



Predictors of Addictive Smartphone Use among University Students: A Correlational Study

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Abstract

In recent years, smartphone addiction has attracted increasing attention from researchers in the behavioural sciences. Numerous studies conducted in various countries, including Romania, have focused on its specific manifestations, predictors, and consequences among children, adolescents, and adults. The correlational study presented here, conducted on a sample of 196 Romanian university students, aimed to identify the predictors of smartphone addiction in relation to five variables: anxiety, depression, and psychological stress (as indicators of emotional well-being), problematic video game use, and Facebook addiction. Four working hypotheses were tested. Comparative data did not reveal statistically significant differences in smartphone addiction according to gender, academic major, or year of study. Models tested using multiple linear regression analysis identified age, Facebook addiction, anxiety, depression, and psychological stress as predictors of smartphone addiction. The findings provided support for three of the working hypotheses. The results are discussed with regard to their practical implications.

Keywords: Anxiety; correlational study; depression; Facebook addiction; problematic video game use; psychological stress; smartphone addiction

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1. Introduction

Over recent decades, unprecedented technological progress has occurred in the fields of information, communication, and human interaction. This global societal development has been facilitated by the expansion of the Internet beginning in the 1980s, the emergence and proliferation of synchronous communication and social networking platforms from the late 1990s onward, and the rapid growth of the video game market, particularly online games. Marketing studies conducted in recent years show a dramatic increase in the number of mobile phone users, especially in highly technologically developed countries. Two major factors explain this phenomenon: the integration of Internet connectivity into mobile systems and the improvement of digital skills among contemporary generations of children, adolescents, and young adults. Students use smart devices both for educational purposes (information searching and processing, academic task completion, teamwork) and for socialization, rendering these devices indispensable in everyday life (Chen & Peng, 2008). In a study conducted by Chaputula and Mutula (2018), 99.7% of respondents ($n = 370$ university students) reported owning at least one mobile phone. When mobile phones are used in moderation and do not interfere with daily functioning (e.g., personal autonomy, household management, academic activity, employment, social relationships, etc.), they represent valuable tools that enhance individual quality of life. Unfortunately, a growing body of research highlights the risks associated with compulsive or addictive mobile phone use. In the literature, terms such as mobile phone addiction, smartphone addiction, or smart device addiction are often used interchangeably in the literature.

Numerous studies employing correlational, longitudinal, or qualitative designs have investigated situational, psychological, and social characteristics associated with smartphone addiction. (Al-Mamun *et al.*, 2023; Dou *et al.*, 2024; Gao *et al.*, 2018; Ge *et al.*, 2023; Hou *et al.*, 2023; Lee *et al.*, 2023; Liu *et al.*, 2016; Rękas & Burzyńska, 2024), as well as its individual-level consequences (Kim *et al.*, 2022; Seo *et al.*, 2016; Twenge *et al.*, 2018). The present study focuses on predictors of problematic smartphone use among Romanian university students. In DSM-5 (2013), excessive and problematic use of smart devices has been discussed as a potential behavioral addiction related to impulse control disorders. Smartphone addiction is conceptualized as a recurrent behavioral pattern characterized by prolonged use, preoccupation, increased tolerance, psychological discomfort when access is restricted, use as compensation for negative emotional states (e.g., anxiety or depression), and significant interference with personal, academic, social, or occupational functioning. Reported prevalence rates of smartphone addiction among adolescents and students range between 10% and 30% (Giansanti, 2025), highlighting its relevance for public health professionals. This study examines anxiety, depression, psychological stress, problematic video game use, and Facebook addiction as predictors of smartphone addiction among Romanian university students.

2. The current study

2.1. Aim and design

The current study aimed to identify predictors of smartphone addiction among Romanian university students, emphasizing the importance of preventive and educational interventions related to new technologies. A correlational design was used, and data were collected through standardized questionnaires. The working hypotheses were: H1) Anxiety and depression positively predict smartphone addiction. H2) Psychological stress positively predicts smartphone addiction. H3) Problematic video game use positively predicts smartphone addiction. H4) Facebook addiction positively predicts smartphone addiction.

2.2. Participants and procedure

The data were obtained from responses provided by 196 Romanian students through the administration of a standardized protocol that operationalized the variables of interest. The sample included 72 male university students and 124 female university students. At the time of data collection, participants were aged between 18 and 35 years ($M = 22.24$; $SD = 5.19$). Approximately 58% of the total participants were between 18 and 20 years old. The sample included students from engineering ($n = 66$), humanities ($n = 61$), and social science ($n = 69$). Engineering students were enrolled in programs such as Materials Science and Engineering, Architecture, Automation and Computer Science, Mechanical/Energy/Engineering, among others. Humanities students were enrolled in programs such as Romanian Language and Literature, English Language and Literature, Classical Philology, Journalism, or American Studies. Social sciences students were enrolled in programs such as Psychology, Communication and Public Relations, Sociology, Philosophy, or International and European Studies. The distribution of respondents by years of study was as follows: 1st year – 20, 2nd year – 36, 3rd year – 101, 4th year – 39.

Participants were recruited using the snowball sampling technique from the student populations of two higher education institutions, namely “Alexandru Ioan Cuza” University of Iași ($n = 130$) and “Gheorghe Asachi” Technical University of Iași ($n = 66$). The standardized protocol was implemented using the *Google Forms* platform. The link was initially distributed to several contacts with a request for further dissemination. Only protocols with eligible responses from students who consented to participate, completed the online form, and successfully submitted it were considered. Questionnaire responses were anonymous. Data collection took place between November 2024 and March 2025. Following the analysis of atypical response patterns, a total of 196 protocols with valid responses were retained in the final database (18 were excluded).

