

Turkish Adaptation and Validation of the Short Smartphone Stress Scale for Adolescents

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Abstract

This study aimed to adapt the Short Smartphone Stress Scale (SSSS), which was developed by Huang et al. (2022), into Turkish and examine its psychometric properties among adolescents. The SSSS is a four-point Likert-type scale, consisting of nine items. With the increasing prevalence of smartphone use in youth populations, there is a growing need for culturally validated tools that can assess the psychological stress associated with digital engagement. The sample consisted of 297 secondary and high school students aged between 14 and 17, who completed the Turkish version of the SSSS along with measures of depression and subjective well-being. Confirmatory factor analysis (CFA) supported the original single-factor structure of the SSSS, with acceptable fit indices ($\chi^2(25) = 53.77$, $\chi^2/df = 2.15$, $p < .001$, GFI = .98, SRMR = .07, RMSEA = .06, AGFI = .93, and CFI = .95). All item loadings were statistically significant, ranging from .34 to .61. The internal consistency of the scale was adequate (Cronbach's alpha = .72). Convergent validity of the Turkish SSSS was supported by significant positive correlation with depression and negative correlation with subjective well-being. The findings of the study suggest that the SSSS Turkish form is a valid and reliable instrument for evaluating smartphone-related stress in adolescents. Given its brevity and clarity, the scale can be used effectively in school-based mental health screenings, psychological research, and digital well-being interventions. The study contributes to the growing literature on adolescent digital stress by providing a culturally relevant measurement tool suitable for the Turkish context.

Keywords: Smartphone stress, adolescents, scale adaptation, digital well-being.

Ergenler İçin Kısa Akıllı Telefon Stres Ölçeğinin Türkçeye Uyarlanması ve Geçerlilik Çalışması

Öz

Bu çalışma, Huang ve ark. (2022) tarafından geliştirilen Kısa Akıllı Telefon Stres Ölçeği'nin (SSSS) Türkçeye uyarlanmasını ve ergenler arasında psikometrik özelliklerinin incelenmesini amaçlamaktadır. Ölçek dörtlü Likert tipindedir ve dokuz maddeden oluşmaktadır. Günümüzde gençler arasında akıllı telefon kullanımının artmasıyla birlikte dijital etkileşim kaynaklı psikolojik stresi değerlendirebilecek kültürel olarak geçerli ölçme araçlarına ihtiyaç duyulmaktadır. Araştırmanın örneklemini, yaşları 14 ile 17 arasında değişen 297 ortaokul ve lise öğrencisinden oluşmaktadır. Katılımcılara SSSS Türkçe formunun yanı sıra depresyon ve öznel iyi oluş ölçekleri de uygulanmıştır. Doğrulamalı faktör analizi sonuçları, ölçeğin özgün tek faktörlü yapısını desteklemiş ve model uyum indeksleri kabul edilebilir düzeyde bulunmuştur ($\chi^2(25) = 53.77$, $\chi^2/df = 2.15$, $p < .001$, GFI = .98, SRMR = .07, RMSEA = .06, AGFI = .93, and CFI = .95). Maddelerin faktör yükleri .34 ile .61 arasında değişmiş ve tamamı istatistiksel olarak anlamlı bulunmuştur. Ölçeğin iç tutarlılığı yeterli düzeyde olup Cronbach alfa katsayısı .72 olarak hesaplanmıştır. Ölçeğin Türkçe formu puanlarının depresyonla pozitif ve öznel iyi oluşla negatif yönde ilişkili olması uyum geçerliği kanıtları olarak değerlendirilmiştir. Elde edilen bulgular, SSSS'nin Türkçe versiyonunun ergenlerde akıllı telefon kaynaklı stresi ölçmek için geçerli ve güvenilir bir araç olduğunu göstermektedir. Ölçeğin kısa ve anlaşılır yapısı, ölçeği okul temelli ruh sağlığı taramaları, psikolojik araştırmalar ve dijital iyi oluş müdahaleleri için kullanışlı hale getirmektedir. Bu çalışma, dijital stres literatürüne kültürel açıdan uyarlanmış yeni bir ölçme aracı kazandırarak önemli bir katkı sunma potansiyeli taşımaktadır.

