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The Reliability and Validity of the Turkish Version of Smartphone Impact Scale

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Abstract

The Smartphone Impact Scale (SIS) was originally developed in English to determine the cognitive, affective, social, and behavioral impacts of smartphones. This study aimed to translate and cross-culturally adapt the SIS instrument into Turkish and investigate its psychometric properties. Two hundred and sixty-four young and middle-aged adults (186 females) with a mean age of 36.24 years (SD = 14.93; range, 18–65 years) were included. For cross-cultural adaptation, two bi-lingual translators used the back-translation procedure. Within a 5-to-7-day period after the first assessment, the participants completed the Turkish version of SIS (SIS-T) to evaluate test-retest reliability. Cronbach's alpha (α) was used to assess internal consistency. The correlation between the Turkish version of the Smartphone Addiction Scale (SAS-T) and the Nottingham Health Profile was determined to check the validity. The SIS-T had a high-level internal consistency (α = 0.86) and test-retest reliability (ICC2,1 = 0.56 to 0.89 for subscales). The SIS-T subscales were correlated with the SAS-T (r = 0.31 to 0.66, $p < 0.01$), indicating a good concurrent validity. The results show that the SIS-T is semantically and linguistically adequate to determine smartphones' cognitive, affective, social, and behavioral impacts on young and middle-aged adults. Good internal validity and test-retest reliability of the SIS-T were defined to evaluate the impacts of smartphones among Turkish-speaking young and middle-aged adults.

Keywords

smartphone, addiction, validity, reliability, social media

Introduction

The use of the internet, as a global network, is becoming more widespread. Smartphones are one of the easiest ways to access the internet, making the mobile phone a requirement for daily life (O'Dea, 2021). Smartphones provide unique opportunities for numerous activities online without the need to travel in the physical sense such as telework, telecommuting, telehealth services, telemedicine, online learning, and shopping (Athanasiadou & Theriou, 2021; Cavalinhos et al., 2021; Fernandes et al., 2022; Pei & Wu, 2019). Especially due to the Coronavirus (COVID-19) pandemic, the importance of engaging in online activities including learning, communicating, or shopping has significantly increased (Mouratidis & Papagiannakis, 2021). Although the various advantages are attributed to smartphones, concern has grown over the potential for excessive smartphone use to become problematic (Choi et al., 2015; Ratan et al., 2021).

The physiological and neurobiological adaptations from the increased amounts of smartphone use have yet to be documented (Billieux, 2012; Harris et al., 2020; Kardefelt-Winther et al., 2017). Although the definition of problematic smartphone use is not clear, and many studies have used different scales for assessment, negative effects of smartphone use on social, interpersonal, mental health, cognition, and musculoskeletal health have been proven (Billieux, 2012; Scott et al., 2016; Vahedi et al., 2020). A recent study found that problematic attachment to technology such as smartphone devices is associated with lowered social skills, emotional intelligence, and empathy as well as increased conflict with others (Scott et al., 2016). Besides, high problematic smartphone use affects participation in social engagement (Pera,

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2020) and led to upper back, neck, and wrist pain (Mustafaoglu et al., 2021).

Smartphone use was assessed in different aspects consisting of motivation and attitude, smartphone use frequency, and problematic use (Harris et al., 2020). However, there is a lack of outcome measures able to properly address and investigate the human–smartphone interactions.

Unfortunately, this obstructs the possibility of assembling an overview of the smartphone phenomenon and systematically studying it. The Smartphone Impact Scale (SIS) seems to be able to overcome these limitations. The SIS is a brief, comprehensive, psychometrically valid measure, which was developed by Pancani et al., and assesses loss of control, nomophobia, smartphone-mediated communication, emotion regulation, support for romantic relationships, task support, and awareness of negative impact during smartphone use in line with 26-items (Pancani et al., 2020).

Present Study

The number of mobile connections in Turkey increased by 2 million between 2020 and 2021, thus validated and reliable scales in Turkish that comprehensively assess the impact of smartphone use are needed to conduct international multicenter studies on this subject (Kemp, 2021). It is hypothesized that the Turkish version of SIS (SIS-T) will show good internal consistency and construct validity. Therefore, the present study aims to cross-culturally adapt and translate the SIS into Turkish and investigate its psychometric properties.

