Research

Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry 2022; 14(Suppl 1):251-260

DOI: 10.18863/pgy.1169932

Turkish Adaptation of the Smartphone Distraction Scale (SDS)

Akıllı Telefona Bağlı Dikkat Dağınıklığı Ölçeğinin (ATDDÖ) Türkçe Uyarlama Çalışması

Yusuf Bilge[1], Yıldız Bilge[2], Esin Sezgin[2]

[1]İstanbul Sabahattin Zaim University, İstanbul, Turkey
[2] Health Sciences University, İstanbul, Turkey

ABSTRACT

The aim of this study is to adapt the Smartphone Distraction Scale to Turkish and to examine its psychometric properties. The participants of the study consisted of a community sample of 399 people, 288 (72.2%) women and 111 (27.8%) men, aged between 18-60 (27.14±10.89). In data collection, Sociodemographic Form (SF), Smartphone Distraction Scale-Turkish Version (SDS), Bergen Social Media Scale (BSMS), Emotion Regulation Questionnaire (ERQ), Current Symptoms Scale (CSS), and Perceived Multitasking Scale (PMS) were used. The data were analyzed through Cronbach alpha internal consistency coefficient, Pearson product-moment correlation test, item-total score correlation coefficients, confirmatory factor analysis to estimate the construct validity of the scale. Considering the internal consistency reliability of the scale, the Cronbach alpha reliability coefficient was found to be .88 for attention/impulsivity, .80 for alertness, .76 for multitasking, and .76 for emotion regulation. The item and total score correlation coefficients of the scale items were found to be between 0.49 and 0.76. Confirmatory factor analysis supported the 16-item and four-factor structure of the scale. The correlation of SDS with BSMAS, ERQ, CSS, and PMS was found to be statistically significant. The results of the research show that the SDS adapted to Turkish culture is a valid and reliable measurement tool that can be used in academic studies and clinical settings.

Keywords: Smartphone distraction scale, validity, reliability, smartphone, distractibility, multitasking, social media addiction, emotion regulation

ÖZ

Bu çalışmanın amacı, Akıllı Telefona Bağlı Dikkat Dağınıklığı Ölçeği'nin (ATDDÖ) Türkçeye uyarlanması ve psikometrik özelliklerinin incelenmesidir. Araştırmanın katılımcıları 18-60 (27,14±10,89) yaş aralığındaki 288 (%72,2) kadın ve 111 (%27,8) erkek olmak üzere 399 kişilik toplum örnekleminden oluşmaktadır. Verilerin toplanmasında Sosyodemografik Form (SF), Akıllı Telefona Bağlı Dikkat Dağınıklığı Ölçeği-Türkçe Versiyonu (ATDDÖ), Bergen Sosyal Medya Ölçeği (BSMÖ), Duygu Düzenleme Ölçeği (DDÖ), Mevcut Semptomlar Ölçeği (MSÖ) ve Algılanan Çoklu Görev Ölçeği (AÇGÖ) kullanılmıştır. Verilere Cronbach alfa iç tutarlılık katsayısı, Pearson momentler çarpımı korelasyon testi, madde-toplam puan korelasyon katsayıları, ölçeğin yapı geçerliliğini tahmin etmek için doğrulayıcı faktör analizi istatistikleri uygulanmıştır. Ölçeğin iç tutarlılık güvenirliği dikkate alındığında, Cronbach alfa güvenirlik katsayısı dikkat/dürtüsellik için,88, online uyanıklık için,80, çoklu görev için,76, duygu düzenleme için,76 olarak bulunmuştur. Ölçek maddelerinin madde toplam puan korelasyon katsayılarının 0,49 ile 0,76 arasında olduğu saptanmıştır. Doğrulayıcı faktör analizi ölçeğin 16 madde ve dört faktörlü yapısını desteklemiştir. ATDDÖ'nün BSMÖ, DDÖ, MSÖ ve AÇDÖ ile korelasyonu istatistiksel olarak anlamlı bulunmuştur. Araştırma sonuçları, Türkçe'ye uyarlanan ATDDÖ'nün akademik çalışmalarda ve klinik ortamlarda kullanılabilecek geçerli ve güvenilir bir ölçme aracı olduğunu göstermektedir.

Anahtar sözcükler: Akıllı telefona bağlı dikkat dağınıklığı, geçerlik, güvenirlik, dikkat dağınıklığı, çoklu görev, sosyal medya bağımlılığı, duygu düzenleme

Address for Correspondence: Yıldız Bilge, Health Sciences University, Hamidiye Faculty of Life Sciences, Department of Psychology, İstanbul, Turkey
E-mail: yildiz.bilge@sbu.edu.tr **Received:** 01.09.2022 **Accepted:** 24.10.2022
ORCID ID: 0000-0003-2315-0055

Introduction

The development of the modern smartphone began in the early 1990s and has evolved significantly since its beginnings. Once bulky "brick-like" objects, the cell phone has now transformed into a small, compact, portable, ubiquitous mass communication device (Hynes 2021). Smartphones have also become very popular all over the world because they have many of the features of a computer and fulfill many functions such as communication and access to information. Today, the number of smartphone users worldwide exceeds six billion and is expected to increase by several hundred million in the next few years (Statista 2021). The average daily usage time of smartphones is also increasing (Andrews et al. 2015). Smartphones provide satisfaction to individuals in numerous areas such as sociability, entertainment, information, time management, coping strategies, and displaying social identity (Panova and Carbonell 2018).

These rapid developments in smartphones also have some negative consequences. Some studies emphasize the negative effects of smartphone use on poor sleep quality (Yogesh et al. 2014), increased use through impaired time perception (Lin et al. 2015), stress (Lee et al. 2014), and academic performance (Samaha and Hawi 2016). Although only Internet Game Disorder (IGD) research criteria are included in DSM 5, the parallelism between smartphone use and behavioral addiction is also striking (Kwon et al. 2013).

