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# Research Article
# Validation of the Arabic Short Version of the Smartphone Addiction Scale (A-SAS-SV) Among the Saudi Population

Mohammed Abdulrahman Ali Alghamdi

Department of Psychology, College of Arts, Taif University, P.O. Box 888, Taif 21974, Saudi Arabia

## Abstract

**Background and Objective:** Smartphone use has expanded rapidly and is now central to daily functioning, particularly among young adults. This study aims to validate the Arabic short version of the Smartphone Addiction Scale (A-SAS-SV) among the Saudi population by examining its reliability, construct validity and psychometric properties to ensure its suitability for assessing smartphone addiction in this cultural context. **Materials and Methods:** The study sample included 403 subjects (267 males, 136 females) with an age range from 16 to 28 years (M = 21.109, SD = 1.53; M = 21.097, SD = 1.493 for males; M = 21.132, SD =1.605 for females). To test construct validity of this scale, Confirmatory factor analysis (CFA) was performed and, t-tests were employed to test the differences in AN between gender and age groups. The prevalence rates of SAS-SV were calculated using percentages. The shortened version of Smartphone Addiction Scale was used for this purpose. Statistical analyses were conducted at a significance level of $p<0.05$. **Results:** The coefficients for the confirmatory factor analysis demonstrated that all indexes had a good model fit, suggesting further evidence of construct validity of the scale. Cronbach's alpha coefficient of 0.848 suggested a good internal consistency. There were no gender specific statistically significant differences. Age differences that were significantly in favor of the younger group noted indicate that levels of smartphone addiction increase among younger people. The prevalence rate of smartphone addiction was 48.13% (50.19% among males and 44.118% among females) overall. **Conclusion:** The scale demonstrates strong validity and reliability, supporting its use in both clinical practice and research. Future studies employing longitudinal designs, more diverse populations and objective behavioral measures are warranted to clarify the underlying mechanisms further.

Key words: Smartphone addiction, arabic scale, psychometric validation, Saudi population, behavioral addiction, mental health

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Corresponding Author: Mohammed Abdulrahman Ali Alghamdi, Department of Psychology, College of Arts, Taif University, P.O. Box 888, Taif 21974, Saudi Arabia Tel.: (+966) 506711105)



Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

## INTRODUCTION

University students' academic, social and personal lives cannot go without the smartphone. Nowhere is this rapid adoption clearer than in Saudi Arabia, where smartphone penetration is over 90%. Smartphones offer many benefits in terms of communication, learning and productivity but problematic smartphone use (PSU), often referred to as smartphone addiction is increasingly a cause for concern. Also, PSU is not currently considered as a psychiatric disorder in key diagnostic systems (e.g., DSM-5; ICD-11), however, it overlaps major behavioural processes of recognized behavioral addictions including salience/preoccupations, withdrawal/loss of control and continued use despite negative consequences World Health Organization[1]. Increasing evidence suggests that PSU is related to poor academic performance, psychological distress and likely to sleep problems as well as more general health risks in young adults, providing impetus for the important public-health and educational attention toward this issue.

Multiple theoretical lenses are used to help elucidate why people overuse smartphones. The interaction of person affect cognition execution (I-PACE) model posits that BA is the result of combined exposure to specific environments with individual vulnerabilities, like impulsiveness, impairments in regulating emotions and an overactive reward system interacting with biased cognitive responses, overvalued body image and executive control deficits. Academic stress and social detachment can strengthen the relationship between emotional relief and smartphone use, enhancing habitual behaviors. Consistent with this view, the Compensation Effect Theory posits that people may use technology in excessive ways to manage negative feelings (e.g., loneliness, anxiety, low self-esteem)[2]. Uses and Gratifications Theory also emphasizes the motivation dimension of media consumption by an emphasis on the purposive nature of smartphone use, which can largely be attributed to social interaction, entertainment, information seeking and mood regulation needs[3]. As a whole, these models suggest that PSU is the product of a combination of psychological vulnerabilities, environmental stressors and reinforcement mechanisms.