Methods

Procedures

Two hundred and sixty-four young and middle-aged adults were evaluated between May 2020 and July 2020. Ethical approval, according to the Helsinki Declaration, was obtained from the Noninvasive Research Ethics Board of Halic University with a decision number 2020/05. Verbal and written explanations were provided to participants about the study, and all participants provided written informed consent. This study was registered with ClinicalTrials.gov (Registration number: NCT04337775).

The eligibility criteria were as follows: (1) age over 18 years old; (2) having a smartphone that is connected to the internet for at least 6 months; (3) ability to read and write in Turkish; and (4) being a volunteer to participate. The exclusion criteria were as follows: (1) having a pathology in visual ability and hearing; and (2) having a cognitive impairment. Information on age, weight, height, body mass index (BMI), sex, education, social media usage, time spent with a smartphone, and the total time of being a smartphone user was obtained from all participants.

Translation and Cross-Cultural Adaptation

After obtaining permission to conduct the translation and validation of the questionnaire from the developer, license protocols were signed to determine the validity. Linguistic validation was conducted following the procedure given by the developer. Two individuals translated the survey from English to Turkish, one being a health professional researcher and the other a blinded independent researcher who is a certified translator. A third independent and blinded researcher evaluated these two Turkish translations. The translated Turkish version of the questionnaire was translated back into English by another researcher who is a native English speaker as well as being fluent in Turkish. This translation was compared with the original version of the questionnaire. There was no difference in the comparison. Before the formal survey, the pre-final Turkish version of the instrument was used for a pilot test. The Turkish translation was primarily applied to five participants for the detection of unintelligible questions or words. We asked participants the following questions: "Is there a question you do not understand?" "Are there any words you do not like?" The questionnaire was not modified because the participants did not experience any problems, and the final version of the questionnaire began to be used for the study (Appendix).

Outcome Measurements

Smartphone Impact Scale (SIS): SIS consists of 26 questions and 7 subgroups including; Loss of control of smartphone use, Nomophobia, Smartphone-mediated communication, Emotion regulation through smartphone usage, Smartphone support to romantic relationships, Smartphone tasks support, and Awareness of smartphone negative impact (Pancani et al., 2020). Scoring is calculated with a 5-point likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The mean scores for each subgroup are computed individually; for "Loss of control of smartphone use" answers from questions 9 (Q9), 13 (Q13) and 26 (Q26) are added together and the result is divided by 3, for "Nomophobia" (Q2 + Q7 + Q14 + Q24)/4, for "Smartphone-mediated communication" (Q4 + Q11 + Q17 + Q23)/4, for "Emotion regulation through smartphone usage" (Q1 + Q8 + Q16 + Q20)/4, for "Smartphone support to romantic relationships" (Q6 + Q15 + Q22)/3, for "Smartphone tasks support" (Q3 + Q10 + Q18 + Q25)/4 and for "Awareness of smartphone negative impact" (Q5 + Q12 + Q19 + Q21)/4.

The highest Cronbach's alpha for each latent factor is as follows; Loss of control of smartphone use, and Smartphone support to romantic relationships ($\alpha = 0.88$), followed by Nomophobia ($\alpha = 0.87$), Smartphone-mediated communication ($\alpha = 0.83$), Emotion regulation through smartphone usage ($\alpha = 0.83$), Smartphone tasks support ($\alpha = 0.73$), and awareness of smartphone negative impact ($\alpha = 0.70$).

Smartphone Addiction Scale. Smartphone Addiction Scale is evaluating the individual's smartphone addiction and it consists of 33 items. Turkish validity and reliability were made by Demirci et al. in 2014 (Demirci et al., 2014). Scoring of the scale is calculated with a 6-point likert scale, ranging from 1 (definitely not) to 6 (absolutely yes). The total score on the scale can vary between 33 and 198. A high score on the scale indicates the risk of smartphone addiction. Subscales have been identified as daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, and tolerance. The Turkish version of SAS (SAS-T) was reported as reliable (α = 0.94) and valid (r = 0.81). The internal consistency of SAS-T was adequate with a Cronbach's α of 0.89 in the present study.