Another area where the negative effects of smartphones have been observed is attention. Attention can be defined as the process of allocating cognitive capacity to an object or task (Kahneman 1973; Lang and Basil 1998). Attention is important and necessary because the environment presents far more perceptual information than can be processed effectively at any given moment, memory contains more competing elements than can be remembered, and the available options, tasks, or motor responses are far more than can be handled (Chun, et al. 2011). The human attentional system has a limited processing capacity (Kahneman 1973, Navon and Gopher 1979). Therefore, it can be said that attention is a limited resource (Cowan 2005) in terms of sustaining it in an "active" and accessible way. In addition to the aforementioned negativities, smartphone use also leads to impaired cognitive performance, especially distractibility (Fazeen et al. 2012, Thornton et al. 2014, Kushlev et al. 2016), impaired performance in multitasking (Strayer and Johnston 2001, Rosen 2008, Uncapher et al. 2016), distraction (Aagaard 2015), and dysfunctional coping with negative emotions (Squires et al. 2021).

With the advent of smartphones, many people have started to engage in media multitasking and allocate time for it. Because these devices are portable, they are used in the workplace, in the classroom, in transportation vehicles, and even while walking on the road, and a call, a message or a visual material that may arrive at any time can have an impact on individuals' attention. When people cannot process the information they obtain from these situations, they start multitasking as a kind of information management strategy (Chun et al. 2011). Multitasking requires constant switching between tasks or task changing. In one study, task switching occurred 27 times per hour among digital generations compared to 17 times per hour among those who grew up with older technologies (Marci 2012). In this context, the distraction-conflict theory (Sanders et al. 1978) suggests that individuals tend to allocate their attention to multiple stimuli while on a task, which can lead to attentional conflict. In their study, Moisala et al. (2016) showed that social media multitasking, especially through smartphones, is associated with a weakening of attention. However, another study with opposite results found that higher media multitasking scores were associated with better performance on specific tasks that require attention (Lui and Wong 2012).

The attentional network model, one of the most important models of attention, divides attention into three subsystems based on behavioral and neural evidence: (1) preparing and maintaining arousal or alertness; (2) directing overt or covert attention to a stimulus; and (3) noticing and selecting stimuli for goal setting/executive control or conscious processing (Posner and Peterson 1990, Petersen and Posner 2012). Another model of attention, the dual network approach, describes attention as two neural systems used to direct attention in a goal-directed (top-down) or stimulus-focused (bottom-up) manner (Corbetta and Shulman 2002). Another model of attention, which emerged with an emphasis on the variability of attention, proposed a pair of large-scale brain networks called "task-negative" and "task-positive" networks (Fox et al. 2005). Wu and Cheng (2019) integrated Posner and Peterson's attentional network model into educational contexts. The Smartphone-Dependent Distraction Scale (SDDS), which was adapted into Turkish, was developed within the framework of the theoretical basis put forward by Wu and Cheng. In this context, smartphone-induced distraction was conceptualized by Throuvala et al. (2021) as the result of a response to extrinsic cues (guidance system) or intrinsic cues (warning system) or a conflict between these two networks competing for attention resources. Throuvala et al. (2021) created this scale by emphasizing that there is very little research on distraction and its relationship with problematic smartphone use and that there are no psychometric assessment tools to assess SDS. When the literature was examined, it was seen that there was only a Chinese adaptation study of the SD scale. In this study, in addition to determining that the scale was valid and reliable, positive relationships were found between SD and smartphone use (one hour a day), fear of missing out, smartphone addiction, and positive and negative metacognitions related to smartphone use (Zhao et al. 2022). In another study conducted in China using the SDS, it was found that SD was significantly associated with problematic social media use, anxiety, depression, and stress, and problematic social media use had a fully mediating role in the relationship between SD and anxiety and depression, and a partial mediating role in the relationship between SD and stress (Yang, Yan, and Hussain 2022). The 16-item SDS was developed in a sample of university students aged 18-24 years and its reliability

and validity have not yet been tested in other populations. Similarly, the Chinese adaptation study was also conducted with university students. Since a measurement tool of this nature has not yet been developed in Turkey and there is no Turkish adaptation study of the SDS, it was thought that it would be useful to adapt the SDS into Turkish. In this framework, the aim of this study was to adapt the SDS into Turkish and to examine the psychometric properties of the scale. In the original study, the SDS was developed on university students, but considering the prevalence of smartphone use, the Turkish adaptation study was conducted with a community sample. Our hypotheses for the study are as follows: (1) Cronbach's alpha values of the total and subscales of the SDS will be above .70, (2) confirmatory factor analysis results will support a four-factor structure as in the original study, and (3) SDS will be positively and significantly related to social media use, distraction, multitasking, and emotion dysregulation.

Method

Sample

The sample group of the study was selected by convenient sampling method from non-probability sampling methods. The study consists of a community sample of 399 people, 288 (72.2%) women and 111 (27.8%) men, aged 18-58 (27.14±10.89). The inclusion criteria were being literate, being over 18 years of age or under 60 years of age, and having a smartphone. Those younger than 18 and older than 60, illiterate and not having a smartphone were determined as exclusion criteria. All participants were given the Bergen Social Media Scale, Emotion Regulation Scale, Current Symptoms Scale, and Perceived Multitasking Scale along with the SDS for convergent validity. Of the participants, 6 (1.6%) had a primary school education, 9 (2.3%) had a secondary school education, 70 (17.5%) had a high school education, and 314 (78.7%) had a university education or higher. The number of people with low-income levels was 71 (17.8%), the number of people with middle-income levels was 308 (77.2%) and the number of people with high-income levels was 20 (5.0%). Among the participants, 88 (22.1%) were married, 301 (75.4%) were single and 10 (2.5%) were divorced. The duration of social media use was 56 (14%) people for 1 hour, 84 (21.1%) people for 2 hours, 96 (24.1%) people for 3 hours, 82 (20.6%) people for 4 hours, and 81 (20.4%) people for 5 or more hours. It was determined that the frequency of using blogs was 78.4%, Youtube was 75.2%, Twitter was 64.9%, Instagram was 33.3% and other social media was 20.6%. Participants' purposes of using social media were determined as communication with 85.5%, music-video with 77.7%, information sharing with 74.9%, shopping with 39.6%, other purposes with 14.3%, and research with 8%.