2.3. Measures

Participants completed a standardized protocol that included four instruments ($k = 51$ items). These instruments are briefly described below.

Smartphone Addiction Scale – Short Version (SAS-SV). The short version of the Smartphone Addiction Scale (SAS-SV) consists of ten items (e.g., “I fail to accomplish all the tasks I planned because I spend too much time on my smartphone” or “I find myself thinking about my smartphone even when I am not using it”), rated on a Likert-type scale with six response anchors ranging from 1 (*not at all*) to 6 (*very much*). The items assess several dimensions, such as difficulties caused by excessive smartphone use in daily life, positive anticipation, reduction of social relationships accompanied by increased engagement in virtual activities, difficulties in managing time spent on the smartphone, increased tolerance to use, and related aspects. The SAS-SV was derived from the original Smartphone Addiction Scale (SAS; Kwon *et al.*, 2013a,b) by revising the 33 items of the long version. The initial psychometric study was conducted on a sample of 540 South Korean high school students. Content validity of the long version was evaluated using the expert judgment method. For ten items, content validity coefficient values (i.e., the proportion of the experts who rated an item as relevant but requiring slight revision or as highly relevant without modification) ranged between 0.85 and 1.00 (Kwon *et al.*, 2013a). This represented a primary criterion for item selection in the short version. Internal consistency was excellent ($\alpha = 0.91$). Corrected item-total correlations ranged from 0.50 to 0.80. The correlation between the total score of the SAS-SV and that for the long SAS version was 0.95 ($p < 0.001$), with similar values for girls and boys.

The short version of the SAS has attracted considerable interest among researchers worldwide and has been psychometrically tested on samples of Brazilian adolescents and university students (Khoury *et al.*, 2017), Chinese participants (Cheung *et al.*, 2019), Egyptian samples (Fathalla, 2019), and Italian samples (De Pasquale *et al.*, 2017). In Romania, the instrument was translated

and psychometrically standardized by G. Tudor (2023) on an experimental sample of 411 adolescents. Confirmatory factor analysis indicated the statistical superiority of a metric model with one latent factor and a pair of correlated errors. The internal consistency of the Romanian version of the SAS-SV was good ($\alpha = 0.83$). In the present study, the total SAS-SV score was computed by summing responses to the ten items (possible range: 10-50). Higher scores were considered indicative of a greater risk of excessive smartphone use. Internal consistency was also good ($\alpha = 0.82$).

Depression Anxiety Stress Scales-21 (DASS-21). The Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) comprise 21 items measuring anxiety (7 items), depression (7 items), and psychological stress (7 items). Each item is rated on a four-point Likert scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me most of the time*). Participants are instructed to respond based on the negative emotional states the experienced over the past six months. In the present study, students completed the anxiety scale (e.g., “I found myself in situations that made me so anxious that I was most relieved when they ended” or “I felt scared without any good reason”), the depression scale (e.g., “I felt that life was meaningless” or “I felt that I was not worth much”), and the stress scale (e.g., “I felt that I was rather irritable” or “I found it difficult to tolerate being interrupted while doing something”). Participants were instructed to indicate what they had thought and felt or how they had behaved over the past six months. Total scores for each scale were obtained by summing the corresponding item scores (possible range: 0-21). Higher scores indicate higher levels of anxiety, depression, and psychological stress.

The DASS scales were developed and standardized on nonclinical samples and can therefore be used for screening adolescent, young adult, and adult populations without diagnosed mental disorders. For a nonclinical student sample ($n = 717$), the original authors reported internal consistency values of 0.73 for Anxiety, 0.81 for Depression, and adapted by A. Perțe and M. Albu (2011) on a nonclinical sample of 1.027 young adults and adults (395 men and 632 women), aged between 19 and 74 years old. Exploratory factor analysis revealed item loadings on the latent factors ranging from 0.49 to 0.80. For a second nonclinical sample ($n = 1.053$; ages 20-59), internal consistency values of 0.85 for Anxiety, 0.86 for Depression, and 0.85 for Stress were reported. In the present study, internal consistency values were good: 0.81 for Anxiety, 0.87 for Depression, and 0.83 for Stress.

Problem Video Game Playing (PVP). In the present study, problematic video game use was measured using the Romanian version (Robu, 2011) of the Problematic Video Game Playing scale (PVP; Tejeiro Salguero & Morán, 2002). The PVP was developed to assess the severity of video game addiction among adolescents exhibiting high addictive potential in their behavioral profile. The authors revised DSM-IV criteria for substance addiction and pathological gambling, as well as relevant literature on substance and behavioral addictions, to construct a brief scale suitable for research and population screening purposes. The scale includes nine items (e.g., “I spend most of my time playing video games” or “When I’m losing in a video game or do not achieve the result I want, I feel the need to play again to win”), rated in a dichotomous format (Yes/No). In the present study, item wording was slightly adjusted to ensure face validity for a student population. Each affirmative response was scored as one point. The total score was calculated by summing item scores (possible range: 0-9), with higher scores indicating potential problems related to video game use.