Evidence-based research in Saudi Arabia reveals a wide range of PSU prevalence among university students. The first study used on a smaller sample to find that around 19% of students meet the criteria for smartphone addiction[4]. Later studies reported much higher prevalence rates: 36.5% among medical students in Jazan[5], 67% among university students using SAS-SV[6] and 47.9 % among medical students in Riyadh (perceived stress had a significant positive relationship with PSU. Prevalence was 36% and associated with hypertension in a study from the Northern Border University[7]. In a community sample, 64% of the majority living in Qassim screened for PSU and university students were triple the risk of unemployed adults to manifest PSU[8]. Together these results emphasize the increasing public-health importance of PSU in Saudi Arabia.

It has been reported in several international and regional studies that PSU is significantly related to psychological health measured in terms of stress, anxiety, depression, loneliness and emotional dysregulation. The PSU has also been linked to sleep quality, fear of missing out, physical activity and academic achievement. There is now increasing evidence of broader physiological and behavioral impacts such as hypertension, headaches, substance use and frequent low mood[9,10]. Also, PSU has been found significantly related to academic impairment and poor attention and cognitive disinhibition in international studies[11,12]. Elevated smartphone addiction also has been associated with loneliness, low self-esteem and psychological distress[13].

However, some methodological and theoretical limitations persist in the increasing literature. Most investigations are pragmatic and employ self-report measures, which may be prone to over-estimation of prevalence or differ in factor structure across cultural contexts. Moreover, many instruments do not feature functional impairment items to tease out high-frequency use from the presence of clinically meaningful addiction. The cross-sectional nature of the studies limits their potential to infer causal associations between PSU and psychological or health correlates. Furthermore, research tends to be concentrated on medical students alone, limiting the generalization of its findings to other university populations. Furthermore, only a small number of studies include objective behavioral measures like academic performance or digital-log data. Rapid digitalization, especially during and after the COVID-19 pandemic, has blurred the lines between non-problematic and problematic use of technology. However, there is an evident need for culturally adapted instruments to assess PSU properly in Saudi university students.

To address these gaps, the current study aims at developing and validating a short version of SAS in Arabic as well as determining PSU among Saudi university students. The purpose of this research is to examine the psychometric characteristics of the translated scale, to determine prevalence rates in a representative student sample and to analyze demographic predictors such as age and gender aspects. Drawing from previous literature, we proposed the following hypotheses: smartphone addiction has a prevalence over 30%, younger students' addiction is greater, perceived stress

significantly predicts smartphone addition and gender difference in smartphone addition was found. Taken together, the end result is anticipated to be empirical evidence for prevention and intervention programs in institutions of higher education in Saudi Arabia.

## MATERIALS AND METHODS

**Study area:** The study was conducted at Taif University, Taif, Saudi Arabia. Data collection was carried out over a defined period from August 2025 to October 2025, during which participant recruitment and all study procedures were completed.

**Participants:** The Participants in this study were 403 students (267 males, 66.25%, 136 females, 33.75%) from Taif University in Saudi Arabia. Their ages ranged from 18 to 28 years; M = 21.109, SD = 1.53; M = 21.097, SD = 1.493 for males; M = 21.132, SD = 1.605 for females. All participants volunteered to participate in this study.

Written informed consent was obtained from all participants involved in the study. The study was approved by the Research Ethics Committee at Taif University in Saudi Arabia with No. (HAPO-02-T-105).

**Instrument:** Smartphone Addiction Scale Short Version (SAS-SV) were applied, this scale is consists of 10 items that were selected from a scale includes 33 items[14]. The SAS-SV is a 10-item scale in which respondents indicate their agreement with each statement on a Likert-type scale. Scale quality The scale score ranged from 10 to 60 and the SAS-SV is a reliable scale that has been tested and used in prior research in China[12]. The researcher translated the scale from English into Arabic language and adapted it tour society, then we tested validity and reliability of this scale.

Prevalence percentage for current study sample and in previous studies sum of responses was calculated as to case score, cutoff point 31 (male) and 33 (female). Scores on the K-scale higher than 33 indicated addiction[14]. On the SAS-SV, the Cronbach's alpha correlation coefficient was 0.848.