Data Collection Tools

Smartphone Distraction Scale (SDS)

It is a 4-dimensional and 16-item scale developed by Throuvala et al. (2021) to assess distraction due to smartphone use. The scale sub-dimensions are attention impulsiveness, online vigilance, emotion regulation, and multitasking. The SDS is a five-point Likert-type scale that is graded in the range of "1=Never", "2=Rarely", "3=Sometimes", "4=Mostly" and "5=Always" and the highest score can be obtained from the whole scale is 80 and the lowest score is 16. The higher the participants' scores, the more distracted they are. The Cronbach's alpha values of the original test were .84 for attentional impulsivity, .80 for emotion regulation, .75 for multitasking, and .74 for online vigilance.

Bergen Social Media Scale (BSMS)

The Turkish adaptation of the scale developed by Andreassen et al. (2016), which evaluates social media addiction, is unidimensional, has 6 items, and uses a 5-point Likert type, was conducted by Demirci (2019). As a result of the reliability analysis of the scale, Cronbach's Alpha value was determined as .79.

Emotion Regulation Questionnaire (ERQ)

The scale prepared by Gross and John (2003) is 7-point Likert-type and consists of 10 items. The scale has two dimensions: 'reappraisal' and 'suppression'. The Cronbach's alpha coefficient of the scale was found to be between .75 and .82 for the reappraisal dimension and between .68 and .76 for the suppression dimension. The scale was adapted into Turkish by Ulaşan-Özgüle and Sümer (2017) and the translation of the scale was carried out with the standard translation-retranslation method and structured as a 6-point Likert-type scale. In the factor analysis studies, similar results were obtained with the original study of the scale. The internal consistency coefficient for the reappraisal dimension was .78 and the internal consistency coefficient for the suppression dimension was .64.

The Current Symptoms Scale (CSS)

CSS is a self-assessment scale prepared according to DSM-IV criteria and used in the diagnosis of attention-deficit/hyperactivity disorder (ADHD) in adults. The scale was developed by Barkley and Murphy (1998) and consists of 3 subscales and 18 items. Its Turkish adaptation was conducted by Ayçiçeği et al. (2003). The validity and reliability study of the scale was repeated in a larger sample of students and the community (Ayçiçeği-Dinn 2007). As a result of the reliability study, questions 6 and 8 were removed from the Turkish version. In the student sample, Cronbach's alpha values were AD=.70, HD=.64, and C=.74; reliability coefficients of .77 for AD and 0.83 for C were found as a result of the retest conducted 1 month apart. As a result of this study, it was seen that the CSS is a valid and reliable screening tool for researchers and clinicians who want to work on ADHD (Ayçiçeği-Dinn 2007).

Perceived Multitasking Scale (PMS)

The scale developed by Kaynarca (2019) had a two-factor structure as course-related multitasking perception and performance-related multitasking perception, and the goodness of fit was found to be sufficient in the confirmatory factor

analysis. The Cronbach's alpha coefficients of the scale are .81 for course-related multitasking and .79 for performance-related multitasking. The higher the scores obtained from the scale, the higher the participants' success in multitasking.

Translation Process

In the process of adapting the SDS developed by Throuvala et al. (2021) into Turkish, permission for adaptation was requested from the authors who developed the measurement tool, and the necessary permission and details about the scale were obtained from the author. For the translation studies of the scale, firstly, the Turkish translation of the original form was carried out by three field experts. The statements that best explained each item were determined and compared with the original form by the same team. The back-translation was performed by another researcher with an advanced level of English. The back-translated scale was sent to the developer of the scale and feedback was obtained for the accuracy and clarity of the translation. After these steps, a 16-item Turkish form was obtained. Ethical approval for the study was obtained from Istanbul Sabahattin Zaim University Scientific Research Ethics Committee with the decision dated 24.02.2022 and numbered 2022/02. The application of the scales was carried out both through Google Forms and by hand give. Informed consent was obtained from all participants who voluntarily participated in the study. In order to evaluate the applicability and comprehensibility of the SDS items, interviews were conducted with 30 participants, including 20 university students (16 female and 4 male) over the age of 18 and 10 adult individuals (7 female and 3 male) who were relatives of the researchers. The participants were asked whether there were any items that were ambiguous and difficult to understand and whether each item was clear and understandable. As a result of the participants' feedback, the scale items were finalized.

Statistical Analysis

Within the scope of the validity and reliability study of the SDS, skewness, and kurtosis values were calculated to determine whether the quantitative variables used in the study were normally distributed. For reliability analysis, Cronbach's alpha internal consistency coefficient and item-total score correlations were analyzed. Confirmatory factor analysis (CFA) was conducted for validity analysis and correlations between subscales were determined. Pearson Product Moment Correlation Coefficient was calculated for convergent validity analysis. All analyses were performed with SPSS v.22 and AMOS 23.0 programs.

Results

Reliability

Cronbach's alpha internal consistency coefficient was calculated to determine the reliability of the SDS, and it was found that the values of the four subscales of the scale were .88 for attention/impulsiveness, .80 for online vigilance, .76 for multitasking, and .76 for emotion regulation. Cronbach's α values were found to be above the acceptable limit of 0.70 for all subscales (Urbina 2004). The mean and standard deviation scores, Cronbach's alpha coefficients, skewness and kurtosis values of the SDS, and other convergent scales used in the study are presented in Table 1.

The item-total correlations of the SDS subscales ranged between .71-.76 for SDS-Attention/Impulsiveness, between .55-.66 for SDS-Online vigilance, between .49-.64 for SDS-Multitasking, and between .53-.58 for SDS-Emotion Regulation (Table 2).