In the initial validation study, the scale was administered to a sample of 223 Spanish adolescents aged between 13 and 18 years old. Participants also completed the Spanish version of the Severity Dependence Scale (SDS; $k = 5$ items; Gossop *et al.*, 1995) and reported sociodemographic information and preferences related to video games. Results indicated a unidimensional factor structure, with all items loading on a single factor explaining approximately 40% of the variance in

item scores. The scale demonstrated good construct validity. Total scores correlated positively and significantly with gaming frequency, average session duration and SDS scores. Adolescents who perceived themselves as excessively involved in video games obtained significantly higher PVP scores than those who reported limited game playing. In Romania, V. Robu (2011) administered the scale to a sample of 167 adolescents (aged between 15 and 19 years old) and reported an internal consistency value of 0.72. Corrected item-total correlations ranged from 0.29 to 0.58 for the student sample in the present study; internal consistency was satisfactory ($KR_{20} = 0.76$).

Bergen Facebook Addiction Scale (BFAS). In the present study, Facebook addiction was measured using the Romanian version of the Bergen Facebook Addiction Scale (BFAS; Andreassen *et al.*, 2012). The scale was designed to assess six core components (symptom dimensions) of Facebook addiction: a) salience – excessive importance attributed to Facebook (e.g., “During the past year, how often have you spent your time thinking of Facebook or use it?”); b) tolerance – increasing time spent using Facebook (e.g., “During the past year, how often have you felt a strong urge to use Facebook more often?”); c) mood changing – using Facebook to cope with negative emotions or stress (e.g., “During the past year, how often have you used Facebook to avoid personal problems?”); d) withdrawal – experiencing irritability or restlessness when you are unable to access Facebook (e.g., “During the past year, how often have you felt irritated or stressed when you couldn’t use Facebook?”); e) conflict – interference of compulsive Facebook use with other life domains, such as social relationships (e.g., “During the past year, how often have you used Facebook in such a way that it had a negative impact on your academic or work performance?”); f) relapse – unsuccessful attempts to control Facebook use (e.g., “During the past year, have you tried to reduce your time on Facebook but did not succeed?”). Each of the six items is rated on a five-point Likert scale ranging from 1 (*very rarely*) to 5 (*very often*). The total score is obtained by summing item scores (possible range: 6-30), with higher scores indicating a greater predisposition toward addictive Facebook use.

The final version items were selected from an initial pool of 18 items (three per each dimension), based on the correlation between each item score and the total score. The initial psychometric evaluation was conducted on a sample of 423 students with a mean age of 22 years old. For test-retest reliability assessment, a subsample of 153 students was retested after three weeks. Confirmatory factor analysis supported a single latent factor, with factor loadings ranging from 0.59 to 0.80 (Andreassen *et al.*, 2012). Test-retest reliability was high ($r = 0.82$), indicating strong temporal stability. In the present study, internal consistency was good ($\alpha = 0.84$).

2.4. Statistical analyses

Quantitative data were analyzed using SPSS for Windows, version 24.0. For the score distributions of the instruments included in the standardized protocol, skewness and kurtosis indices were computed. For a quantitative variable with a normal distribution, both skewness and kurtosis should be equal to zero (when the distribution is analyzed using statistical software that adopts this reference criterion). Some authors (Labăr, 2008) propose the interval $[-1.00; 1.00]$ as critical reference values, while others extend this range to ± 4.00 (Sava, 2011). Mean score comparisons for the SAS-SV instrument were conducted according to participants’ undergraduate field of study, year of study, and gender, using One-Way ANOVA and the independent-samples Student’s t-test, respectively. For the interpretation of the statistical significance of the observed differences, the significance level was set at $\alpha = 0.05$ (two-tailed).

The testing of predictive models in which smartphone addiction served as the dependent variable required the computation of linear correlations between SAS-SV scores, participants’ age, and scores obtained on the other administered instruments. For the statistical interpretation of

correlation significance, the critical threshold was set at $\alpha = 0.05$ (two-tailed). Multiple linear regression analyses were conducted using the enter method, with all independent variables entered simultaneously into the model (Labăr, 2008). The individual contributions of the independent variables identified as significant predictors in explaining the variance of SAS-SV scores were estimated by calculating the squared semipartial correlation (r^2_{sp}) and converting the resulting values into percentages.

3. Results

Table 1 presents the descriptive statistical indicators for the distributions of the variables examined in the present study. Considering the possible score ranges of the instruments administered for raw data collection, the following trends were observed: a) students tended to report low to at most moderate levels of smartphone addiction; b) within the surveyed sample, a very low level of addictive potential toward video games was identified; c) similarly, respondents reported a very low level of Facebook addiction; d) the recorded levels of anxiety, depression and psychological stress were low.

Table 1. Descriptive statistics for the distributions of the variables of interest

| Variables | <i>M</i> | <i>SD</i> | <i>Skewness</i> | <i>Kurtosis</i> |
|-------------------------------------------|----------|-----------|-----------------|-----------------|
| 1. Smartphone addiction (SAS-SV score) | 24.28 | 7.34 | 0.50 | - 0.33 |
| 2. Problematic video game use (PVP score) | 0.99 | 1.58 | 2.15 | 4.99 |
| 3. Facebook addiction (BFAS score) | 9.58 | 4.18 | 1.67 | 3.08 |
| 4. Anxiety (DASS-21 score) | 6.50 | 4.37 | 0.72 | 0.12 |
| 5. Depression (DASS-21 score) | 5.03 | 4.47 | 1.29 | 1.46 |
| 6. Psychological stress (DASS-21 score) | 8.23 | 4.34 | 0.46 | - 0.01 |

The absolute values of the skewness index ranged between 0.46 and 2.15, with more problematic deviations observed for video game addiction, Facebook addiction, and depression. The absolute values of the kurtosis index ranged between 0.01 and 4.99, with departures from normality recorded for the same variables. Nevertheless, when considered as a whole, the data regarding the shape of the distributions of the variables of interest did not indicate distortions severe enough to preclude the use of parametric statistics for testing multiple linear regression models.