Nottingham Health Profile. Nottingham Health Profile is a measurement tool that evaluates individuals' health problems and how these problems affect their daily activities. NHP was developed in the United Kingdom (1985) and translated into 32 languages. The Turkish version was edited by Küçükdeveci et al. in 2000 (Kücükdeveci et al., 2000). In this survey, the questions of the participants are asked to be answered as yes or no. It contains a total of 38 questions and consists of 6 parts. Pain and physical activity are brought up in 8 questions, sleep in 5 questions, fatigue in 3 questions, social isolation in 5 questions, and emotional reaction in 9 questions. The scale is a 24-item measure of distress embedded within it the NHP. Scores are presented as a profile rather than an overall score. Each field is scored between 0–100. As the score increases, the health deteriorates. The reliability (α = 0.88) and validity (r = 0.87) of the Turkish version of NHP (NHP-T) were also good. All of the six Cronbach's α domains were higher than 0.7 in the present study (α = 0.73 for Physical Mobility, α = 0.72 for Social Isolation, α = 0.73 for Emotional Reaction; α = 0.71 for Pain, α = 0.78 for Sleep, and α = 0.75 for Energy).

Initially, all participants completed the SIS-T, SAS-T, and NHP-T. Within a 5-to-7-day period after the first assessment. The participants completed the SIS-T questionnaire to evaluate the test-retest reliability.

Statistical Analysis

The analysis of the data was performed using the Statistical Package for the Social Sciences (SPSS) 20.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics included frequency, the percentage for nominal variables, as well as mean and standard deviation for continuous variables were calculated. The level of significance considered was 0.05. The Kolmogorov–Smirnov test was used to test for the normal distribution of data. Internal consistency of the SIS-T was analyzed through Cronbach's alpha (α). An α value ranging from 0.70 to 0.95 was considered to be adequate (Nunnally, J. C., & Bernstein, 1994). Relative reliability, which examines the relationship between multiple repeated measurements, can be obtained by calculating the intraclass correlation coefficient (ICC) (Nair et al., 2012). The ICC was calculated using a two-way, mixed model under consistency. Values ≥ 0.4 were considered satisfactory (ICC = 0.81–1.0, excellent; 0.61–0.80, very good; 0.41–0.60, good; 0.21–0.40, fair; and 0.00–0.20, poor). The Pearson correlation coefficient was used to analyze construct, convergent and divergent, and content validity. The construct validity of the SIS-T was analyzed based on its correlation with the SAS-T. Correlations with the physical mobility, social isolation, emotional reactions, pain, sleep, and energy score domains of NHP-T were used to assess the convergent validity and divergent validity. The strength of correlations was interpreted as 0.00–0.30 negligible correlation; 0.30 to 0.50 weak correlation; 0.50 to 0.70 moderate correlation; 0.70 to 0.90 strong correlation; 0.90 to 1.00 very strong correlation (Hinkle et al., 1988). The agreement was assessed with the standard error of measurement (SEM) and the minimal detectable change (MDC). The within-subject variability attributable to repeated measures is estimated by calculating the SEM. The MDC is defined as the minimal amount of change that is required to distinguish a true performance change from a change due to variability in performance or measurement error (Nair et al., 2012). The SEM is calculated as the standard deviation of the scores multiplied by the square root of (1-ICC). MDC was calculated as the SEM multiplied by 1.96 multiplied by the square root of 2 (De Vet et al., 2003). Confirmatory factor analysis (CFA) was conducted to test the factor structure. Maximum likelihood with robust standard errors (i.e., MLR) was used as an estimator in the following analysis to avoid problems related to data nonnormality. Various fit indices were used to evaluate the following; CFA: Comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), the probability of close fit associated with the RMSEA (Cfit of RMSEA), and the standardized root mean square residual (SRMR). A model adequately explains the data when the CFI and TLI are higher than 0.90 (better if > 0.95), the RMSEA is lower than 0.08 (better if lower than 0.05), the Cfit of RMSEA is nonsignificant (better if higher than 0.50), if the SRMR is lower than 0.08 (Brown, 2015; Kline, 2015).