Validity

Convergent Validity

In order to test the convergent validity, the relationships of the SDS with the BSMS, PMS-Course and PMS-Performance sub-dimensions, ERQ-Reappraisal and ERQ-Suppression sub-

Table 1. Mean and standard deviation scores, Cronbach's Alpha coefficients, skewness and kurtosis values of smartphone distraction, Bergen social media, perception of multitasking, emotion regulation and current symptoms scales

Subscales	M.	SD	α	Skewness	Kurtosis
SDS-Attention/Impulsivity	11.29	4.27	.88	.23	-.74
SDS-Online Vigilance	9.67	3.93	.80	.59	-.12
SDS-Multitasking	11.13	3.69	.76	.30	-.17
SDS-Emotion Regulation	11.03	3.68	.76	.04	-.30
BSMS	15.57	5.39	.82	.22	-.56
PMS-Course	7.88	2.58	.83	.07	-.43
PMS-Performance	6.82	2.54	.74	.34	-.28
ERQ-R	23.95	5.91	.82	-.16	-.29
ERQ-Supression	13.79	4.73	.77	-.08	-.75
CSS-AD	17.56	7.31	.88	-.15	-.25
CSS-HI	14.66	6.04	.84	-.21	-.18
CSS-Composite	32.22	12.36	.92	-.20	-.09

SDS: Smartphone Distraction Scale, BSMS: Bergen Social Media Scale, PMS: Perceived Multitasking Scale, EDQ: Emotion Regulation Questionnaire, EDQ-R: Emotion

dimensions, CSS-AD, CSS-H, and CSS-Composite sub-dimensions were examined by Pearson correlation analysis. It was found that there were moderate and positive correlations with the sub-dimensions of SDS; weak and moderate positive correlations with PMS-Course; weak and positive correlations with ERS-Q; and weak and positive correlations with CSS-AD, CSS-H, and CSS-C. The PMS-Performance was weakly and positively correlated with subscales other than SDS-Attention/Impulsiveness. On the other hand, it was found that the ERQ-S subscale was only weakly and positively correlated with the SDS-ER subscale (Table 3).

Table 2. Item-total correlations of the SDS

SDS Subscales	Item No.	Item-total correlation
SDS-Attention/Impulsivity	1	.71**
	2	.76**
	3	.75**
	4	.71**
SDS-Online Vigilance	5	.58**
	6	.65**
	7	.66**
	8	.55**
SDS-Multitasking	9	.49**
	10	.58**
	11	.55**
	12	.64**
SDS-Emotion Regulation	13	.53**
	14	.56**
	15	.57**
	16	.58**

*p<.05; **p<.01
SDS: Smartphone Distraction Scale

The correlation levels between the SDS and its subscales were also examined, and it was observed that the lowest correlation level was found between the multitasking subscale and attention/impulsiveness (r=.33), while the highest correlation was found between alertness and attention/impulsiveness (r=.68). The correlations of all subscales with each other were found to be at a significant level. When the averages of the scores obtained from the scale were examined; attention/impulsiveness was 11.29±4.27, online vigilance 9.67±3.93, multitasking 11.13±3.70, emotion regulation 11.03±3.68 (Table 4).

Confirmatory Factor Analysis (CFA)

In order to test the construct validity of the scale, both first-order and second-order CFA analyses were conducted using SPSS AMOS 23. The chi-square value calculated for model-data fit in the first level CFA for the construct validity of the scale was χ^2 (sd=96)= 318,220, p<0.001, CMIN/DF=3.09. Other fit indices of the model were RMSEA=0.073 (90% confidence interval [CI] 0.067-0.084); CFI=0.93; GFI=0.91; AGFI=0.91 (Figure 1). In the second level CFA, model-data fit was χ^2 (sd=98)=320.237, p<0.001, CMIN/DF=3.27, and other fit indices were as follows: RMSEA=0.075 (90% CI 0.066-0.085); CFI=0.92; GFI=0.91; AGFI=0.91 (Figure 2). The same two modifications were performed in both models. The first modification was made between items 13 and 14 and the second modification was made between items 7 and 8. The fit indices presented below include the values obtained after these two modifications. The fit index values obtained in both models showed that the SDS is a valid scale.

Discussion

In this study, the reliability and validity of the Turkish version of the SDS were evaluated in adolescent and adult samples. In line with the data obtained, the convergent validity of the scale was determined with the BSMS, PMS, ERQ, and CSS scales, Cronbach's alpha values were examined, and model fit was tested with confirmatory factor analysis.

Table 3. Correlations between the smartphone distraction scale and Bergen social media, perception of multitasking, emotion regulation, and current symptoms scales

	Validity Scales							
SDS Subscales	**BSMS**	**PMS-Course**	**PMS-Performance**	**ERQ- R**	**ERQ-Supression**	**CSS-AD**	**CSS-HI**	**CSS-Composite**
SDS-Attention/ Impulsivity	.55**	.33**	.06	.10*	.06	.35**	.30**	.35**
SDS-Online Vigilance	.59**	.37**	.22**	.11*	.03	.36**	.35**	.38**
SDS-Multitasking	.39**	.55**	.38**	.22**	.03	.11*	.19**	.16**
SDS-Emotion Regulation	.55**	.38**	.21**	.22**	.19**	.28**	.26**	.29**

*p<.05; **p<.01
SDS: Smartphone Distraction Scale, BSMS: Bergen Social Media Scale, PMS: Perceived Multitasking Scale, EDQ: Emotion Regulation Questionnaire, EDQ-R: Emotion Regulation Questionnaire Reappraisal, CSS: Current Symptoms Scale, CSS-AD: Current Symptoms Scale Attention Deficit, CSS-HI: Current Symptoms Scale Hyperactivity-Impulsivity, CSS-Composite: Current Symptoms Scale Attention Deficit/Hyperactivity-Impulsivity

In order to test the convergent validity, the relationships between the sub-dimensions of the SDS and social media, perception of multitasking, emotion regulation, and current symptoms were examined and statistically significant positive relationships were found. The highest correlations were found between all subscales of the SDS except multitasking and the BSMS, between all scales of the SDS and the PMS-Course, and between the SDS-Online Alertness and the CSS-Composite. The weakest correlations were found between SDS-Attention/Impulsivity and Online Vigilance and between SDS-Multitasking and CSS-AD.