Participants' gender did not have a significant effect on SAS-SV scores (Table 2). Both male and female students tended to report low to moderate levels of smartphone addiction.

Table 2. Comparative data (DV = smartphone addiction)

| Independent variables | Compared subsamples | <i>M</i> | <i>SD</i> | <i>t</i> _{Student} / <i>F</i> _{Anova} | <i>p</i> |
|-----------------------------------------|---------------------------|----------|-----------|---------------------------------------------------------|----------|
| <i>Gender</i> | Male | 24.76 | 7.23 | 0.70 | 0.484 |
| | Female | 24.00 | 7.42 | | |
| <i>Bachelor's degree field of study</i> | Engineering | 24.95 | 7.40 | 1.23 | 0.294 |
| | Letters | 23.06 | 6.45 | | |
| | Social and human sciences | 24.71 | 7.98 | | |
| <i>Year of study</i> | 1 st year | 24.70 | 7.47 | 0.80 | 0.493 |
| | 2 nd year | 24.00 | 7.28 | | |
| | 3 rd year | 22.10 | 6.88 | | |
| | 4 th year | 22.66 | 6.46 | | |

Similarly, participants' undergraduate field of study and year of study did not have significant effects on smartphone addiction scores. In light of these findings, the aforementioned variables

were not included in the regression analyses in which smartphone addiction served as the dependent variable.

Table 3 summarizes the linear correlations among the variables of interest. Smartphone addiction showed a negative, statistically significant, though relatively modest, correlation with participants' age. Specifically, older students tended to report lower SAS-SV scores.

Table 3. Correlational analysis

| Variables | 1. | 2. | 3. | 4. | 5. | 6. |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1. <i>Smartphone</i> addiction | - | | | | | |
| 2. Age | - 0.22 ** | - | | | | |
| 3. Problematic video game use | 0.24 ** | - 0.19 * | - | | | |
| 4. Facebook addiction | 0.43 *** | - 0.01 | 0.16 * | - | | |
| 5. Anxiety | 0.43 *** | - 0.20 ** | 0.26 *** | 0.34 *** | - | |
| 6. Depression | 0.47 *** | - 0.07 | 0.27 *** | 0.30 *** | 0.69 *** | - |
| 7. Psychological stress | 0.44 *** | - 0.18 * | 0.27 *** | 0.31 *** | 0.73 *** | 0.64 *** |

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed)

In addition, smartphone addiction exhibited a positive and statistically significant correlation with students' scores on the PVP. The correlation between SAS-SV and BFAS scores was stronger and statistically significant. Furthermore, SAS-SV scores were positively and significantly associated with comparable effect sizes ($r = 0.43-0.47$) with scores on the DASS-21 scales.

Tables 4-6 present the results of the multiple linear regression analyses, in which the independent variables included students' age and scores on instruments assessing problematic video game use, Facebook addiction, anxiety, depression, and psychological stress, while the dependent variable (criterion) was smartphone addiction. The testing of multiple regression models was justified by the high intercorrelations among the SASS-21 scale scores (Table 3). One of the conditions that contributes to the accuracy of a regression model is the absence of multicollinearity among the independent variables included in the analysis (Labár, 2008). Multicollinearity refers to correlations exceeding 0.50-0.60 between any two independent variables used within a regression model. Assessing multicollinearity is necessary to enhance the accuracy of a regression model with respect to predictor estimates and the individual explanatory power of independent variables within the overall model. In the present study, anxiety scores correlated above 0.60 with both depression and psychological stress scores. Additionally, the correlation between depression and psychological stress was 0.64. For this reason, anxiety, depression, and psychological stress were considered separately within three distinct regression models.

The first regression model (Table 4) was statistically significant ($F_R = 21.87$; $p < 0.001$) and accounted for 30% of the variance in smartphone addiction scores. Age emerged as a negative predictor, whereas Facebook addiction and anxiety were positive predictors of SAS-SV scores.

Table 4. Multiple linear regression analysis data (model 01)

| Independent variables | β | p | r^2_{sp} |
|------------------------------|---------------------------|----------|------------------------------|
| Age | - 0.14 | 0.020 | 0.0198 |
| Problematic video game use | 0.09 | 0.160 | - |
| Facebook addiction | 0.32 | < 0.001 | 0.0906 |
| Anxiety | 0.27 | < 0.001 | 0.0600 |

Note: The model included the intercept in the equation.

Facebook addiction and anxiety made substantially larger contributions to explaining individual differences in addictive smartphone use (9.06% and 6%, respectively) compared to students' age (1.98%). Problematic video game use did not emerge as a predictor of SAS-SV scores. Therefore, this variable was excluded from the analyses conducted to test the remaining two regression models

Similarly, the second regression model (Table 5) was statistically significant ($F_R = 34.61$; $p < 0.001$) and accounted for 34.1% of the variance in SAS-SV scores. Once again, age was a negative predictor, whereas Facebook addiction and depression were positive predictors of smartphone addiction. The three predictors accounted for 3.68%, 9.3%, and 11.56% of the variance in SAS-SV scores, respectively.

Table 5. Multiple linear regression analysis data (model 02)

| Independent variables | β | p | r^2_{sp} |
|-----------------------|---------|---------|------------|
| Age | - 0.19 | 0.001 | 0.0368 |
| Facebook addiction | 0.32 | < 0.001 | 0.0930 |
| Depression | 0.35 | < 0.001 | 0.1156 |

Note: The model included the intercept in the equation.