Results

The translators had no difficulties in finding the most suitable Turkish words during the translation process. Participants did not report any difficulty in understanding questions. The participants required approximately 10 minutes to complete SIS-T. Two hundred and sixty-four young and middle-aged adults with a mean age of 36.24 ± 14.93 years were included in this study. The demographic and clinical characteristics of the participants and the descriptive statistics for the scores at baseline are shown in Table 1. All participants were social media users, and the total time of being a smartphone user was 9.57 ± 5.20 years. Also, the time spent with a smartphone in a week was 25.38 ± 17.63 hours in this study (Table 1).

The means and standard deviations of the SIS-T subscales of the first and second assessments are provided in Table 2. The SIS-T domains exhibited good to excellent ICC values, ranging from 0.56 to 0.86. The SIS-T showed adequate reliability. The internal consistency of the first assessment of the SIS-T was adequate, with an α of 0.86. The internal consistency of the SIS-T subscales ranged from 0.70 to 0.88 and an α value was close to the overall α value (0.86), indicating that the scale was homogeneous (Table 2).

Table 1. Demographic and General Assessment Data of the Participants.

Characteristics	Mean ± SD
Age *(years)*	36.24 ± 14.93
BMI *(kg/m^2)*	24.03 ± 4.29
Sex [*n* (%)]	
Female	186 (70.5%)
Male	78 (29.5%)
Education [*n* (%)]	
High school graduate	58 (22%)
Graduate	147 (55.7%)
Postgraduate	59 (22.3%)
Social Media Usage [*n* (%)]	
Yes	264 (100%)
No	0 (0%)
Total time of being a smartphone user *(years)*	9.57 ± 5.20
Time spent with a smartphone in a week *(hours)*	25.38 ± 17.63
Smartphone addiction scale *(score)*	79.28 ± 24.69
Nottingham health profile *(score)*	
Physical mobility	11.48 ± 6.73
Social isolation	16.79 ± 9.46
Emotional reactions	23.26 ± 19.76
Pain	20.25 ± 14.80
Sleep	21.63 ± 16.18
Energy	30.91 ± 22.28

Note. BMI = body mass index; SD = Standard deviation.

The SIS-T subscales were significantly positively correlated with the SAS-T score, except for the awareness of the smartphone negative impact subscale, indicating good concurrent validity ($p < 0.05$). Loss of control of smartphone use, nomophobia, smartphone-mediated communication, emotion regulation through smartphone usage, smartphone support to romantic relationships, smartphone tasks support, and awareness of smartphone negative impact subscales had a negligible and positive correlation with subscales of the NHP-T, with a correlation coefficient and ranged from 0.00 to 0.30, indicating that the convergent validity and divergent validity were poor (Table 3).

The SEM and MDC_{95} were determined as 0.42 and 1.77 for loss of control of smartphone use, 0.51 and 1.95 for nomophobia, 0.42 and 1.79 for smartphone-mediated communication, 0.36 and 1.64 for emotion regulation through smartphone usage, 0.57 and 2.01 for smartphone support to romantic relationships, 0.49 and 1.92 for smartphone tasks support, 0.52 and 1.97 for awareness of smartphone negative impact subscale.

The CFA showed good fit indices (RMSEA = 0.055, Cfit of RMSEA = 0.16, SRMR = 0.063). However, the CFI was 0.897 and the TLI was 0.880. The CFI and the TLI did not reach the recommended level. The standardized item loadings ranged from 0.31 to 0.90 (Table 4). All the loadings are found significant at the $p < 0.001$ level.

Discussion

The present study aimed to evaluate the validity and reliability of the Turkish language version of SIS. Acceptable levels of reliability and good concurrent validity were established for SIS-T. The $ICC_{2,1}$ ranged from 0.56 to 0.89 for the SIS-T subscales. In the current study, the MDC_{95} values ranged from 1.64 to 1.97 for the SIS-T subscales. Reporting MDC_{95} and SEM values is critical to detect whether the observed changes in an outcome measure can be taken as reliable and clinically important; therefore, the clinicians should be aware that the observed

Table 2. Test-Retest Reliability and Internal Consistency of the Turkish Version of the Smartphone Impact Scale.