Within the scope of convergent validity, it was found that the sub-dimensions of the SDS had a moderate and positive relationship with the BSMS. Accordingly, it can be said that social media use is related to smartphone distraction. Similarly, in the original study, a moderate and positive correlation was found between the SDS and the BSMS. In this context, in the smartphone literature, problematic smartphone and social media use that interferes with daily functioning and productivity can be evaluated as an urgent problem today (Throuvala et al. 2021). There are many studies showing that social media use is frequently accompanied by academic distraction and that these two variables are related to each other (Carrier et al. 2015, Kates et al. 2018). Social media contains various features that may be particularly attractive for adolescents with ADHD symptoms. Social media can be used anytime and anywhere through smartphones, and social media applications on smartphones actively inform users of incoming messages and updated content (Pielot et al. 2014). It is thought that individuals increase their use of smartphones due to these features.

Two structures that are similar to emotion regulation, another subscale of the SDS, are mentioned in the literature. These are reappraisal and suppression of emotional expression (Gross 1998, 1999). In the present study, the relationship between the SDS and the ERQ, which includes the factors mentioned above, was examined and it was found that there were positive and weak relationships between the SDS-Emotion Regulation subscale and the suppression and reappraisal subscales of the ERQ. However, it can be said that while the ERQ evaluates a general emotion regulation, the SDS-Emotion Regulation subscale measures the effort to realize emotion regulation through the smartphone. In the literature, it is suggested that people with high levels of problems and boredom use their smartphones not only to 'feel good' and 'pleasure' (i.e., positive expectations) but also to avoid unpleasant emotions (i.e., negative expectations), and therefore that people are prone to problematic smartphone use (Elhai et al. 2020, Casale et al. 2021). It is stated that these individuals exhibit behaviors such as distraction, avoidance, or withdrawal through their smartphones to overcome their negative emotions (Elhai et al. 2018). Similarly in the original study, it was stated that the SDS-Emotion Regulation was the strongest subscale referring to the strategies used by individuals to modulate the emotional state, timing, and expression of emotion (Throuvala et al. 2021).

It is seen that the SDS sub-dimensions are weakly and moderately positively correlated with the PMS-Course. Multitasking has been accepted as functionally equivalent to distraction (Zwarun and Hall 2014). In studies conducted with undergraduate students, it has been observed that students spend less time

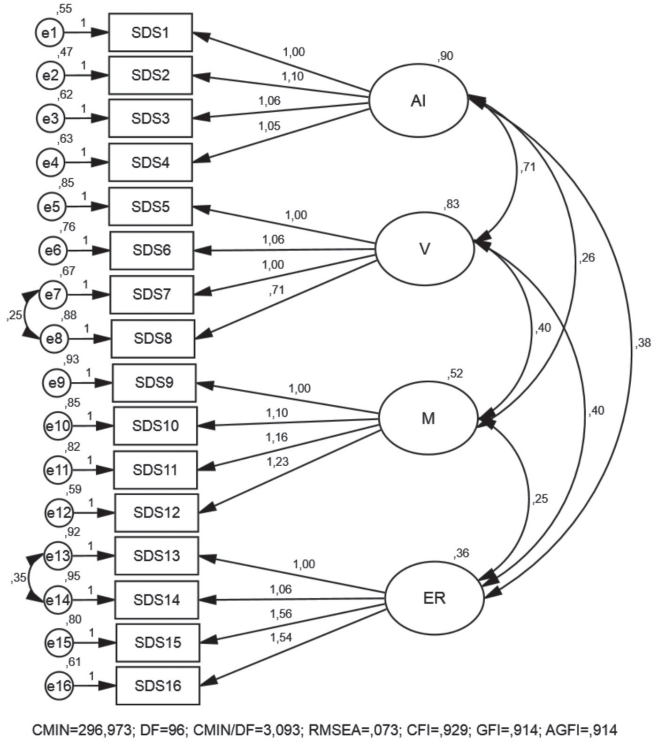

Figure 1. Level 1 CFA results of SDS
SDS: Smartphone Distraction Scale, AI: Attention/impulsivity, V: Online vigilance, M: Multitasking, ER: Emotion regulation

Table 4. Scale subscale mean, standard deviation values and correlations

	M.±SD	SDS-Attention/Impulsiveness	SDS-Online Vigilance	SDS-Multitasking	SDS-Emotion Regulation
SDS-Attention/Impulsiveness	11.29±4.27	1	.68**	.33**	.52**
SDS-Online Vigilance	9.67±3.93		1	.50**	.57**
SDS-Multitasking	11.13±3.70			1	.46**
SDS-Emotion Regulation	11.03±3.68				1

*p<.05; **p<.01
SDS: Smartphone Distraction Scale

on academic activities when they are highly dependent on smartphones (Praveeni and Wickramasinghe 2020), and screen addiction is associated with media multitasking in the US and Taiwan sample (Lin et al. 2020). Research provides evidence that mobile media use distracts attention with consequences for safety, productivity, and learning. Moreover, media overuse is associated with high levels of impulsivity and distraction (Levine et al. 2012). On the other hand, it has also been suggested that media multitasking (using different media simultaneously) may be associated with increased sensitivity to internal and external sources of distraction (Wiradhany et al. 2020). In addition, the moderate and significant positive correlations between the attention/impulsivity and online vigilance subscales of the SDS with the CSS which assesses attention deficit and hyperactivity can be considered supportive findings that can be taken into consideration in terms of the relationship between smartphone distraction and adult distraction.

In order to test the reliability of the scores obtained from the scale, the internal consistency coefficient and item-total correlations were analyzed. The internal consistency coefficient and Cronbach's alpha values of the scale were found to be .88 for the attention/impulsivity subscale, .80 for the online alertness subscale, .76 for the multitasking subscale, and .76 for the emotion regulation subscale. The fact that the reliability coefficient $\alpha \geq 0.70$ shows that Cronbach's alpha values for all dimensions of the scale give reliable results (Büyüköztürk 2014, Taber 2018) and that the items are sufficient to distinguish individuals in terms of smartphone use causing distraction. The internal consistency coefficients of the original scale were determined as .84 for attention impulsivity, .80 for emotion regulation, .75 for multitasking, and .74 for online vigilance. In addition, in the reliability study conducted in the Chinese sample, the total score Cronbach's alpha value of the scale was found to be .92, attention impulsivity .87, online alertness .80, multitasking .74, and emotion regulation .92. Accordingly, the Cronbach's alpha values of the four subscales are at an acceptable level (Büyüköztürk 2014) and are similar to our study. In addition, the item-total correlation ranged from .49 to .76. A positive and high item-total correlation indicates that the item exemplifies similar behaviors and the internal consistency of the test is high, and an item-total correlation of .30 and above indicates that the items have high discrimination (Büyüköztürk 2014).