The third regression model (Table 6) was also statistically significant ($F_R = 29.59$; $p < 0.001$) and explained 30.6% of the variance in smartphone addiction. Age was a negative predictor of SAS-SV scores, accounting for 2.62% of the variance. Facebook addiction and psychological stress emerged as positive predictors, explaining 10.4% and 8.06% of the variance in smartphone addiction scores, respectively.

Table 6. Multiple linear regression analysis data (model 03)

| Independent variables | β | p | r^2_{sp} |
|-----------------------|---------|---------|------------|
| Age | - 0.16 | 0.007 | 0.0262 |
| Facebook addiction | 0.33 | < 0.001 | 0.1004 |
| Psychological stress | 0.30 | < 0.001 | 0.0806 |

Note: The model included the intercept in the equation

4. Discussion

In the present study, older students tended to obtain lower scores on the SAS-SV instrument. This finding may be explained by the greater diversity of activities in which older student engage (e.g., those who combine their studies with employment), which occupy a larger proportion of their time budget and consequently, reduce smartphone use for online gaming, web browsing, social media navigation, or content posting. Smartphone addiction showed a positive correlation with scores obtained by participants on problematic video game use. Although the strength of this correlation was relatively modest, the finding is consistent with prior research suggesting that one of the reasons smartphones exert strong appeal across age groups lies in the ease of access to online games, a leisure activity that often involves minimal financial costs.

As expected, intensive smartphone use was associated with higher levels of engagement in social networking activities, particularly via Facebook. Due to its high degree of mobility, which transcends the various contexts in which individuals may find themselves, smartphones represent an ideal tool for the rapid access of multiple online social networking platforms (e.g., Facebook, Instagram, Snapchat, Flickr, Threads), effectively bypassing spatial and temporal barriers and enhancing human interconnectivity. High levels of smartphone addiction were associated with elevated levels of anxiety, depression, and psychological stress. These findings corroborate

previous studies indicating that smartphones, through the applications they support, are frequently used as a means of compensating for negative emotional states, in addition to providing entertainment opportunities (e.g., posting content on TikTok). Individuals experiencing intense psychological demands or feelings of sadness may be more likely to use smartphones to access social networking platforms for casual conversations with friends or even to seek emotional support. Furthermore, engagement in online gaming activities may help individuals create moments of relaxation by shifting their attention away from stress-inducing problems. This interpretation is supported by the positive and statistically significant correlations (albeit of modest magnitude) observed between PVP scores and DASS-21 scale scores.

In the present study, age, problematic Facebook use, and negative indicators of emotional functioning (anxiety, depression, and psychological stress) emerged as predictors of smartphone addiction. These variables explained between 1.98% and 11.56% of the variance in individual differences. Age functioned as a negative predictor, whereas the remaining variables acted as positive predictors. The fact that Facebook addiction emerged as a significant predictor suggests that smartphones may be used excessively, particularly by individuals who rely on social networking platforms as a means of coping with daily difficulties, compensating for psychological demands, and enhancing social visibility. At the same time, anxiety emerged as a risk factor for problematic smartphone use, as smartphones may be perceived as tools for diverting intrusive thoughts generated by personal difficulties toward a more familiar and reassuring environment, serving as a form of refuge (regardless of the specific online activities involved), as well as a means of accessing support networks or identifying rapid solutions to challenges. Depression, in turn, is associated with reduced self-confidence, perceptions of uncontrollability or insurmountability of problems, tendencies toward social withdrawal, feelings of helplessness, and negative evaluations of life events or significant others. Within this context of impaired individual functioning, smartphone-based activities may, at least in the short term, create the perception that difficulties can be overcome and that the virtual environment offers friends or acquaintances upon whom individuals can rely.

The relationships between anxiety and depression, on the one hand, and mobile phone addiction, on the other, may be mediated by variables such as self-isolation, negative self-image, perceived personal or social incompetence, sensation-seeking, and perceived control over the social environment. In other words, anxiety and depression increase the risk of an unhealthy relationship with mobile phones insofar as these negative emotional states foster maladaptive coping patterns, which individuals attempt to regulate by allying with an intimate companion that requires minimal maintenance effort, such as a preferred game, a content-posting platform, or a social network. Addicted individuals may develop the belief that such easily accessible smartphone-based activities enhance public visibility, facilitate meeting new people, or simply provide access to a virtual environment from which information related to self-help or everyday life can be obtained. All these affordances, made possible through Internet connectivity via mobile phones, may create the impression that the smartphone constitutes an inexhaustible resource, thereby contributing to the development of a potentially harmful relationship with an “object” that demands little more than ensuring it is neither lost nor damaged.

5. Limitations and further research directions

The results of the quantitative study conducted among Romanian students should be interpreted in light of several limitations, which also point to directions for future research. Participants were self-recruited from only two higher education institutions. Consequently, the sample exhibited limited representativeness of the Romanian student population. Future research should employ a more

heterogeneous sample in terms of academic programs by including students from a wider range of disciplines (e.g., visual and fine arts, economics, sport and movement sciences, health sciences, medicine, etc.).

The main variables of interest were operationalized using standardized self-report questionnaires. This data collection method entails the risk of response distortion due to a lack of sincerity on the part of respondents, either as a result of a defensive mechanism aimed at protecting self-image or due to socially desirable responding (Demetriou *et al.*, 2015). In future research, we intend to complement standardized measures assessing the addictive potential of new information, communication, and socialization technologies with individual semi-structured interviews. The interview method allows for the development of a richer understanding of a broader range of factors that may contribute to an increased risk of unhealthy smartphone use.