Anahtar Kelimeler: Akıllı telefon stresi, ergenler, ölçek uyarlama, dijital iyi oluş

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INTRODUCTION

In the digital age, smartphones have become an indispensable aspect of daily life, particularly among adolescents. These devices facilitate education, social interaction, and entertainment, presenting both opportunities and challenges for young users. While smartphones enhance communication and access to information, concerns have emerged regarding their potential adverse effects, including elevated levels of stress, disrupted sleep patterns, and emotional distress (Rose et al., 2022). Recent studies suggest that the way adolescents engage with smartphones—whether for academic purposes, social networking, or entertainment—significantly influences their well-being (Elavsky et al., 2022). For instance, excessive smartphone use has been associated with increased risk of anxiety, depression, and social withdrawal in young populations, with problem-avoidant use (e.g., to suppress worries or avoid negative thoughts) being a key driver of emotional disturbance (Kater & Schlarb, 2020). Globally, studies indicate that nearly one in three adolescents may exhibit problematic smartphone use patterns, emphasizing the urgency of addressing its psychological ramifications (Goswami & Deshmukh, 2023). As smartphone usage continues to rise worldwide, understanding its impact on adolescent mental health and stress levels has become a critical area of research.

In response to this growing concern, recent scholarly efforts have increasingly focused on the concept of smartphone-induced stress, which refers to the psychological and emotional strain resulting from excessive and often compulsive digital engagement. This form of stress frequently manifests in adolescents as anxiety, reduced emotional well-being, and cognitive overload (Huang et al., 2022). Current research emphasizes that smartphone stress encompasses several interrelated dimensions, including persistent social pressure to remain online, an overwhelming number of notifications, and dependency on digital communication (Jeong, 2023). One particularly salient factor within this landscape is the Fear of Missing Out (FoMO)—a pervasive anxiety about being excluded from online interactions or social updates (Gioia et al., 2021). Adolescents experiencing FoMO are more prone to excessive smartphone monitoring, disturbed sleep, and a sense of inadequacy, all of which contribute significantly to stress and emotional dysregulation (Kater & Schlarb, 2020). Additionally, the internalization of stress due to digital overexposure has been shown to mediate the relationship between smartphone dependence and broader mental health challenges, particularly in adolescents with pre-existing anxiety symptoms (Lee et al., 2023).

The psychological consequences of smartphone-induced stress extend beyond the individual level, influencing adolescents' social environments and support systems. Numerous studies have demonstrated that high levels of smartphone-related stress are closely linked to reduced social support, deteriorating family relationships, and impaired psychological resilience (Kwak, 2023). Adolescents who report elevated smartphone stress often experience greater social anxiety, diminished self-worth, and weakened interpersonal bonds, which, in turn, heighten their dependence on virtual platforms as a maladaptive coping mechanism (Abu Khait et al., 2024). Similarly, recent data highlight that smartphone overdependence is significantly associated with loneliness, depressive symptoms, and heightened stress, particularly when combined with interpersonal conflicts at home or school (Yun & Choi, 2024). These findings collectively underscore the importance of fostering strong familial and peer-based support systems to mitigate the adverse psychosocial outcomes of digital stress (Rachubińska et al., 2023).

Although global research in this area has expanded considerably, country-specific analyses remain essential due to cultural and contextual differences in digital behavior. In Turkey, recent findings mirror global trends, indicating a marked increase in adolescent smartphone dependency in recent years. Notably, 77.3% of adolescents in Turkey report using their smartphones for more than four hours daily, and 34.8% display symptoms consistent with smartphone addiction (Yağci Şentürk et al., 2024). However, existing literature in the Turkish context has primarily concentrated on smartphone addiction, screen time, and general well-being, while relatively few studies have explored smartphone-induced stress as a distinct psychological phenomenon (Parlak et al., 2023). Furthermore, research suggests that academic pressure and emotional challenges are key drivers of excessive digital engagement among Turkish adolescents, pointing to a potential cyclical relationship between stress and smartphone dependence (Wang et al., 2020). This highlights the need for culturally appropriate tools and frameworks to assess and interpret smartphone stress in diverse populations (Avci et al., 2023).

Responding to these challenges, intervention strategies have increasingly sought to promote healthier digital habits and emotional regulation among adolescents. One notable initiative, the Be Aware of Stress smartphone application, has shown promising results in reducing perceived stress and enhancing positive thinking in at-risk adolescents through targeted cognitive-behavioral strategies (Hengudomsu et al., 2024). These types of interventions not only offer scalable and accessible support but also underscore the importance of early

identification and prevention in digital mental health. However, to ensure such interventions are effective and appropriately targeted, there is a pressing need for standardized, validated measurement tools that can reliably capture the unique stressors associated with smartphone use. In this context, the Smartphone Stress Scale (SSS) was developed by Huang et al. (2022) to provide a multidimensional assessment of smartphone-induced stress. The original long form evaluates stress across six domains: unsatisfactory communication, unmet recreational motivation, online learning burden, social concerns, overloaded notifications, and exposure to online verbal attacks. Due to its length and complexity, a short form—the Short Smartphone Stress Scale (SSSS) (Huang et al., 2022)—was later introduced by the same authors to allow rapid screening and reduce respondent fatigue, especially in adolescent populations. Short-form tools have been shown to improve response quality by minimizing cognitive burden while maintaining sufficient psychometric rigor (Rentzsch et al., 2021; Stavradi et al., 2022). Recently, the SSSS was also employed in a Chinese adolescent sample to investigate co-occurrence patterns of smartphone addiction and academic burnout, demonstrating its utility in identifying stress-linked behavioral profiles in large-scale analyses (Yao et al., 2025).

