

The mediating effect of nomophobia in the relationship between problematic social media use/problematic smartphone use and psychological distress among university students

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ABSTRACT

As smartphones and social media become more common, the psychological impact on university students has garnered increasing research attention. The present study examined nomophobia as the mediator in the relationship between problematic social media use (PSMU)/ problematic smartphone use (PSU), and psychological distress among university students during the COVID-19 pandemic. Of the 622 Malaysian university students recruited through online survey, socio-demographic information, Bergen Social Media Addiction Scale (BSMAS), Smartphone Application-Based Addiction Scale (SABAS), Nomophobia Questionnaire (NMPQ) and Depression, Anxiety and Stress Scale-21 (DASS-21) were completed. To analyze mediation effects, partial least squares structural equation modelling (PLS-SEM) was used. PSMU, PSU and psychological distress were found to be positively related to nomophobia. Nomophobia was a significant mediator between PSMU/PSU and psychological distress. Findings appear to highlight the importance of nomophobia in increasing psychological distress among young adults. Future research could examine these relationships longitudinally to better understand the relationship for effective interventions for the improvement of psychological well-being of young adults navigating the challenges of modern technology.

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Introduction

As students begin their university life, various demands and expectations of education including demanding curriculum, coursework, and examinations can be stressful (Fauzi et al., 2021). This was even more evident throughout the pandemic when a shift to online learning was found, which was not previously practiced by universities worldwide (Alavudeen et al., 2021; Marler et al., 2021). The psychological well-being of university students is often

negatively impacted due to these demands, which could in turn lead to poorer academic performance and detrimental health outcomes (Sharp & Theiler, 2018). A total of 27 studies reviewed systematically concluded a prevalence of 39% and 36% of university students were with depression and anxiety symptoms (Li et al., 2021). Similarly, in Malaysia, (the location of the present study), the prevalence of depression ranged from 21% to 51.4%, anxiety 50% to 85.1%, and stress 12% to 65% among university students (Amir Hamzah et al., 2019; Fauzi et al., 2021; Ismail et al., 2021).

Prolonged media exposure is associated with elevated likelihood of depression and anxiety, as confirmed by a systematically reviewed study of 68 studies on psychological distress related factors during the pandemic (Wang et al., 2020). This is not surprising given the shift to online lectures, resulting in extensive reliance on the internet and gadgets such as tablets, smartphones, and computers as a means of communication with peers and educators (Hossain et al., 2021; Yuchen Li et al., 2021; Nishimura et al., 2021). In a recent study in Malaysia, the use of the internet, smartphones and social media was notably prevalent among medical students, with the prevalence of students spending more than 5 hours on these platforms reported to be 66.3%, 64.1%, and 35.6%, respectively (Lee et al., 2023). When looking at PSMU, a prevalence of 23% was reported across 32 nations, with Asia being the second highest at 31% compared to other geographical regions (Cheng et al., 2021).

In an era where digital technologies have become crucial for communication, the use of such technologies can be problematic even though many forms of problematic technology use have not yet been formally recognized as disorders in any diagnostic psychiatric manuals (Farchakh et al., 2021). For instance, the inability to control the use of smartphones, which is known as problematic smartphone use (PSU) resulting in smartphone addiction in the most extreme cases, can lead to detrimental effects on everyday function (e.g., relationships, education and/or occupation) and is associated with psychological distress (Achangwa et al.,

2023; Kara et al., 2021; Kim et al., 2015; Lei et al., 2020). PSU typically involves the dysfunctional use of multiple smartphone applications and/or activities multi-functional applications such as (but not restricted to) social media use, gaming, gambling, instant messaging, watching online videos, streaming media content (e.g., TV shows, films, pornography), which results in constant need to use a smartphone (Csibi et al., 2018).

Similarly, problematic social media use (PSMU) resulting in social media addiction in the most extreme cases, is the problematic use of social media applications (e.g., *Facebook*, *Instagram*, *TikTok*, etc.) to the extent that the behaviors affects an individual's psychological health and everyday well-being (Huang et al., 2023). PSMU includes activities such as posting photos, videos and messages, constant scrolling on newsfeeds, interacting with social media content (e.g., posting 'likes' and comments) which can provide psychological and social rewards. There is a large crossover between PSMU and PSU, particularly when the main use for using smartphones is to use social media applications (Kuss & Griffiths, 2017). The need to be constantly online and staying up to date with information and communications is associated with both fear of missing out (FOMO) and the fear of being without a mobile phone, which in short is known as nomophobia (Rodríguez-García et al., 2020).