**Translation process:** The Kwon *et al.*[14], smartphone addiction scale short version (SAS-SV) was translated to the Arabic language and back translated to English by an independent translator as suggested in adaptation model provided for cross culture researches[15]. The entire process, translation phase as well as its related monitoring and performance management, digital integration between humans and machines are advocated. To achieve equivalence in terms of language, the Arabic version was checked by a panel of native Arabic speakers. A group of male and female Saudi panel reviewed the translated scale for clarity and compatibility of each item with culture. They were also requested to highlight any discrepancies and suggestions for modification, if at all necessary. It didn't need to be "naturalized" or scaled with Saudi cultural concepts. The A-SAS-SV (Arabic version) was tested administrated in a group of 35 individuals (17 males, 18 females) for clarity and readability.

**Statistical methods:** Confirmatory Factor Analysis (CFA) was performed to assess the construct validity of the scale with AMOS version 26 using maximum likelihood estimation, testing data fit for a proposed one-factor structure of the short version of this scale. CFA was used as the factor structure of the instrument had previously been established in previous studies, whilst this study aimed to confirm whether this structure is valid within the Saudi context. Descriptive statistics were initially computed with SPSS version 26.0 to summarize characteristics of the study sample, as well as the distribution of the study variables. Descriptive statistics, including means, standard deviations, frequencies and percentages, were performed as a general description of participants' demographic characteristics and the smartphone addiction scores independent samples t-tests were performed to compare group differences. In contrast, a t-test was performed to examine the results according to gender and age.

Statistical analyses were conducted using an alpha level of $p<.05$, which is widely used in behavioral and psychological studies to judge if the observed differences or associations are statistically significant.

## RESULTS AND DISCUSSION

**Confirmatory factor analysis (CFA):** This model as illustrated in Fig. 1 contains the primary one-factor measurement that is assumed to be Smartphone Addiction indicated by 10 exposures (Item 1 to Item10). Normalized loadings range between 0.39 and 0.76, showing at least moderate to strong total relations of items with the latent factor. Items that reflect most strongly the construct were item 6 ($\lambda = .76$) and item 5 ($\lambda = .68$), then Item 7 ($\lambda = .67$) and Item 8 ($\lambda = .66$), suggesting that these inclusions capture more of the variance of the common factor. In contrast, item 3 ($\lambda = .39$) and item 2 ($\lambda \approx .46$) have relatively lower loadings, which suggests that they relate weakly to the latent trait and need to be looked at closely in future scale revision.

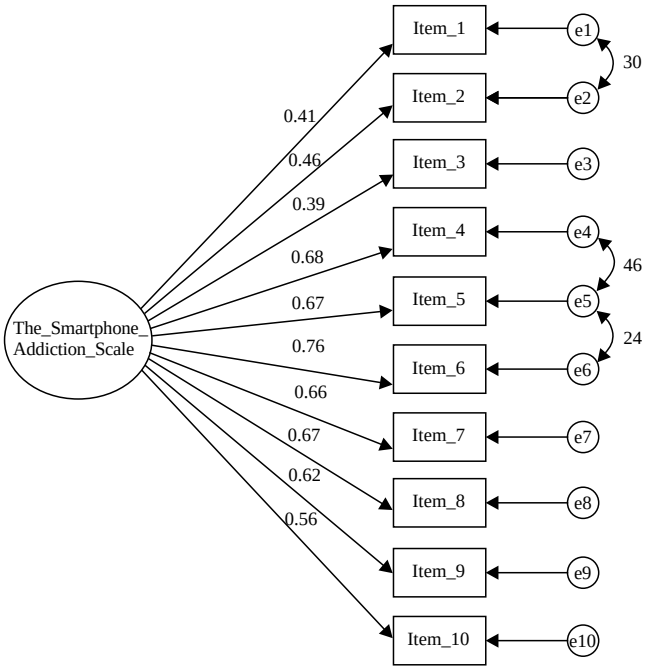


Fig. 1: Confirmatory factor analysis of the Arabic SAS-SV

Rectangles = observed items (Item 1-Item 10), Circle = latent construct (Smartphone Addiction), Single-headed arrows = standardized factor loadings; Double-headed arrows = covariances between errors (if applicable), Error terms (e) represent measurement error for each item, Standardized factor loadings ranged from 0.39 to 0.76, with items 6, 5, 7 and 8 showing strongest loadings and Model fit indices ($\chi^2$/df, RMSEA, RMR, GFI, AGFI, CFI, NFI, TLI, IFI, RFI) indicate good fit for a one-factor structure (see Table 1)