Smartphone Impact Scale Subscales	Mean ± SD		Reliability		Internal Consistency
	First Assessment	Second Assessment	*p* values	ICC (95% CI)	Cronbach's Alpha
Loss of control of smartphone use	1.98 ± 1.02	1.99 ± 0.93	< 0.001	0.83 (0.80–0.86)	0.88
Nomophobia	2.85 ± 0.98	2.75 ± 0.99	< 0.001	0.72 (0.66–0.77)	0.87
Smartphone-mediated communication	2.25 ± 0.87	2.14 ± 0.84	< 0.001	0.76 (0.71–0.80)	0.83
Emotion regulation through smartphone usage	2.75 ± 1.09	2.68 ± 1.11	< 0.001	0.89 (0.87–0.91)	0.83
Smartphone support to romantic relationships	2.74 ± 1.06	2.67 ± 1.04	< 0.001	0.71 (0.64–0.76)	0.88
Smartphone tasks support	3.18 ± 0.86	3.29 ± 0.89	< 0.001	0.67 (0.60–0.73)	0.73
Awareness of smartphone negative impact	2.65 ± 0.79	2.68 ± 0.73	< 0.001	0.56 (0.47–0.64)	0.70

Note. CI, Confidence interval; ICC, Intraclass correlation coefficient; SD, Standard deviation.

Table 3. Correlation between the Turkish Version of Smartphone Impact Scale, Smartphone Addiction Scale, and Nottingham Health Profile.

		Nottingham Health Profile					
Smartphone Impact Scale	Smartphone Addiction Scale	Physical mobility	Social isolation	Emotional reactions	Pain	Sleep	Energy
Loss of control of smartphone use	***0.50*** **	0.12	**0.21***	***0.18***	0.17	0.09	0.06
Nomophobia	***0.66*** **	***0.20***	***0.24*** **	***0.19***	***0.18***	0.09	0.13
Smartphone-mediated communication	***0.49*** **	0.18	***0.21***	***0.24*** **	0.07	***0.19***	***0.22***
Emotion regulation through smartphone usage	***0.51*** **	0.18	***0.20***	0.06	0.14	0.02	−0.007
Smartphone support to romantic relationships	***0.45*** **	0.10	0.01	0.11	0.08	−0.04	0.10
Smartphone tasks support	***0.31*** **	0.18	0.19	0.04	0.02	0.08	0.08
Awareness of smartphone negative impact	0.04	−0.008	0.06	0.20	0.02	0.10	0.10

Pearson correlation test $p < .05^{*}$, $p < .01^{**}$.

Table 4. The Results of the CFAs: Standardized Loadings (λ).

	SIS-T λ
Loss of control of smartphone use	0.84
Q9	0.83
Q13	0.71
Q26	
Nomophobia	0.51
Q2	0.63
Q7	0.67
Q14	0.68
Q24	
Smartphone-mediated communication	0.65
Q4	0.63
Q11	0.79
Q17	0.62
Q23	
Emotion regulation through smartphone usage	0.73
Q1	0.80
Q8	0.90
Q16	0.88
Q20	
Smartphone support to romantic relationships	0.81
Q6	0.79
Q15	0.45
Q22	
Smartphone tasks support	0.44
Q3	0.67
Q10	0.47
Q18	0.71
Q25	
Awareness of smartphone negative impact	0.47
Q5	0.31
Q12	0.50
Q19	0.68
Q21	

CFA = confirmatory factor analysis; SIS-T = Turkish version of the Smartphone Impact Scale; Q: question.
All the loadings are significant at the 0.001 level.

changes of less than these values of MDC_{95} on repeated administrations of the SIS-T might reflect measurement errors rather than a clinically important change (Schmitt & Di Fabio, 2004).