Another limitation concerns the correlational nature of the research design. The variables of interest were measured simultaneously, and the hypotheses were tested using multiple linear regression analyses. These methodological characteristics limited our ability to interpret the relationships among variables presumed to be potential determinants of smartphone addiction in terms of cause-and-effect relationships. Future investigations should adopt a longitudinal design and appropriate statistical methods that allow for the examination of the temporal dynamics between risk factors and addictive smartphone use.

6. Conclusions and practical implications

Over the past two decades, smart devices have become increasingly accessible, both in terms of acquisition costs and their applicability across multiple domains of human life and activity (e.g., household task management, entertainment, leisure activities, building and enriching social relationships, and fulfilling professional duties). Worldwide, these devices are being used from increasingly younger ages, with a level of flexibility and precocity that continues to surprise both researchers and industry professionals.

Due to the nature of academic learning activities, as well as communication needs, social experience sharing, and daily activity organization, students make intensive use of smart devices such as tablets and smartphones. The utility of these devices in young people's lives is indisputable and does not undermine their capacity for academic creativity or emotional and social adaptation. However, some individuals engage in compulsive smartphone use, a behavioural pattern that may lead to numerous long-term consequences, including physical fatigue, eye strain, headaches or musculoskeletal pain (resulting from prolonged adoption of harmful postures), sleep disturbances, anxiety related to the inability to access one's phone or to its loss (nomophobia), self-isolation, feeling of social inadequacy (particularly among users dependent on social networking platforms), and loneliness. Research has shown that the size of virtual friendship networks is only weakly related to satisfaction with the quality of real-life social relationships. The outcomes are often accompanied by significant interference with academic functioning, such as attentional difficulties or superficial processing of information essential for learning, academic performance and exam preparation.

The wide range of consequences associated with excessive smartphone use has drawn the attention not only of researchers across disciplines, psychoeducational counsellors, psychiatrists, and clinical psychologists, but also of mental health professionals, school counsellors and parents. Coordinated efforts among these stakeholders may contribute to fostering healthy attitudes toward smartphone use, thereby reducing the risk of physical, mental and social health problems. Mental health practitioners can benefit from scientific findings that highlight the complex relationships among individual variables, social and virtual environmental characteristics, attitudes and

behaviours related to smartphone use, as well as the impact of excessive engagement with this technological innovation.

Researchers have focused not only on smartphone addiction as a phenomenon but also on strategies for counteracting it. What measures might be accessible to individuals at risk of developing an unhealthy relationship with their mobile phones? Below, we outline several approaches, without claiming to provide an exhaustive list:

- ✓ Developing a realistic perception of the “power” of the smartphone. It should be viewed as a tool for information access, daily life management, communication and leisure. Such a rational attitude implies not outsourcing personal abilities and life experiences to the device but rather enhancing them through its use. While smartphones can save time and energy, they do not provide “miraculous solutions” to everyday difficulties, emotional problems, work-related challenges or life events that must be actively confronted.
- ✓ Many compulsive users perceive the smartphone as an “alter ego” or a marker of personal identity that enhances social visibility, attractiveness and immediate psychological gratification. In reality, this device is not only time-consuming and mentally draining, but it also subtly undermines decision-making capacity, personal agency and the satisfaction derived from relying on one’s own resources in challenging life situations. Developing a realistic and rational understanding of the role of smartphones in daily life represents an important cognitive factor in addiction prevention.
- ✓ From a behavioral management perspective, it is necessary to regulate the impulse to check the smartphone frequently by replacing this behavior with other professional activities, passive relaxation (e.g., sleep when possible), outdoor walks, physical exercise or social outings with friends. Individuals may also establish a regular schedule for accessing social networking sites, browsing, content posting or other time-consuming activities that are not priorities within personal, family, academic, professional, or social domains.
- ✓ Participation in group counseling programs, individual psychotherapy or personal development training can be particularly beneficial for individuals experiencing loneliness and consequently anxiety and/or depression. Such individuals often resort excessively to smartphone use as a means of compensating for negative emotional states.
- ✓ Face-to-face social interaction allows for the replacement of smartphone-based activities with efforts directed toward building productive social networks. In addition to the satisfaction it provides, this approach contributes to the development of interpersonal skills and the maintenance of self-confidence. This measure is especially beneficial for individuals who are shy or socially anxious, as well as for those facing high levels of stress.

References

1. Al-Mamun, F., Mamun, M. A., Prodhan, M. S., Muktarul, M., Griffiths, M. D., Muhit, M., & Sikder, M. T. (2023). Nomophobia among university students: Prevalence, correlates, and the mediating role of smartphone use between Facebook addiction and nomophobia. *Heliyon*, 9(3). doi: 10.1016/j.heliyon.2023.e14284.
2. American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
3. Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook Addiction Scale. *Psychological Reports*, 10(2), 501-517. doi: 10.2466/02.09.18.PR0.110.2.501-517.
4. Chaputula, A. H., & Mutula, S. (2018). Factors impacting library-related uses of mobile phones by students in public universities in Malawi. *South African Journal of Libraries and Information Science*, 84(1), 35-46. doi: 10.7553/84-1-1757.