Table 1: Confirmatory factor analysis

| Fit indexes | Results | Acceptance criteria |
|---|---|---|
| RMSEA | 0.061 | 0.08 or less |
| RMR | 0.095 | 0.1 and less |
| GFI | 0.961 | 0.9 and over |
| AGFI | 0.933 | 0.9 and over |
| CFI | 0.964 | 0.9 and over |
| TLI | 0.949 | 0.9 and over |
| NFI | 0.942 | 0.9 and over |
| IFI | 0.964 | 0.9 and over |
| RFI | 0.918 | 0.9 and over |

RMR: Root mean square residual, RMSEA: Root-mean-square error of Approximation, GFI: Goodness fit index, CFI: Comparative fit index, AGFI: Adjustment goodness fit index, TLI: Tucker-lewis index, NFI: Normed fit index, IFI: Incremental fit index, RFI: Relative fit index, $\chi^2$ Chi-square statistic and df: Degrees of freedom

Confirmatory factor analysis (CFA) was used to investigate construct validity of the smartphone addiction scale short version (SAS-SV), Based upon the hypothetical underlying constructs for the SAS-SV is one factor[10], The confirmatory factor analysis provides sufficient evidence for the construct validity of the one factor of the scale (see Fig. 1).

The results of confirmatory factor analysis indicated that all the fit indexes reached the standard of good model fit ($\chi^2$/df = 2.501<5, Root Mean Square Residual (RMR)RMR = 0.095<0.1; Root Mean Square Error of Approximation (RMSEA) = 0.061<0.080, Comparative Fit Index (CFI) = 0.964>0.900, Normed Fit Index (NFI) = 0.942>0.900, Non Normed Fit Index (NNFI) = 0.98>0.900; Goodness of Fit Index (GFI) = 0.961>0.900>0.900, Adjusted Goodness of Fit Index (AGFI) = 0.933>0.900 indicating that the overall fit of the model is good. As shown in Table 1.

Cronbach's alpha was .848 for the smartphone addiction scale this coefficient over 0.7 this means that the scale has a good reliability.

**Gender differences:** First, test the normal distribution of the data, then use an independent t-test as shown in Table 2.

Table 2: Gender differences in smartphone addiction

| Gender | N | Mean | SD | Degrees of freedom | T | Significance |
|---|---|---|---|---|---|---|
| Males | 267 | 35.813 | 10.192 | 401 | 0.067 | 0.947 |
| Females | 136 | 35.882 | 9.182 | | | |

N: Sample size, SD: Standard deviation, df: Degrees of freedom, t: t-test statistic and Sig.: p-value

Table 3: Age group differences in smartphone addiction

| Age | N | Mean | SD | t | Degrees of freedom | Significance | Effect size |
|---|---|---|---|---|---|---|---|
| Age≤20 | 123 | 37.959 | 9.523 | 2.894 | 401 | 0.004 | 0.02 |
| age>21 | 280 | 34.904 | 9.865 | | | | |

N: Number of participants, SD: Standard deviation, t: Independent t-test value, df: Degrees of freedom, Sig.: Significance (p-value), Effect size ($\eta^2$) indicates the proportion of variance explained by age group, Younger students (≤20 years) scored significantly higher on the Arabic Smartphone Addiction Scale-Short Version, suggesting higher risk of smartphone addiction

As given in the previous table, no statistically significant differences exist between males and females in terms of short version SAS-SV scores. Several studies found that gender was a significant predictor of smartphone addiction, with female participants reporting significantly higher scores than the male[10]. Another study also revealed that females are more addicted to smartphone than males when compared among the adolescents aged from10-24 years. females they spends fairly higher time on smart phones as compared to male)[16]. On the other hand, some studies revealed sex difference in smartphone addiction; for instance, it was discovered that males were more addicted to smartphones than females. Some studies conducted and came up with the findings that analyses revealed there was no significant difference between female and male students towards smartphone addiction while using smartphone. and failing to find a link from gender for smartphone addiction.