Despite its growing international application, the SSSS has not yet been adapted to Turkish, and this study represents the first such effort. Unlike existing tools such as the Smartphone Addiction Scale or the Mobile Phone Problem Use Scale—which primarily focus on addictive behaviors or screen time—the SSSS directly targets smartphone-induced psychological stress. This distinction is essential, as digital stress is defined as the emotional and cognitive strain arising from complex digital interactions, including internal pressures (e.g., Fear of Missing Out) and external triggers (e.g., intrusive notifications or online conflicts). By offering a brief yet theoretically grounded measure, the SSSS provides researchers and practitioners with a focused lens through which to assess digital stress as a distinct construct, rather than as a secondary symptom of problematic use.

Building upon the identified research gap in Turkey, this study employs the Short Smartphone Stress Scale (SSSS) (Huang et al., 2022) to examine smartphone stress among Turkish adolescents, contributing to both the localization and cross-cultural generalizability of the scale. While prior studies have primarily focused on smartphone addiction and digital dependency, limited research has explored the specific stress-related consequences of excessive smartphone use in the Turkish context. By implementing this validated measurement tool, the present study aims to cultivate a more refined understanding of the psychological and social repercussions of smartphone stress within a culturally relevant framework. Additionally, findings from this research will offer valuable insights for policymakers, educators, and mental health professionals, facilitating the development of targeted interventions to address the challenges posed by digital stress in adolescent populations. In doing so, it lays the groundwork for developing culturally sensitive intervention strategies that may be adapted and implemented in broader international contexts.

METHOD

This study employed a quantitative, cross-sectional research design to examine the validity and reliability of the Short Smartphone Stress Scale (SSSS) Turkish form, as well as to explore the relationships between smartphone-related stress, subjective well-being, and depressive symptoms among adolescents. Data were collected through self-report questionnaires and analyzed using correlational and confirmatory factor analysis techniques. The following section presents the methodological framework of the study in detail, including information about the participants, data collection procedures, measurement instruments, and statistical analyses, to ensure transparency and replicability of the research process.

Participants

The study group was formed using a convenience sampling method, and data collection was conducted online. Initially, 305 adolescents participated in the survey. However, as part of a data quality check, responses from eight participants who failed to respond correctly to control items were excluded. Consequently, the final sample included 297 participants. Of these participants, 157 (52.9%) identified as female and 140 (47.1%) as male. The participants' ages ranged from 11 to 19 years, with a mean age of 14.81 years ($SD = 2.32$). Of the participants, 112 (37.8%) were enrolled in secondary school (grades 5–8), and 285 (62.2%) were attending in high school (grades 9–12). Participants also reported their average daily smartphone usage. The mean daily smartphone use was 4.03 hours ($SD = 2.89$). Additionally, adolescents were asked to rate their families' socioeconomic status using a 10-point scale (1 = very low, 10 = very high). The mean perceived socioeconomic status was 6.21 ($SD = 2.11$). Descriptive statistics related to participants' demographic characteristics are presented in Table 1.

Table 1. Descriptive Statistics of Participant Demographics

		f	%
Gender	Female	157	52.9
	Male	140	47.1
School Level	Secondary school	112	37.8
	High school	285	62.2
School Type	Imam hatip secondary school	7	2.4
	Secondary school	105	35.4
	Anatolian high school	109	36.7
	Anatolian imam hatip high school	9	3.0
	Vocational and technical anatolian high school	60	20.2
	Science high school	7	2.3
Grades	5th grade	23	7.7
	6th grade	40	13.5
	7th grade	30	10.1
	8th grade	19	6.4
	9th grade	35	11.7
	10th grade	56	18.9
	11th grade	57	19.2
	12th grade	37	12.5
Daily Smartphone Usage Time	Less than 3 hours	99	33.3
	3-5 hours	141	47.5
	More than 5 hours	57	19.2
Smartphone Ownership Period	Less than 1 year	79	26.6
	1-2 years	51	17.2
	3-5 years	116	39.1
	More than 5 years	51	17.2

*f= frequency; % = percentage.

Research Ethics & Procedures

This study received ethical approval from the Manisa Celal Bayar University Social and Humanities Sciences Research and Publication Ethics Committee with the issue number of E--050.01-905042 and date of 29.11.2024. Data were collected online using a self-report questionnaire administered through a secure survey platform. Participation in the study was entirely voluntary. The survey link was distributed to adolescents with the assistance of school teachers. Prior to data collection, all participants were informed about the study's purpose, and written consent was obtained. Anonymity and confidentiality were ensured throughout the research process.