5. Charlton, J. P., & Danforth, I. D. W. (2007). Distinguishing addiction and high engagement in the context of online game playing. *Computers in Human Behavior*, 23(3), 1531-1548. doi: 10.1016/j.chb.2005.07.002.
6. Chen, Y.-F., & Peng, S. S. (2008). University students' Internet use and its relationships with academic performance, interpersonal relationships, psychosocial adjustment, and self-evaluation. *CyberPsychology & Behavior*, 11(4), 467-469. doi: 10.1089/cpb.2007.0128.
7. Cheung, T., Lee, R. L. T., Tse, A. C. Y., Do, C. W., So, B. C. L., Szeto, G. P. Y., & Lee, P. H. (2019). Psychometric properties and demographic correlates of the Smartphone Addiction Scale-Short Version among Chinese children and adolescents in Hong Kong. *CyberPsychology, Behavior & Social Networking*, 22(11), 714-723. doi: 10.1089/cyber.2019.0325.
8. Demetriou, C., Uzun Ozer, B., & Essau, C. A. (2015). Self-report questionnaires. In R. L. Cautin & S. O. Lilienfeld (Eds.), *The Encyclopedia of Clinical Psychology* (Vol. 5, pp. 1-6). New York, NY: John Wiley & Sons.
9. De Pasquale, C., Sciacca, F., & Hichy, Z. (2017). Italian validation of Smartphone Addiction Scale Short Version for adolescents and young adults (SAS-SV). *Psychology*, 8(10), 1513-1518. doi: 10.4236/psych.2017.810100.
10. Dou, X., Lu, J., & Yu, Y., (2024). The impact of depression and anxiety on mobile phone addiction and the mediating effect of self-esteem. *Scientific Reports*, 14. doi: 10.1038/s41598-024-71947-6.
11. Elhai, J. D., Levine, J. C., & Hall, B. J. (2019). The relationship between anxiety symptom severity and problematic smartphone use: A review of the literature and conceptual frameworks. *Journal of Anxiety Disorders*, 62, 45-52. doi: 10.1016/j.janxdis.2018.11.005.
12. Fathalla, M. M. (2019). Egyptian validation of Smartphone Addiction Scale Short Version for adolescents (SAS-SV). *Psycho-Educational Research Reviews*, 8(3), 7-10.
13. Gao, Y., Li, A., Zhu, T., Liu, X., & Liu, X. (2016). How smartphone usage correlates with social anxiety and loneliness. *PeerJ*, 4. doi: 10.7717/peerj.2197.
14. Ge, J., Liu, Y., Cao, W., & Zhou, S. (2023). The relationship between anxiety and depression with smartphone addiction among college students: The mediating effect of executive dysfunction. *Frontiers in Psychology*, 13. doi: 10.3389/fpsyg.2022.1033304.
15. Giansanti, D. (2025). Smartphone addiction in youth: A narrative review of systematic evidence and emerging strategies. *Psychiatry International*, 6(4). doi: 10.3390/psychiatryint6040118.
16. Gossop, M., Darke, S., Griffiths, P., Hando, J., Powis, B., Hall, W., & Strang, J. (1995). The Severity of Dependence Scale (SDS): Psychometric properties of the SDS in English and Australian samples of heroin, cocaine and amphetamine users. *Addiction*, 90(5), 607-614. doi: 10.1046/j.1360-0443.1995.9056072.x.
17. Griffiths, M. D. (2005). A "components" model of addiction within a biopsychosocial framework. *Journal of Substance Use*, 10(4), 191-197. doi: 10.1080/14659890500114359.
18. Hou, X., Elhai, J. D., Hu, T., She, Z., & Xi, J. (2023). Anxiety symptoms and problematic smartphone use severity among Chinese college students: The moderating role of social support. *Current Psychology*, 42(4), 2841-2849. doi: 10.1007/s12144-021-01610-0.
19. Khoury, J. M., de Freitas, A. A. C., Roque, M. A. V., Albuquerque, M. R., das Neves, M. C. L., & Garcia, F. D. (2017). Assessment of the accuracy of a new tool for the screening of smartphone addiction. *PLoS ONE*, 12(5). doi: 10.1371/journal.pone.0176924.