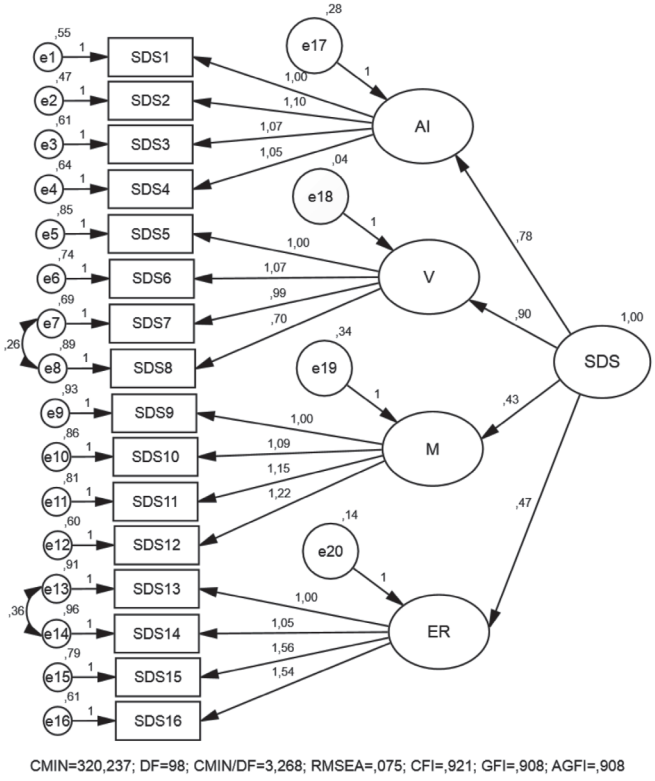

Figure 2. Level 2 CFA results of SDS
SDS: Smartphone Distraction Scale, AI: Attention/impulsivity, V: Online vigilance, M: Multitasking, ER: Emotion regulation

As a result of the CFA conducted with the data obtained from the study, it was revealed that the Turkish form of the SDS had a structure consisting of 16 items and four factors and that this structure was consistent with the factor structures found in the original scale. All of the items that make up the factors are the same as the items that make up the factors in the original scale (Throuvala et al. 2021). The ratio of the chi-square value to the degrees of freedom is used to decide on the fit of the scale (Kline 2005). In the first level (3.09) and second level (3.27) CFA, the model-data fit was found to be less than 5 and it can be said that this value indicates an acceptable fit (Kline 2005). In terms of other fit indices of the model, the first level RMSEA=0.073; CFI=0.93; GFI=0.91; AGFI=0.91 and the second level RMSEA=0.075; CFI=0.92; GFI=0.91; AGFI=0.91 values of CFI, AGFI and NFI are greater than 0. 90, and RMSEA values less than 0.08 indicate an acceptable fit (Hooper et al. 2008, Çokluk et al. 2014). In this study, the results of the confirmatory factor analysis conducted to test the construct validity of the scale showed that the fit indices of the scale consisting of four subscales and 16 items were at acceptable levels. In line with these results, none of the scale items were excluded. Similar to the subscales of the original scale, four factors were obtained in our study. These factors were named as attention impulsivity, online alertness, multitasking, and emotion regulation. Considering the distribution of the items in the scale according to the factors; items 1., 2., 3., and 4. are in the attention impulsivity subscale, items 5., 6., 7., and 8. are in the online alertness subscale, items 9., 10., 11., and 12. are in the multitasking subscale, and items 13., 14., 15., and 16. are in the emotion regulation subscale. Similarly, in a study conducted in China, it was observed that the four-factor structure was preserved (Yang et al. 2022). Differently, in a study conducted in a Chinese sample, 3-factor and 4-factor models were compared in order to compare the structural features of the scale and it was found that the 3-factor model was more appropriate for assessing distraction on smartphones (Zhao et al. 2022).

One of the limitations of this study is that various age groups could not be fully represented since university students constituted 80% of the sample group. Therefore, it would be useful for future studies to investigate various samples and age

groups such as drivers, workers, retired older adults, and clinical samples. Secondly, due to the use of self-report scales, the results can have a bias in terms of social desirability.

Conclusion

This study supported that the four-dimensional and 16-item (Throuvala et al. 2021) SDS, developed based on the attention networks model, is a valid and reliable tool that can be used to assess smartphone distraction in Turkish culture. Within the scope of this study, no scale study was found to determine distraction due to smartphone use. Therefore, it is thought that the scale will fill an important gap in the field. The sample of the study was between the ages of 18-60. In future studies, it may be recommended to work with diagnosed groups and to test the reliability of the scale in larger samples. Finally, it is thought that the SDS has psychometric properties at a level that can be used in studies to investigate variables that may be related to distraction due to smartphone use.

References

Aagaard J (2015) Media multitasking, attention, and distraction: a critical discussion. Phenom Cogn Sci, 14:885-896.

Andreassen CS, Billieux J, Griffiths MD, Kuss DJ, Demetrovics Z, Mazzoni E et al. (2016) The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. Psychol Addict Behav, 30:252-260.

Andrews S, Ellis DA, Shaw H, Piwek L (2015) Beyond self-report: tools to compare estimated and real-world smartphone use. PloS One 10:e0139004.

Ayçiçeği A, Dinn WM, Harris CL (2003) Assessing adult attention-deficit/hyperactivity disorder: A Turkish version of the Current Symptoms Scale (Turkish Version). Psychopatology, 36:160-167.

Ayçiçeği Dinn A (2007) Mevcut Semptomlar Ölçeği: Geçerlik ve güvenirlik çalışması. Klinik Psikiyatri Dergisi, 10:201-215.