In adapting the SSSS into Turkish, the procedures recommended by the International Test Commission (ITC) Guidelines for Translating and Adapting Tests (2017) were followed. In addition, translation-related issues emphasized by Byrne (2016) were considered. According to ITC (2017), test adaptation should address both linguistic and cultural equivalence between the original and target populations. The adaptation process began with an expert review. Two researchers specialized in cyberpsychology independently evaluated the conceptual and item-level relevance of the SSSS in the Turkish context. Both experts confirmed that the theoretical basis and the items of the scale were culturally appropriate and meaningful for Turkish adolescents. Next, two native Turkish speakers fluent in English independently translated each item into Turkish. Their translations were compared and consolidated into a single consensus version. This version was then back-translated into English by a professional bilingual translator. The original English items were compared with the back-translated versions by both the translator and the research team to ensure semantic and conceptual consistency. Following the translation phase, the Turkish version of the SSSS was pilot tested with a group of 15 adolescents. During the in-person interviews, the participants were requested to identify any items they found unclear or difficult to understand, and to suggest alternative wording. Based on their feedback, no modifications were necessary, as all items were deemed understandable and culturally appropriate.

In addition to SSSS, Adolescent Subjective Well Being Scale (ASWBS) (Eryılmaz, 2009) and The Kutcher Adolescent Depression Scale (KADS-6) (LeBlanc et al., 2002) were also applied to evaluate the convergent validity of the Turkish version. A review of the relevant literature indicates a negative correlation between digital stress and subjective well-being (Zheng, 2022; Zhu & Wang, 2025), as well as a positive correlation between digital stress and depression (Kim and Ahn, 2023; Sharma et al., 2023).

Measures

Short Smartphone Stress Scale (SSSS)

The SSSS, a nine-item scale, was developed by Huang et al. (2022) to assess adolescents' levels of smartphone-related stress. Items are rated on a four-point Likert scale ranging from "1 = never" to "4 = always," with higher scores indicating greater smartphone stress. The scale was originally validated in three independent samples. The Cronbach's alpha coefficients were .90, .93, and .85, respectively. The test-retest reliability was reported as .68. Confirmatory factor analysis (CFA) conducted in two samples indicated a good model fit for the single-factor structure (Sample 1: $\chi^2 = 175.509$, $df = 25$, CFI = .99, TLI = .99, RMSEA = .074; Sample 2: $\chi^2 = 54.132$, $df = 24$, CFI = .99, TLI = .99, RMSEA = .04). Convergent validity analyses revealed that SSSS scores were positively correlated with anxiety and depression measures, indicating strong construct alignment. In the current study, the Cronbach's alpha coefficient for the Turkish version of the SSSS was calculated as .72, suggesting acceptable internal consistency.

Adolescent Subjective Well Being Scale (ASWBS)

The ASWBS is a multidimensional instrument designed to assess adolescents' perceived well-being (Eryılmaz, 2009). The scale consists of 15 items rated on a five-point Likert scale ranging from "1 = totally disagree" to "5 = totally agree." The ASWBS comprises four sub-dimensions: satisfaction with family relationships, satisfaction with significant others, life satisfaction, and positive feelings. A total well-being score can also be obtained by summing all items. Higher scores reflect greater subjective well-being. In the original development study, the Cronbach's alpha coefficient was reported as .86, and the test-retest reliability coefficient was .83 (Eryılmaz, 2009). In the present study, the internal consistency reliability for the ASWBS was calculated as .92, indicating excellent internal consistency.

The Kutcher Adolescent Depression Scale (KADS-6)

The KADS-6 is a brief screening tool developed to assess depressive symptoms in adolescents aged 11 and older. The scale consists of six items, each rated on a four-point Likert scale ranging from 0 (almost never) to 3 (always). There are no reverse-scored items, and a total score of 6 or above suggests the potential presence of depression. The KADS-6 was developed by LeBlanc et al. (2002) as a shortened version of the original 16-item scale. In the original study, the internal consistency of the scale was reported with a Cronbach's alpha of .80. The Turkish adaptation of the KADS-6 was conducted by Tatar and Bekiroğlu (2019). Confirmatory factor analysis (CFA) supported a unidimensional structure, with excellent fit indices ($\chi^2 = 49.568$, $df = 9$, GFI = .99, AGFI = .98, NFI = .99, CFI = .99, RMR = .02, RMSEA = .05). In their validation study with 1,931 adolescents, the Cronbach's alpha was .82. In the current study, the internal consistency reliability of the Turkish version of the KADS-6 was found to be .84, indicating good reliability.