20. Khoury, J. M., Neves, M. C. L. D., Roque, M. A. V., Freitas, A. A. C., da Costa, M. R., & Garcia, F. D. (2019). Smartphone and Facebook addictions share common risk and prognostic factors in a sample of undergraduate students. *Trends in Psychiatry and Psychotherapy*, *41*(4), 358-368. doi: 10.1590/2237-6089-2018-0069.
21. Kim, N.-H., Lee, J.-M., Yang, S.-H., & Lee, J.-M. (2022). Association between smartphone overdependency and mental health in Korean adolescents during the COVID pandemic: Age- and gender-matched study. *Frontiers in Public Health*, *10*. doi: 10.3389/fpubh.2022.1056693.
22. Koç, T., & Turan, A. H. (2021). The relationships among social media intensity, smartphone addiction, and subjective well-being of Turkish college students. *Applied Research in Quality of Life*, *16*(4), 1999-2021. doi: 10.1007/s11482-020-09857-8.
23. Kwon, M., Kim, D.-J., Cho, H., & Yang, S. (2013a). The Smartphone Addiction Scale: Development and validation of a short version for adolescents. *PLoS ONE*, *2013*, 8(12). doi: 10.1371/journal.pone.0083558.
24. Kwon, M., Lee, J.-Y., Won, W.-Y., Park, J.-W., Min, J.-A., Hahn, C., Gu, X., Choi, J.-H., & Kim, D.-J. (2013b). Development and validation of a Smartphone Addiction Scale (SAS). *PLoS ONE*, *8*(2). doi: 10.1371/journal.pone.0056936.
25. Labăr, A.-V. (2008). *SPSS pentru științele educației/ SPSS for Education Sciences*. Iași: Polirom (original in Romanian).
26. Labrague, L. J. (2023). Problematic internet use and psychological distress among student nurses: The mediating role of coping skills. *Archives of Psychiatric Nursing*, *46*, 76-82. doi: 10.1016/j.apnu.2023.08.009.
27. Lee, K. W., Ching, S. M., Ali, N., Ooi, C. Y., Sidek, S. K. H., Amat, A., Ystim, Y., Yahaya, Z., Shamsuddin, N., Ibrahim, I., Majid, F. A., Othman, F. S., Zakaria, N. S., Abidin, A., Talib, N. H., & Sivaratnam, D. (2023). Prevalence and factors associated with smartphone addiction among adolescents: A nationwide study in Malaysia. *International Journal of Mental Health Promotion*, *25*(2), 237-247. doi: 10.32604/ijmh.2023.013407.
28. Liu, C. H., Lin, S. H., Pan, Y. C., & Lin, Y. H. (2016). Smartphone gaming and frequent use pattern associated with smartphone addiction. *Medicine*, *95*. doi: 10.1097/MD.0000000000004068.
29. Lovibond, S. H., & Lovibond, P. F. (1995). *Depression Anxiety Stress Scales (DASS-21, DASS-42)*. Washington, DC: American Psychological Association, Psyc Tests.
30. Matar Boumosleh, J., & Jaalouk, D. (2017). Depression, anxiety, and smartphone addiction in university students: A cross sectional study. *PLoS One*, *12*(8). doi: 10.1371/journal.pone.0182239.
31. Matsumoto, D. (General Editor, 2009). *The Cambridge Dictionary of Psychology*. Cambridge, UK: Cambridge University Press
32. Perțe, A. (Ed.), Albu, M. (2011). *DASS – Manual pentru scalele de depresie, anxietate și stres. DASS-21-R – adaptarea și standardizarea DASS pe populația din România/ DASS – Manual for the Depression, Anxiety and Stress Scales. DASS-21-R – Adaptation and Standardization of the DASS for the Romanian Population*. Cluj-Napoca: ASCR (original in Romanian).
33. Rekas, M., & Burzyńska, J. (2024). Smart youth: Sociodemographic factors, usage patterns, and self-reported vs. actual smartphone addiction among secondary school students. *medRxiv*. doi: 10.1101/2024.04.17.24305981.

34. Robu, V. (2011). Video game addiction among Romanian adolescents: A profile of characteristics. *Romanian Journal of School Psychology*, 4(8), 7-31.
35. Sarman, A., & Çiftci, N. (2024). Relationship between smartphone addiction, loneliness, and depression in adolescents: A correlational structural equation modeling study. *Journal of Pediatric Nursing*, 76, 150-159. doi: 10.1016/j.pedn.2024.02.019.
36. Sava, Fl.-A. (2011). *Analiza datelor în cercetarea psihologică* (ediția a II-a revizuită) [Data Analysis in Psychological Research (2nd rev. ed.)]. Cluj-Napoca: Editura ASCR (original in Romanian).
37. Sayeed, M. A., Rasel, M. S. R., Habibullah, A. A., & Hossain, M. M. (2021). Prevalence and underlying factors of mobile game addiction among university students in Bangladesh. *Global Mental Health*, 8. doi: 10.1017/gmh.2021.34.
38. Seo, D. G., Park, Y., Kim, M. K., & Park, J. (2016). Mobile phone dependency and its impacts on adolescents' social and academic behaviors. *Computers in Human Behavior*, 63, 282-292. doi: 10.1016/j.chb.2016.05.026.
39. Tejeiro Salguero, R. A., & Bersabé Morán, R. M. (2002). Measuring problem video game playing in adolescents. *Addiction*, 97(12), 1601-1606. doi: 10.1046/j.1360-0443.2002.00218.x.
40. Tudor, G. (2023). Proprietăți psihometrice ale versiunii în limba română a *Smartphone Addiction Scale – Short Version* (SAS-SV) [Psychometric properties of the Romanian version of *Smartphone Addiction Scale – Short Version* (SAS-SV)]. *Revista de Psihologie* [Journal of Psychology], 69(2), 95-111 (original in Romanian).
41. Twenge, J. M., Martin, G. N., & Campbell, W. K. (2018). Decreases in psychological well-being among American adolescents after 2012 and links to screen time during the rise of smartphone technology. *Emotion*, 18(6), 765-780. doi: 10.1037/emo0000403.
42. Yilmaz, R., Sulak, S., Griffiths, M. D., & Karaoglan Yilmaz, F. G. (2023). An exploratory examination of the relationship between Internet gaming disorder, smartphone addiction, social appearance anxiety and aggression among undergraduate students. *Journal of Affective Disorders Reports*, 11. doi: 10.1016/j.jadr.2023.100483.
43. Zhang, A., Xiong, S., Peng, Y., Zeng, Y., Zeng, C., Yang, Y., & Zhang, B. (2022). Perceived stress and mobile phone addiction among college students: The roles of self-control and security. *Frontiers in Psychiatry*, 13, Article ID 1005062. doi: 10.3389/fpsy.2022.1005062.
44. Zhang, X., Chi, M., Liu, X., Zhang, Y., Tao, Y., Liu, Y., & Xuan, Y. (2024). Prevalence of smartphone addiction and its relation with psychological distress and internet gaming disorder among medical college students. *Frontiers in Public Health*, 12. doi: 10.3389/fpubh.2024.1362121.
45. Zhang, X., Gao, F., Kang, Z., Zhou, H., Zhang, J., Li, J., Yan, J., Wang, J., Liu, H., Wu, Q., & Liu, B. (2022). Perceived academic stress and depression: The mediation role of mobile phone addiction and sleep quality. *Frontiers in Public Health*, 10. doi: 10.3389/fpubh.2022.760387.