Barkley RA, Murphy KR. (1998) Attention-Deficit Hyperactivity Disorder: A Clinical Workbook, 2nd ed. New York, Guilford Press.

Büyüköztürk Ş (2014) Sosyal Bilimler İçin Veri Analizi El Kitabı, 19. Baskı. Ankara, Pegem.

Carrier LM, Rosen LD, Cheever NA, Lim AF (2015) Causes, effects, and practicalities of everyday multitasking. Dev Rev, 35:64–78.

Casale S, Fioravanti G, Spada MM (2021) Modelling the contribution of metacognitions and expectancies to problematic smartphone use. Psychol Addict Behav, 10:788-798.

Corbetta M, Shulman GL (2002) Control of goal-directed and stimulus-driven attention in the brain. Nat Rev Neurosci, 3:201-215.

Chun MM, Golomb JD, Turk-Browne NB (2011) A taxonomy of external and internal attention. Annu Rev Psychol, 62:73-101.

Çokluk Ö, Şekercioğlu G, Büyüköztürk Ş (2014) Sosyal Bilimler İçin Çok Değişkenli İstatistik, 3. Baskı. Ankara, Pegem.

Cowan N. (2005) Working Memory Capacity. New York, Psychology Press.

Demirci İ (2019) Bergen Sosyal Medya Bağımlılığı Ölçeğinin Türkçe'ye uyarlanması, depresyon ve anksiyete belirtileriyle ilişkisinin değerlendirilmesi. Anadolu Psikiyatri Derg, 20:15-22.

Elhai JD, Tiamiyu MF, Weeks JW, Levine JC, Picard KJ, Hall BJ (2018) Depression and emotion regulation predict objective smartphone use measured over one week. Pers Individ Dif, 133:21-28.

Elhai JD, Yang H, Dempsey AE, Montag C (2020) Rumination and negative smartphone use expectancies are associated with greater levels of problematic smartphone use: A latent class analysis. Psychiatry Res, 285:112845.

Fazeen M, Gozick B, Dantu R, Bhukhiya M, González MC. (2012) Safe driving using mobile phones. IEEE trans Intell Transp Syst, 13:1462-1468.

Fox MD, Snyder AZ, Vincent JL, Corbetta M, Van Essen DC, Raichle ME (2005) The human brain is intrinsically organized into dynamic, anticorrelated functional networks. Proc Natl Acad Sci U S A, 102:9673-9678.

Gross JJ (1998) The emerging field of emotion regulation: An integrative review. Rev Gen Psychol, 2:271-299.

Gross JJ (1999) Emotion regulation: Past, present, future. Cogn Emot, 13:551-573.

Gross JJ, John OP (2003) Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-Being. J Pers Soc Psychol, 85:348-362.

Hynes M (2021) The Social, Cultural and Environmental Costs of Hyper-Connectivity: Sleeping Through the Revolution. Bingley, Emerald Publishing.

Hooper D, Coughlan J, Mullen M (2008) Structural equation modelling: Guidelines for determining model fit. Electronic Journal on Business Research Methods, 6:53-60.

Kahneman D (1973) Attention and Effort. Englewood Cliffs, NJ, Prentice Hall.

Kates AW, Wu H, Coryn CLS (2018) The effects of mobile phone use on academic performance: A meta-analysis. Comput Educ, 127:107–112.

Kaynarca İ (2019) Üniversite öğrencilerinin çoklu görev davranışları ve çoklu görev algıları ile öz düzenleme becerileri arasındaki ilişki (Yüksek lisans tezi). Ankara, Hacettepe Üniversitesi.

Kline RB (2005) Principles and Practice of Structural Equations Modeling. New York, Guilford Press.

Kushlev K, Proulx J, Dunn EW (2016) Silence your phones" Smartphone notifications increase inattention and hyperactivity symptoms. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, 7–12 May 2016 San Jose, CA, USA. pp:1011-1020.

Kwon M, Lee JY, Won WY, Park JW, Min JA, Hahn C, Choi JH et al. (2013) Development and validation of a smartphone addiction scale (SAS). PLoS One, 8:e56936.

Lang A, Michael DB (1998) Attention, Resource Allocation, and Communication Research: What Do Secondary Task Reaction Times Measure Anyway? vol. 21 Beverly Hills: Sage.

Lee U, Lee J, Ko M, Lee C, Kim Y, Yang S et al. (2014) Hooked on smartphones: an exploratory study on smartphone overuse among college students. Proceedings of the 32nd Annual ACM conference on human factors in computing systems. April 26–May 1, 2014, Toronto, Ontario, Canada. pp:2327-2336.

Levine LE, Waite BM, Bowman LL (2012) Mobile media use, multitasking and distractibility. International Journal of Cyber Behavior, Psychology and Learning, 2:15-29.

Lin YH, Lin YC, Lee YH, Lin PH, Lin SH, Chang LR et al. (2015) Time distortion associated with smartphone addiction: Identifying smartphone addiction via a mobile application (App). J Psychiatr Res, 65:139–145.

Lin TT, Kononova A, Chiang YH (2020) Screen addiction and media multitasking among American and Taiwanese users. J Comput Inf Syst, 60:583-592.

Lui KF, Wong ACN (2012) Does media multitasking always hurt? A positive correlation between multitasking and multisensory integration. Psychon Bull Rev, 19:647-653.

Marci C (2012) A (biometric) day in the life: engaging across media. Paper presented at Re: Think 2012. New York, USA, 28.03.2012.

Moisala M, Salmela V, Hietajärvi L, Salo E, Carlson S, Salonen O et al. (2016) Media multitasking is associated with distractibility and increased prefrontal activity in adolescents and young adults. Neuroimage, 134:113-121.

Navon D, Gopher D (1979) On the economy of the human-processing system. Psychol Rev, 86:214-217.

Panova T, Carbonell X (2018) Is smartphone addiction really an addiction? J Behav Addict, 7:252-259.

Petersen SE, Posner MI (2012) The attention system of the Human brain: 20 years after. Annu Rev Neurosci, 35:73-89.

Pielot M, Church K, De Oliveira R (2014) An in-situ study of mobile phone notifications. In Proceedings of the SIGCHI Conference on Human Computer Interaction with Mobile Devices and Services (MobileHCI '14): 233–242.