Demographic Form

A demographic information form was used to collect data on participants' background characteristics. This form included questions regarding gender, grade, and school type. Participants were also asked to report their perceived family socioeconomic status, the length of time they had owned a smartphone, and their average daily smartphone usage.

Data Analysis

To examine the construct and convergent validity of the SSSS Turkish form, confirmatory factor analysis (CFA) was performed using the maximum likelihood estimation method. Although opinions vary regarding optimal sample size for CFA, previous studies suggest that 200 or more participants are sufficient (Comrey & Lee, 1992; Hoe, 2008; Singh et al., 2016). With data from 297 adolescents, the current sample met this criterion. Before conducting CFA, assumptions of univariate and multivariate normality were tested. Skewness and kurtosis values were found to be within the acceptable range of -1.5 to +1.5, pointing to univariate normality (Tabachnick et al., 2007). Multivariate normality was confirmed by the elliptical distribution observed in the scatter plot matrix (Sheather & Sheather, 2009).

Model fit was assessed using the following indices: chi-square to degrees of freedom ratio (χ^2/df), goodness of fit index (GFI), standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA), adjusted goodness of fit index (AGFI), and comparative fit index (CFI), following the guidelines by Brown (2015) and Schermelleh-Engel et al. (2003). Convergent validity was evaluated using Pearson correlation coefficients between the SSSS, the Adolescent Subjective Well-Being Scale (ASWBS), and the Kutcher Adolescent Depression Scale (KADS-6). Criterion-related validity was tested by examining the correlation between SSSS scores and participants' average daily smartphone usage. Reliability was assessed through Cronbach's alpha and item-total correlations. Additionally, composite reliability (CR) and average variance extracted (AVE) values were calculated.

FINDINGS

This section presents the findings of the study, including analyses of construct, convergent, and criterion-related validity, as well as internal consistency reliability of the Turkish version of the SSSS.

Construct Validity of SSSS Turkish Form

The original version of the SSSS is structured as a single-factor model. To examine whether this structure is valid in the Turkish context, a confirmatory factor analysis (CFA) was conducted on the adapted version. The analysis indicated that the model demonstrated acceptable fit indices: $\chi^2(25) = 53.77$, $\chi^2/\text{df} = 2.15$, $p < .001$, GFI = .98, SRMR = .07, RMSEA = .06, AGFI = .93, and CFI = .95. These values fall within the acceptable thresholds proposed by Schermelleh-Engel et al. (2003) (Table 2).

Table 2. Goodness-of-Fit Indices for the SSSS Turkish Form

Fit Measure	Good Fit	Acceptable Fit	Measure
χ^2/df	$0 \leq \chi^2/\text{df} \leq 2$	$2 < \chi^2/\text{df} \leq 3$	2.15
GFI	$.95 \leq \text{GFI} \leq 1.00$	$.90 \leq \text{GFI} < .95$.98
SRMR	$0 \leq \text{SRMR} \leq .05$	$.05 < \text{SRMR} \leq .10$.07
RMSEA	$0 \leq \text{RMSEA} \leq .05$	$.05 < \text{RMSEA} \leq .08$.06
AGFI	$.85 \leq \text{AGFI} < .90$	$.90 \leq \text{AGFI} < 1.00$.93
CFI	$.97 \leq \text{CFI} \leq 1.00$	$.95 \leq \text{CFI} < .97$.95

Furthermore, the results of the Confirmatory Factor Analysis (CFA) showed that the item loadings of the Turkish SSSS form items ranged from .34 to .61, $p < .001$ (Table 3). Factor loadings that exceeded the recommended cut-off value of .30 indicated that all items exhibited substantial saturation (Kline, 1998).

Table 3. Factor Loadings for SSSS Turkish Form Items

Items	Factor loadings (95% CI)	P
Item 1	.34 [.25, .43]	< .001
Item 2	.35 [.26, .45]	< .001
Item 3	.53 [.43, .63]	< .001
Item 4	.46 [.34, .57]	< .001
Item 5	.42 [.30, .53]	< .001
Item 6	.47 [.38, .56]	< .001
Item 7	.39 [.28, .50]	< .001
Item 8	.61 [.50, .72]	< .001
Item 9	.54 [.42, .65]	< .001

Convergent Validity of the SSSS Turkish Form

Convergent validity was assessed using Pearson correlation analyses between the SSSS, the Adolescent Subjective Well-Being Scale (ASWBS), and the Kutcher Adolescent Depression Scale (KADS-6). The results revealed a significant moderate positive correlation between SSSS and KADS-6 scores ($r = .34$, $p < .01$), indicating that higher levels of smartphone-related stress were associated with greater depressive symptoms. Additionally, a significant small negative correlation was found between the SSSS and ASWBS scores ($r = -.19$, $p < .01$), suggesting that increased smartphone stress is related to lower subjective well-being (see Table 4).