The current perspective of the biopsychosocial model encourages an interdisciplinary approach that unifies biological, psychological, and social parameters to problem-solving (Pratarelli, 2014). A comprehensive assessment helps the healthcare professionals to define the problems and prepare a program for the desired goal. At this point, the SIS is an important questionnaire due to its dimensions showing meaningful associations with a series of psychosocial constructs related to human and smartphone interaction, as well as with self-reported negative impacts related to smartphone overuse (Pancani et al., 2020). The assessment of young and middle-aged adults using SIS helps reveal the negative impacts of smartphone use such as pain, anger, lack of concentration, and vision problems. Besides, the SIS is a questionnaire that identifies the loss of control of smartphone use, nomophobia, smartphone-mediated communication, emotion regulation through smartphone usage, smartphone support for romantic relationships, smartphone tasks support, and awareness of smartphone negative impact. Therefore, it seems considerable to use SIS in clinical settings and scientific research in the field of healthcare.

The test-retest indicated good to excellent reliability for the subscales and the Turkish version of SIS as a whole. In the literature, the psychometric properties of SIS have not been demonstrated in different languages; therefore, its reliability was not compared to another study. In the original study, Pancani et al. had included smartphone users whose demographic and clinical features were similar to those in the SIS-T. The analysis of the SIS dimensionality has yielded excellent fit indices and its subscales demonstrated good to excellent reliability (Pancani et al., 2020).

The SIS-T subscales were significantly correlated with the SAS-T score. These correlation scores are similar to the study conducted by Pancani et al. except for the awareness

Akıllı Telefon Etki Skalası (ATES)	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Kızgın olduğumda, akıllı telefon kullanmak beni daha iyi hissettiriyor.	1	2	3	4	5
2. Akıllı telefonumda bir sorun olduğunda yalnızca bu sorunu düşünüyorum (örneğin açılmıyorsa ya da kırılmışsa).	1	2	3	4	5
3. Akıllı telefon ne yapmam gerektiğini hatırlamama yardımcı oluyor.	1	2	3	4	5
4. Duygularım hakkında yüz yüze konuşmak yerine akıllı telefon aracılığıyla konuşmayı tercih ediyorum.	1	2	3	4	5
5. Akıllı telefon kullanmadığım zaman kendimi daha iyi hissediyorum.	1	2	3	4	5
6. Partnerimle olan ilişkim, akıllı telefon olmamasından etkilenecektir.	1	2	3	4	5
7. Akıllı telefonumu kaybetme fikri beni çok korkutuyor.	1	2	3	4	5
8. Kendimi baskı altında hissettiğimde, akıllı telefon kullanmak beni daha iyi hissettiriyor.	1	2	3	4	5
9. Başkaları bana akıllı telefonda çok fazla zaman harcadığımı söylüyor.	1	2	3	4	5
10. Akıllı telefonum işlerimi daha hızlı yapmama yardımcı oluyor.	1	2	3	4	5
11. Sanal ilişkiler sürdürmeyi yüz yüze ilişkiler sürdürmekten daha kolay buluyorum.	1	2	3	4	5
12. Normal bir cep telefonum olduğunda kendimi daha iyi hissediyordum.	1	2	3	4	5
13. Etrafımdaki insanlar akıllı telefon kullanımımı genellikle aşırı buluyor.	1	2	3	4	5
14. Akıllı telefonum kapandığında kaybolmuş gibi hissediyorum.	1	2	3	4	5
15. Partnerimle olan ilişkimin önemli bir kısmı akıllı telefon iletişiminden oluşuyor.	1	2	3	4	5
16. Üzgün olduğumda, akıllı telefonu kullanmak beni daha iyi hissettiriyor	1	2	3	4	5
17. Sorunlarım hakkında yüz yüze konuşmak yerine akıllı telefon aracılığı ile konuşmayı tercih ediyorum.	1	2	3	4	5
18. Akıllı telefonum olmasa randevularımı hatırlayamam.	1	2	3	4	5
19. Akıllı telefon bunaltıcı bir cihazdır.	1	2	3	4	5
20. Gergin olduğumda, akıllı telefonumu kullanmak beni daha iyi hissettiriyor.	1	2	3	4	5
21. Akıllı telefonu kullanmadığımda daha sakin hissediyorum.	1	2	3	4	5
22. Akıllı telefon, ilişkilerimi canlı tutmama yardım eder.	1	2	3	4	5
23. Akıllı telefon iletişimini tercih ediyorum çünkü yüz yüze olanlardan farklı olarak müdahale edip etmeyeceğinize ve ne zaman müdahale edeceğinize karar verebiliyorsunuz.	1	2	3	4	5
24. Okula/üniversiteye/işe gittikten sonra akıllı telefonumu evde unuttuğumu fark edersem panik oluyorum.	1	2	3	4	5
25. Akıllı telefon günlük aktivitelerde bana yardımcı oluyor.	1	2	3	4	5
26. Bazen çevremdeki kişilerle akıllı telefonu aşırı derecede kullanmam hakkında tartışıyorum.	1	2	3	4	5