Posner MI, Petersen SE (1990) The attention system of the human brain. Annu Rev Neurosci, 13:25-42.

Praveeni SMN, Wickramasinghe CN (2020) Impact of Smartphone Addiction on Academic Performance of Undergraduates in Sri Lanka; Mediating Effect of Technology Driven Multitasking. In Proceedings of the International Conference on Business & Information (ICBI). University of Kelaniya, Sri Lanka. pp:641-650.

Rosen C (2008) The myth of multitasking. The New Atlantis, 20:105-110.

Samaha M, Hawi NS (2016) Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. Comput Human Behav, 57:321-325.

Sanders GS, Baron RS, Moore DL (1978) Distraction and social comparison as mediators of social facilitation effects. J Exp Soc Psychol, 14:291-303.

Squires LR, Hollett KB, Hesson J, Harris N (2021) Psychological distress, emotion dysregulation, and coping behaviour: a theoretical perspective of problematic smartphone use. Int J Ment Health Addict, 19:1284-1299.

Statista (2021) Number of Smartphone Users Worldwide from 2016 to 2021. New York, NY, Statista.

Strayer DL, Johnston WA (2001) Driven to distraction: Dual-task studies of simulated driving and conversing on a cellular telephone. Psychol Sci, 12:462-466.

Taber KS (2018) The use of Cronbach's alpha when developing and reporting research instruments in science education. Res Sci Educ, 48:1273-1296.

Thornton B, Faires A, Robbins M, Rollins E (2014) The mere presence of a cell phone may be distracting. Soc Psychol, 45:479-485.

Throuvala MA, Pontes HM, Tsaousis I, Griffiths MD, Rennoldson M, Kuss DJ (2021) Exploring the dimensions of smartphone distraction: development, validation, measurement invariance, and latent mean differences of the Smartphone Distraction Scale (SDS). Front Psychiatry, 12:642634.

Ulaşan-Özgüle ET, Sümer N (2017) Ergenlikte duygu düzenleme ve psikolojik uyum: Duygu Düzenleme Ölçeğinin Türkçe uyarlaması. Türk Psikoloji Yazıları, 20:1-18.

Uncapher MR, Thieu MK, Wagner AD (2016) Media multitasking and memory: Differences in working memory and long-term memory. Psychon Bull Rev, 23:483-490.

Urbina S (2004) Essential of Psychological Testing, Hoboken, NJ, Wiley.

Wiradhany W, van Vugt MK, Nieuwenstein MR (2020) Media multitasking, mind-wandering, and distractibility: A large-scale study. Atten Percept Psychophys, 82:1112-1124.

Wu JY, Cheng T (2019) Who is better adapted in learning online within the personal learning environment? Relating gender differences in cognitive attention networks to digital distraction. Comput Educ, 128:312-329.

Yang Z, Yan Z, Hussain Z (2022) The relationships between smartphone distraction, problematic smartphone use and mental health issues amongst a Chinese sample. Soc Sci J, doi: 10.1080/03623319.2022.2066880.

Yogesh S, Abha S, Priyanka S (2014) Short Communication Mobile usage and sleep patterns among medical students. Indian J Physiol Pharmacol, 58:100–103.

Zhao X, Hu T, Qiao G, Li C, Wu M, Yang F, Zhou J (2022) Psychometric properties of the smartphone distraction scale in Chinese college students: validity, reliability and influencing factors. Front Psychiatry, 13:859640.

Zwarun L, Hall A (2014) What's going on? Age, distraction, and multitasking during online survey taking. Comput Hum Behav, 41:236-244.

Addendum. Smartphone Distraction Scale (Turkish Version)

	Akıllı Telefona Bağlı Dikkat Dağınıklığı Ölçeği	**(1) Hiçbir zaman**	**(2) Nadiren**	**(3) Ara sıra**	**(4) Çoğunlukla**	**(5) Her zaman**
1	Telefonumdan gelen bildirimler dikkatimi dağıtır.	1	2	3	4	5
2	Telefonumdaki uygulamalar dikkatimi dağıtır.	1	2	3	4	5
3	Telefonum yanımda olduğunda dikkatim dağılır.	1	2	3	4	5
4	Yaptığım başka işler için tümüyle dikkatli olmam gerektiğinde bile telefonum dikkatimi dağıtır.	1	2	3	4	5
5	Telefonuma gelen mesajları hemen kontrol etmezsem endişelenirim.	1	2	3	4	5
6	Telefonuma erişemediğimde telefonumu kontrol etmeyi çok düşünürüm.	1	2	3	4	5
7	Diğer işlerimi yaparken telefonda paylaşabileceğim şeyler dikkatimi dağıtır.	1	2	3	4	5
8	Diğer işlerimi yaparken ne kadar beğeni ve yorum alacağımı düşünmekten dikkatim dağılır.	1	2	3	4	5
9	Çalışırken aynı zamanda telefonumda birkaç uygulamayı da kullanırım.	1	2	3	4	5
10	Telefonumu kullanırken konuşmaları kolaylıkla takip edebilirim.	1	2	3	4	5
11	Aynı anda hem yürüyüp hem de telefonumu kullanırım.	1	2	3	4	5
12	Telefonumda ne olduğunu kontrol ederken bir yandan da başkalarıyla konuşurum.	1	2	3	4	5
13	Telefonumu kullanmak hoş olmayan şeyler yapmaktan beni alıkoyar.	1	2	3	4	5
14	Telefonumu kullanmak beni olumsuz veya hoş olmayan düşüncelerden uzaklaştırır	1	2	3	4	5
15	Sıkıcı veya zor işleri yaparken telefonumu kullanmak, benim dikkatimi dağıtır.	1	2	3	4	5
16	Baskı altındayken telefonumu kullanmak benim dikkatimi dağıtır.	1	2	3	4	5

Scoring:

Attention/impulsivity: 1, 2, 3, 4

Online Vigilance: 5, 6, 7, 8

Multitasking: 9, 10, 11, 12

Emotion Regulation: 13, 14, 15, 16

There are no reverse items in the scale.