Table 4. Internal Consistencies and Intercorrelations of Study Variables

		1.	2.	3.
1.	SSSS Turkish form – Smartphone stress	(.72)		
2.	ASWBS - Subjective well-being	-.19**	(.92)	
3.	KADS-6 – Depression	.34**	-.58**	(.84)

Notes: Values in parenthesis indicate Cronbach's alpha internal consistency coefficients.

*p < .05, **p < .01

Criterion-Related Validity of the SSSS Turkish Form

Criterion-related validity is a method of test validation that assesses the extent to which scores on an inventory or scale are correlated with external, non-test criteria (Cohen & Swerdlik, 2005). It was evaluated by examining the relationship between adolescents' daily smartphone usage time and their scores on the SSSS. A Pearson correlation analysis revealed a significant small positive correlation between the two variables ($r = .21$, $p < .05$), indicating that higher smartphone use is associated with greater levels of smartphone-related stress.

Reliability of the SSSS Turkish Form

The internal consistency of the Turkish version of the SSSS was assessed via Cronbach's alpha. The coefficient was calculated as .72, indicating acceptable reliability, as values above .70 are generally considered adequate (Bland & Altman, 1997). In addition to Cronbach's alpha, composite reliability (CR) was computed using parameters derived from the CFA model. The CR value was .71, which also meets the threshold for acceptable internal consistency. According to Hair et al. (2019), CR values of .70 or higher demonstrate sufficient reliability in psychological scales. The AVE value was calculated as .32. According to Fornell and Larcker (1981) AVE values higher than .50 acceptable. However, as asserted by numerous researchers, in instances where the AVE value is below .50 but the CR value is above .60 and CR value exceeds AVE value, the convergent validity of the construct remains adequate (Byrne, 2010; Fornell & Larcker, 1981; Lam, 2012).

DISCUSSION

The results of the CFA supported the construct validity of the SSSS Turkish form, indicating that the original single-factor structure was preserved in the Turkish adolescent sample. All items demonstrated statistically significant loadings ranging from .34 to .61, suggesting that each item adequately represented the underlying construct. The model's fit indices, including $\chi^2(25) = 53.77$, $\chi^2/df = 2.15$, $p < .001$, GFI = .98, SRMR = .07, RMSEA = .06, AGFI = .93, and CFI = .95, were within acceptable ranges, affirming the scale's unidimensional structure. These findings are consistent with the original validation study by Huang et al. (2022), which reported similarly strong model fit and item saturation across three independent adolescent samples (Huang et al., 2022). The structural validity of other smartphone-related stress and dependence measures among adolescents also reinforces the robustness of unidimensional models. For example, Clark and Harris (2021) developed the Smartphone Connectivity Stress Scale, which showed strong factor loadings and internal consistency across both adolescent and adult population. Similarly, Souza (2020) identified a coherent four-factor structure in the Smartphone Influence Scale for Adolescents, reporting high reliability coefficients ($\Omega = .91$) and meaningful construct association. Our findings also align with psychometric studies conducted in culturally distinct adolescent populations. For instance, Quiroz et al. (2024) confirmed the construct validity of a multidimensional smartphone addiction scale in Peruvian adolescents, while Andrade et al. (2022) demonstrated solid CFA results and internal consistency ($\alpha = .72$) in a Brazilian sample. Taken together, these findings reinforce that the Turkish adaptation of the SSSS is consistent with current psychometric standards and is a structurally valid tool for assessing smartphone-related stress in adolescents across different cultural settings.

The convergent validity of the SSSS Turkish form was supported by its significant associations with related psychological constructs. In particular, smartphone-related stress was positively correlated with depressive symptoms and negatively correlated with adolescents' subjective well-being. These relationships indicate that the SSSS captures meaningful dimensions of psychological functioning, consistent with its theoretical foundation. The observed correlations are aligned with findings from previous studies demonstrating that problematic

smartphone use among adolescents is frequently linked with elevated depressive symptoms and reduced well-being. For example, Kim and Ahn (2023) found that depression significantly mediated the relationship between smartphone over-dependence and diminished well-being, suggesting a cascading effect whereby excessive use heightens emotional strain, ultimately undermining life satisfaction. Similarly, Huang et al. (2022) reported moderate to strong correlations between smartphone stress and both anxiety and depression, reinforcing the SSSS as a valid tool for capturing distress-related dimensions among adolescents. In another study, Zheng (2022) highlighted a consistent association between excessive smartphone use and reduced psychological well-being, particularly through mechanisms such as emotional exhaustion, negative affect, and fear of missing out. Further evidence by Sharma et al. (2023) showed that the majority of adolescents identified as smartphone-addicted also exhibited clinical levels of depression, pointing to a robust and widespread comorbidity between these variables. Moreover, Zhu and Wang (2025) found that even when smartphone use is socially oriented, its cumulative psychological toll can lead to depressive symptoms, especially among adolescents lacking emotional regulation strategies. Together, these findings support the convergent validity of the SSSS Turkish form by demonstrating its significant relationship with psychological indicators that are both theoretically and empirically connected to smartphone-induced stress.