of the smartphone negative impact subscale in the presented study. On the other hand, Pancani et al. did not use the overall health outcome scale in their study. The authors of the presented study need to show participants' overall health levels to compare relation with smartphone use. Although results showed poor correlations overall, the loss of control of smartphone use, nomophobia, and smartphone-mediated communication subscales had a small correlation between social isolation and emotional reactions (Pancani et al., 2020). Similar to the original study, the CFI and the TLI did not reach the recommended level. However, this should not be a problem because the null model has an RMSEA of exactly 0.158, Cfit of RMSEA of 0.00, and SRMR of 0.234; thus, CFI and TLI

could not mathematically reach the minimum values of 0.90 (Kenny, 2020).

The strength of the current study is a cross-culturally adapted scale measuring impact of the smartphone in Turkish because there is no reliable and valid scale in this context in the Turkish language. Besides, we reported the SEM and MDC_{95} for SIS-T. Despite demonstrating adequate reliability, validity, and internal consistency of SIS-T in young and middle-aged adults, this study has several limitations. First, the responsiveness to change in SIS-T was not reported in this study. Secondly, data were obtained from healthy young and middle-aged adults; therefore, the findings should be interpreted with caution in young and middle-aged adults with smartphone addiction. Thirdly, the sample size was slightly low to test the CFA model. Lastly, the total score comparison could not be performed between addicted and non-addicted because the appropriate data did not exist.

Conclusion

The results of the present study indicate that the Turkish version of SIS is semantically and linguistically adequate to comprehensively assess the impact of the smartphone among Turkish-speaking young and middle-aged adults. The Turkish version of SIS is an effective tool to assess the impact of smartphone use as a comprehensive outcome measure. SIS-T has a high level of validity and reliability that can be easily used by researchers and clinicians. This questionnaire can be an important outcome measure including subscales for loss of control of smartphone use, nomophobia, smartphone-mediated communication, emotion regulation through smartphone usage, smartphone support to romantic relationships, smartphone tasks support, and awareness of smartphone negative impact in multidisciplinary research. Future research could investigate whether and how the SIS-T dimensions change over time and whether these changes are predicted by specific psychosocial constructs.

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Ethical approval

Ethical approval for this study was obtained from the Noninvasive Research Ethics Board of Halic University with a decision number 2020/05.

ClinicalTrials

This study has been registered in ClinicalTrials.gov with registration number NCT04337775.

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Appendix

Turkish Version of the Smartphone Impact Scale.

Puanlama:

Akıllı telefon kullanımında kontrol kaybı = (S9 + S13 + S26)/3

Nomofobi = (S2 + S7 + S14 + S24)/4

Akıllı telefon aracılığıyla iletişim = (S4 + S11 + S17 + S23)/4

Akıllı telefon kullanımıyla duygu düzenleme = (S1 + S8 + S16 + S20)/4

Romantik ilişkilerde akıllı telefon desteği = (S6 + S15 + S22)/3

Akıllı telefon görevleri desteği = (S3 + S10 + S18 + S25)/4

Akıllı telefonun olumsuz etkisi hakkında farkındalık = (S5 + S12 + S19 + S21)/4