**Differences according to age:** As can be seen in Table 3, indeed an appropriate level of relationship was found and there is a significant difference between two groups for short version smartphone addiction scale scores (they measured high levels of smartphone addition who belongs to younger group) as opposed to older group. The reason may be that the older students have finished university and have matured, whereas they are more concerned about their future work life and their high grades also play a part in finding a job after graduation. The effect size = 0.02 is too small, indicating that the age explains only 2% of variance in smartphone dedication. The younger people (18-80 years) have the highest mean daily use and the higher score in SAS in comparison to older people for sample 1006 & 1078[17]. Younger age users for the sample (935) and their age 18 years and above related to significantly higher smartphone addiction scores[18].

**Prevalence:** The mean of the score for the men and women was 35.836 (SD = 9.851), M(267) = 35.813 (SD = 10.191) for men; Mean 35.882, SD = 9.181 for women, as indicated from data presented were: M(403) = 35.836, SD = 9.851; (M (267 = 35.813, SD = 10.191 in males; M = 35.882, SD = 9.181 females). The researcher set cut-off score who has smartphone addiction 36 or higher the general rate of 48.38% (50.19% for male and 44.129% female). This finding is consistent with previous studies that identified the prevalence of smartphone addiction among their participants were 29. 8% (30.3% for men and 29.3% for women) in China[19]. Prevalence of Smartphone Addiction was also very high (57.8%) as reported by a study on 1083 sample size[20]. The prevalence of SA among the participants was 61.4%; male participants (68.4%) had more addiction than female participants (53.4%)[21]; The prevalence of smartphone addiction for our study was 66(36.5%)[5]. Smartphone Addiction Prevalence for Sample 1532 participants were of about 67.80%[22].

The results indicated the cell phone addicts accounted for 49.8% in a survey of 420 college students[23]. The prevalence of smartphone addiction among Chinese medical students was 29.8%[24]. The incidence of other researches was 18.6-49.8%[25]. Nearly 40% of Chinese college students suffer from different level smartphone addiction, such that became a dominating non-substance addiction[26].

The prevalence of smartphone addiction in Chinese university students rose from 4.05 to 27.4% between 2011 and ≈22.4% and ≈33.1% between 2022. The prevalence of smartphone addiction among Chinese college students is approximately 40%, such being a significant non-substance addition[26]. The addiction of smartphone was found to be 37% among the sample sized between 16-19 years[27].

This study translate, to adapt the A-SAS-SV and assess its psychometric properties in a sample of Saudi university students and investigate the gender- and age-related differences in smartphone addiction as well as its prevalence. In general, the results offer good evidence for the psychometric soundness of the Arabic SAS-SV and apparent patterns of mobile phone use within young adults residing in Saudi Arabia.

The one-factor structure of the A-SAS-SV was confirmed by the confirmatory factor analysis, with all of them showing acceptable fits. As well as replicating previous work confirming the measurement equivalence of the SAS-SV in Western and Asian countries[12,14], they are consistent with more recent research which reported gender measurement invariance among university students[28]. The internal consistency of the instrument was. 848 reflects high internal consistency, which was in line with those of the previous studies conducted in Arabic settings[29]. Taken together, these results suggest that the Arabic version of the SAS-SV is a reliable and valid measure to screen smartphone addiction in Saudi university.

The prevalence of smartphone addiction at all levels in the present study was 48.1%, wherein males demonstrated marginally higher prevalence than females (50.19% and 44.12%). These results are in line with recent national and international studies, which have reported prevalence estimates vary from 30% to greater than 60%, depending upon the measuring instrument as well as types of population [5,6,20,21]. The high rates noted in this study might mirror the increasing influence of smart phones on educational, social and individual aspects based on handiness along with swift digitalization in KSU.