The criterion-related validity of the SSSS Turkish form was supported by its significant positive correlation with adolescents' daily smartphone usage time. This finding suggests that the more adolescents use their smartphones throughout the day, the more likely they are to report elevated levels of smartphone-related stress, reinforcing the ecological validity of the scale. Similar patterns have been consistently documented in recent literature. For instance, Jeong (2023) found that smartphone usage time significantly mediated the relationship between perceived stress and anxiety, highlighting its dual role as both a behavioral indicator and a psychological stress amplifier. Likewise, Seo et al. (2024) demonstrated that adolescents who used smartphones excessively (over four hours daily) reported markedly higher levels of stress, suicidal ideation, and substance use, particularly when usage exceeded critical daily thresholds. Kater and Schlarb (2020) offered further insight by showing that excessive bedtime smartphone use, especially for worry avoidance or emotional distraction, was associated with both stress and poor sleep quality among adolescents. Additionally, behavioral health indicators such as dietary habits and emotional states were found to correlate with smartphone overuse; Mougharbel (2023) reported that adolescents with excessive screen time also exhibited increased loneliness, sadness, and anxiety, along with unhealthy dietary behaviors. Dogra and Sharma (2024) also noted that adolescents with longer average screen time were more likely to belong to psychological profiles characterized by greater emotional distress and reduced regulatory control. Collectively, these findings reinforce the utility of smartphone use duration as a behavioral criterion for stress assessment and substantiate the criterion-related validity of the SSSS in adolescent populations.

The reliability analysis of the SSSS Turkish form demonstrated acceptable internal consistency, with a Cronbach's alpha of .72 and a composite reliability (CR) value of .71. These findings indicate that the scale maintains sufficient measurement stability and internal coherence, particularly considering its concise, single-factor structure. In the context of psychological scale development, a Cronbach's alpha value above .70 is generally accepted as adequate for initial validation studies, especially for brief instruments designed for rapid assessment. The reliability values obtained in the present study are consistent with those reported in the original scale development by Huang et al. (2022), where internal consistency ranged from .85 to .96 across multiple adolescent samples and test-retest reliability values fell between .68 and .72. Other similar tools used to assess smartphone-related stress and addiction among adolescents have also yielded comparable reliability metrics. For instance, Clark and Harris (2021) validated the Smartphone Connectivity Stress Scale, reporting $\alpha = .87$ and two-week test-retest reliability of $r = .82$, demonstrating robust temporal stability and internal agreement. Ching et al. (2020) in their adaptation of the Smartphone Addiction Scale Short Form for Malaysian adolescents, found a Cronbach's alpha of .80, reinforcing the suitability of such brief tools for adolescent populations. Likewise, Andrade et al. (2022) reported $\alpha = .81$ and ICC = .846 for Smartphone Addiction Scale Short Form, indicating both internal consistency and test-retest reliability among Brazilian adolescents. Moreover, Souza (2020) emphasized high structural reliability for their adolescent-targeted Smartphone Influence Scale, with McDonald's omega reaching .91. These converging findings from diverse cultural contexts confirm that the reliability metrics of the SSSS Turkish form are in line with psychometric expectations and reinforce the scale's dependability for use in both research and applied settings.

In addition to its adherence to international test adaptation standards, the Turkish SSSS offers notable practical advantages. The study followed the International Test Commission (ITC) Guidelines for Translating and Adapting Tests (2017), ensuring both linguistic and cultural equivalence throughout the adaptation process. Its brief and clear format allows for quick administration, which is especially important when assessing adolescents

who may struggle with attention or fatigue during lengthy assessments. Recent literature highlights a growing preference for short-form tools in psychological research, particularly when working with young populations. Short measures have been shown to reduce cognitive fatigue and improve data quality in adolescent evaluations (Stavraki et al., 2022). Similarly, short and ultra-short forms are recommended for large-scale studies and time-limited settings involving adolescents (Rentzsch et al., 2021). Therefore, the SSSS is well-positioned for use in educational, clinical, and community-based settings where time efficiency and usability are essential.

Taken together, the findings of this study provide robust support for the psychometric adequacy of the SSSS Turkish form. The scale preserved its original one-factor structure and demonstrated acceptable internal consistency, while its significant associations with depression, subjective well-being, and daily smartphone usage affirmed its convergent and criterion-related validity. These results align with prior literature highlighting the detrimental effects of excessive smartphone use on adolescents' psychological functioning and underscore the value of culturally adapted tools for accurately assessing technology-related stress. As smartphone usage continues to rise among youth, the validated SSSS Turkish form represents a timely and relevant instrument for both researchers and practitioners seeking to evaluate and intervene in smartphone-related stress in educational and clinical contexts.

