2,44	43	8,08	48	9,02	108	20,30	104	19,55	68	12,78	148	27,82	3,96	1,71	-,396	-,806
i25	126	23,68	87	16,35	79	14,85	112	21,05	67	12,59	34	6,39	27	5,08	2,22	1,78	,363	-,835
i26	42	7,89	74	13,91	69	12,97	149	28,01	96	18,05	67	12,59	35	6,58	2,98	1,64	-,066	-,720
i27	86	16,17	74	13,91	60	11,28	151	28,38	79	14,85	42	7,89	40	7,52	2,66	1,78	,091	-,837
i28	181	34,02	84	15,79	90	16,92	100	18,80	43	8,08	16	3,01	18	3,38	1,74	1,67	,682	-,348
i29	59	11,09	86	16,17	72	13,53	153	28,76	79	14,85	45	8,46	38	7,14	2,74	1,69	,117	-,715
i30	157	29,51	108	20,30	75	14,10	112	21,05	39	7,33	25	4,70	16	3,01	1,83	1,66	,630	-,458
i31	32	6,02	70	13,16	70	13,16	128	24,06	142	26,69	50	9,40	40	7,52	3,11	1,59	-,140	-,603
i32	156	29,32	105	19,74	82	15,41	111	20,86	45	8,46	23	4,32	10	1,88	1,80	1,60	,553	-,571
i33	162	30,45	104	19,55	85	15,98	97	18,23	45	8,46	22	4,14	17	3,20	1,80	1,67	,666	-,409
i34	124	23,31	106	19,92	90	16,92	124	23,31	52	9,77	23	4,32	13	2,44	1,99	1,59	,436	-,576
i35	156	29,32	103	19,36	68	12,78	118	22,18	46	8,65	26	4,89	15	2,82	1,87	1,68	,546	-,626
i36	37	6,95	69	12,97	75	14,10	135	25,38	98	18,42	53	9,96	65	12,22	3,14	1,72	-,005	-,789
i37	71	13,35	91	17,11	78	14,66	132	24,81	60	11,28	55	10,34	45	8,46	2,68	1,80	,206	-,887
i38	112	21,05	90	16,92	91	17,11	114	21,43	54	10,15	38	7,14	33	6,20	2,29	1,79	,403	-,746
i39	170	31,95	103	19,36	70	13,16	115	21,62	37	6,95	20	3,76	17	3,20	1,76	1,66	,669	-,389
i40	176	33,08	90	16,92	88	16,54	118	22,18	27	5,08	18	3,38	15	2,82	1,71	1,61	,682	-,237
i41	149	28,01	126	23,68	83	15,60	102	19,17	36	6,77	21	3,95	15	2,82	1,76	1,60	,726	-,207
i42	118	22,18	108	20,30	79	14,85	116	21,80	62	11,65	24	4,51	25	4,70	2,13	1,71	,459	-,635

Appendix 2. Content Validity Rates of Items Based on Expert Evaluation

Item No	Appropriate							Appropriate but needs revision							Should be removed							TA	TABNR	TRS	CVR	Final
	D	S	F	B	E	A	O	D	S	F	B	E	A	O	D	S	F	B	E	A	O					
1	1	1	1		1	1	1				1											6	1	0	0.71	Appropriate but needs revision
2	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
3	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
4	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
5	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
6	1	1	1			1	1					1						1				5	1	1	0.43	Should be removed
7	1	1	1			1	1					1						1				5	1	1	0.43	Should be removed
8		1	1	1	1	1	1	1														6	1	0	0.71	Appropriate but needs revision
9	1	1		1	1	1	1			1												6	1	0	0.71	Appropriate but needs revision
10	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
11	1	1	1			1	1				1	1										5	2	0	0.43	Should be removed
12			1	1	1			1	1				1								1	3	3	1	-0.14	Should be removed
13	1						1		1	1		1	1					1				2	4	1	-0.43	Should be removed
14	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
15	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
16	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
17	1		1	1	1	1	1		1													6	1	0	0.71	Appropriate but needs revision
18								1	1	1		1	1	1				1			1	0	6	1	-1.00	Should be removed
19		1	1	1	1	1	11	1														6	1	0	0.71	Appropriate but needs revision
20	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
21	1	1			1	1				1	1			1								4	3		0.14	Should be removed
22	1	1		1	1	1	1			1												6	1	0	0.71	Appropriate but needs revision
23	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
24		1	1	1	1	1	1	1														6	1	0	0.71	Appropriate but needs revision
25	1	1	1	1	1	1	1															7		00	1.00	Appropriate
26					1	1		1	1	1								1			1	2	3	2	-0.43	Should be removed
27	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
28	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
29		1			1	1		1		1	1			1								3	4	0	-0.14	Should be removed
30		1	1	1	1	1	1	1														6	1	0	0.71	Appropriate but needs revision
31	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
32	1	1	1		1	1	1											1				6		1	0.71	Appropriate but needs revision
33		1	1	1	1	1	1	1														6	1	0	0.71	Appropriate but needs revision
34		1	1	1	1	1	1	1														6	1	0	0.71	Appropriate but needs revision
35		1	1	1	1	1	1	1														6	1	0	0.71	Appropriate but needs revision
36	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
37		1	1	1	1	1		1						1								6	1	0	0.71	Appropriate but needs revision
38	1	1	1		1	1	1											1				6		1	0.71	Appropriate but needs revision

(continued)

Appendix 2. (continued)

Item No	Appropriate							Appropriate but needs revision							Should be removed							TA	TABNR	TRS	CVR	Final
	D	S	F	B	E	A	O	D	S	F	B	E	A	O	D	S	F	B	E	A	O					
39	1		1	1	1	1	1		1													6	1	0	0.71	Appropriate but needs revision
40	1	1	1	1	1	11	1															7	0	0	1.00	Appropriate
41	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
42	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
43	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
44	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
45	1	1				1	1			1		1						1				4	2	1	0.14	Should be removed
46	1		1	1	1	1	1		1													6	1	0	0.71	Appropriate but needs revision
47	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
48	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
49	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
50	1	1	1			1	1					1						1				5	1	1	0.43	Should be removed
51	1	1		1	1	1	1			1												6	1	0	0.71	Appropriate but needs revision
52	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
53	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
54	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
55	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
56	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
57	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
58	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
59	1	1	1		1	1	1											1				6	0	1	0.71	Appropriate but needs revision
60	1		1	1	1	1	1		1													6	1	0	0.71	Appropriate but needs revision 4416
61	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
62		1	1		1	1		1						1				1				4	2	1	0.14	Should be removed
63	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
64	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
65	1	1	1	1	1	1	1															7	0	0	1.00	Appropriate
66	1	1		1	1	1				1				1								5	2	0	0.43	Should be removed
67	1		1		1	1			1									1	1			4	1	2	0.14	Should be removed
68	1					1			1			1		1			1	1				2	3	2	-0.43	Should be removed