Prevalence variability between the studies is likely associated with cutoffs and cultural issues, as well as composition of samples. However, the current prevalence in this study suggests that smartphone addiction is a growing problem for university students and deserves greater attention as regards screening and intervention.

In current study, no significant difference was determined in terms of smart phone addiction between male and female individuals. This is consistent with some recent studies in which gender differences did not exist[14,30], but contrary to those reporting more female addiction[10,31] and more male addiction[17]. These discrepancies can be ascribed to a transformation in smartphone use practices increasingly widespread between both sexes, particularly at academic and social levels. The use of smartphones for learning, entertainment and communication could reduce the gender differences reported in previous studies.

Smartphone dependence was significant more for younger ($\leq$20 years) students than older students. This is in line with empirical findings that young adults are more susceptible to reward-related and emotionally motivated smartphone use[17,32]. Despite the small effect size (2%), the difference is in line with studies conducted among both Saudis and non-Saudis where younger users are frequent smartphone users, making them vulnerable to having problematic use behaviours[5].

Developmentally, it is also possible that young students' use of smartphones for social belonging, digital entertainment and emotional regulation strategies discussed earlier Compensatory Internet Use Theory[2], I-PACE model,[32] is more pronounced compared to their older counterparts as highlighted in Uses and Gratifications Theory[3].

The results of the present study clearly confirm current theoretical models on problematic smartphone use. The I-PACE model highlights the interplay among individual vulnerabilities, affective states and cognitive biases and might thus provide some insight as to why younger students are more vulnerable. This may also lead to the excessive use of smartphones, which is associated with clinical levels of anxiety, depression or being bullied at school and relates to stress relief or low mood in general consistent with compensatory Internet Usage Theory[9,33,34].

From a practical perspective, the high prevalence and good psychometric properties of the A-SAS-SV confirm its utility as a screening device for universities. Recognition at an early age may help to mitigate later sequelae, including learning difficulties, disruption of sleep and emotional distress. Interventions that are customized for emotional regulation, time-management skills and appropriate usage of digital technologies may be more effective especially in younger children.

An important strength of the study is that of comprehensive psychometric validation of a commonly used screening instrument from an Arab Saudi sample. The high number of participants also increases confidence in the prevalence and group-difference results.

Yet the study is cross-sectional and self-reported data are utilized as well as a single university sample that restricts generalizability. Future work should adopt longitudinal designs and consider broader populations and behavioural measurements (e.g. screen-time logs or ecological momentary assessment). Examining potential psychological mediators, particularly stress, loneliness, emotion regulation and fear of missing out would also help to further elucidate underlying mechanisms.

The present study offers powerful evidence of the reliability and validity of the Arabic SAS-SV and reports a high percentage of smartphone addiction among the Saudi university students. Addiction among younger pupils was significantly elevated and no gender differences were

reported. These results align with existing literature both from the region and rest of the globe, that identifies smartphone addiction as a new public-health and an educational problem. Universities could establish screening programs and initiatives to promote digital wellbeing in order to reduce the risks associated with unhealthy patterns of students' mobile phone use external validity.

## CONCLUSION

The current study is an empirical approach that demonstrates the reliability and validity of the Arabic version (A-SAS-SV) of the Smartphone Addiction Scale Short Version among Saudi university students. The proposed one-factor structure was confirmed by the confirmatory factor analysis and adequate internal consistency of the scale was shown. Moreover, the results also showed a relatively high prevalence of smartphone addiction especially in unfortunate rooms, characterizing young students and no significant gender differences. These findings demonstrate smartphone addiction is an emerging behavioral issue in university context and point to suspected early screening and preventive digital wellbeing strategies.

## SIGNIFICANCE STATEMENT

Our findings give a culturally validated Arabic language Smartphone Addiction Scale-Short Version (A-SAS-SV) for Saudi and Arabic university settings. The instrument provides a psychometrically sound and validated measure with excellent discrimination against an objectively identified criterion of smartphone addiction that will be applicable to researchers, clinicians and educators in screening for and identifying smartphone addiction. Its app can deploy early identification of high-risk students, but can also trigger the design of institution/facility-targeted digital wellbeing interventions and policies.

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