Conclusion

In summary, this study adapted and validated the Turkish version of the SSSS for use among adolescents, demonstrating that the scale maintains strong psychometric properties. The findings confirmed the original single-factor structure of the scale and provided evidence of its internal consistency, convergent validity with depression and subjective well-being, and criterion-related validity through its association with smartphone usage time. These results point out that the SSSS Turkish form is a reliable and valid instrument for assessing smartphone-related stress in adolescents and can serve as a valuable tool in both research and applied psychological settings. Beyond confirming the scale's psychometric adequacy, this study also contributes to the broader literature by positioning digital stress as a distinct and measurable construct, paving the way for future culturally sensitive research in adolescent mental health.

Practical Implications

Given the increasing prevalence of smartphone use and the associated psychological risks in adolescent populations, the availability of a culturally appropriate, brief, and psychometrically sound instrument is of significant practical importance. The SSSS Turkish form can be effectively utilized by school counselors, psychologists, and educators to identify students experiencing elevated levels of smartphone stress, allowing for early intervention and targeted support strategies. Moreover, the scale's brevity and clarity make it suitable for use in large-scale assessments, school-based screenings, and digital well-being programs. These practical advantages are especially valuable when working with adolescents, who often experience fatigue or limited attention span during longer assessments. Short-form psychological tools have been shown to reduce participant burden while maintaining measurement accuracy, making them highly suitable for youth-focused research and interventions.

Future research should aim to replicate these findings across different regions and socioeconomic backgrounds to enhance the generalizability of the scale. Longitudinal studies are also needed to explore causal relationships between smartphone stress and mental health outcomes, while experimental interventions may help determine the effectiveness of specific coping strategies or digital literacy programs. Overall, this study contributes a validated and culturally relevant assessment tool that can support ongoing efforts to understand and mitigate the psychological effects of smartphone overuse in adolescents.

Limitations

While this study offers valuable insights, several limitations should be noted. First, data were collected via self-report measures in an online format, which may introduce response bias, particularly due to social desirability effects where participants may provide answers they believe are more socially acceptable rather than their true feelings. Second, the cross-sectional nature of the study limits causal interpretations between smartphone stress and mental health outcomes. Third, the sample was based on a convenience sampling method, which is a non-probability sampling technique and may limit the generalizability of the findings to the broader adolescent population. Additionally, the sample was restricted to a specific adolescent group in Turkey, which further reduces generalizability across different regions and cultural contexts. Lastly, the scale assesses smartphone stress at a general level, without accounting for specific contextual factors such as academic or social stressors. Future research should consider more diverse samples, longitudinal designs, and the inclusion of contextual factors to enhance the applicability of findings.

Statements of Publication Ethics

This study was conducted in accordance with ethical publication principles, and ethical approval was obtained from the Manisa Celal Bayar University Social and Humanities Sciences Research and Publication Ethics Committee prior to data collection. All procedures complied with COPE guidelines.

Researchers' Contribution Rate

Both authors contributed substantially to the study. Author 1 was primarily responsible for the methodological framework, including data collection, data analysis, results interpretation, and the conclusion. Author 2 contributed significantly to the literature review, data collection, discussion section, and the finalization of the conclusion.

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APPENDIX

Kısa Akıllı Telefon Stres Ölçeği Türkçe Formu

		Hiçbir zaman	Ara sıra	Sıklıkla	Her zaman
		1	2	3	4
1.	Akıllı telefonumla net bir şekilde iletişim kuramamak beni endişelendirir.				
2.	Akıllı telefonumda tutarsız bir içerik ortaya çıktığında kendimi rahatsız hissediyorum.				
3.	Akıllı telefonum aracılığıyla aradığım bilgiyi bulamadığımda üzülürüm.				
4.	Mobil oyun oynarken takım arkadaşlarım iş birliği yapmadığında sinirlenirim.				
5.	Mobil oyunları kaybetmek beni sinirlendiriyor.				
6.	Çevrim içi sınıfların akıllı telefon platformu üzerindeki çalışma sorunlarını çözmemesi beni rahatsız ediyor.				
7.	Sosyal medyada gezinirken başkalarının değer verdiğim insanlara hakaret ettiğini, saldırdığını veya kötü yorumlar yaptığını görmek beni üzüyor.				
8.	Mobil haber akışlarıma gönderilen reklamlar beni sinirlendiriyor.				
9.	Telefonumdaki kısa videoların yorumlar bölümünde yer alan kötü yorumlar (ör. küfürlü veya saldırgan yorumlar) beni sinirlendiriyor.				