Nomophobia is a modern phobia that first appeared in the digital era and is becoming widespread due to the everyday and constant use of smartphones. The word 'nomophobia' derives from the words 'no-mobile phobia' and refers to uneasiness, anxiety and fear of not having a mobile device at specific times or not having access to one when it is needed (Gezgin et al., 2018; King et al., 2013; Lucia et al., 2010; Rodríguez-García et al., 2020). In its broadest sense, nomophobia is the fear of being cut off from the digital world. Globally, the rate of nomophobia is high, and university students are most affected with severe nomophobia (Humood et al., 2021). This was further confirmed by another review of 28 cross-sectional studies among university students, with the prevalence of 24%, 56% and 17% for mild,

moderate and severe nomophobia respectively (Tuco et al., 2023). Given the association of nomophobia and addiction towards social media and smartphones with psychological distress (Chen et al., 2022; Faiza Hasan Ansari, Muhd Al-Aarifin Ismail, Muhamad Saiful Bahri Yusoff, 2022; Lin et al., 2021; Santl et al., 2022), this might conceivably serve as a mediator in these relationships.

To the best of the present authors' knowledge, no previous study has ever examined the mediating effects of nomophobia and relating it with PSMU/PSU with psychological distress, especially among Malaysian individuals. Past studies have examined nomophobia either as antecedent or an outcome of PSU (Kara et al., 2019; Al-Mamun et al., 2023) and rarely relate it with psychological distress as an outcome. Other studies have examined mediating factors such as mindfulness (Aparci et al., 2022), loneliness, and anxiety (Kara 2019). Understanding the mediating role of nomophobia could help healthcare providers to know if nomophobia is a factor that should be included when designing psychological distress reduction programs.

Therefore, the present study tested a mediation model to investigate the how nomophobia acts as a mediator these relationships university students in Malaysia (Fig. 1). It was hypothesized that (i) PSMU and PSU would be positively related to nomophobia and psychological distress (depression, anxiety, and stress), (ii) nomophobia would be positively related with depression, anxiety, and stress, and (iii) nomophobia would act as a mediator relating PSMU and PSU with psychological distress. Testing these relationships could provide valuable insights in identifying potential mediators and serve as foundation for hypothesis generation of causal pathways which could be tested in future longitudinal and experimental studies. Findings from the present study would likely provide useful information for healthcare professionals to design programs to improve mental health and the quality of life for university students.

Materials and methods

Participants and data collection

A total of 622 university students (26.7% male; 73.3% female) (Table 1) were recruited from August to November 2021 using a convenience sampling method. Social media platforms (e.g., *WhatsApp*, *Instagram*, *Facebook*, and *Telegram*) were used to recruit eligible participants by providing them a *Google Forms* platform to the survey. Before the commencement of the survey, consent was obtained from all participants. Inclusion criteria of the eligible participants recruited for the study were: (i) university students during the study period residing in Malaysia and (ii) being a legal adult (i.e., aged 18 years or above). Exclusion criteria for the participants were being a: (i) pregnant or lactating female and (ii) student with a chronic disease (cardiovascular diseases and cancer). The data used in the present study were part of a larger research project that included variables such as weight-related self-stigma and physical activity. However, these variables were excluded from the present study because the findings have been published separately (Gan et al., 2022; Liu et al., 2022). All relevant questions pertaining to the aforementioned were assessed through the online survey and none were excluded based on these criteria. The study was presented and approved by the Universiti Putra Malaysia Ethics Committee for Research Involving Human Subjects (JKEUPM-2021-455). Although the present study was not pre-registered, all the hypotheses in the present study were a priori.

Measures

All measures were exclusively in English, a language extensively used in Malaysia due to the multicultural setting of the country. All psychometric instruments were pre-tested to ensure readability and comprehensibility within the context of the local population. The psychometric properties of these assessment tools were previously tested and published elsewhere (Tung et al., 2022).

Socio-demographic background

Age, gender, and study program level were the items of demographic information obtained from all participants.

Bergen Social Media Addiction Scale (BSMAS)

The risk of PSMU was assessed using Bergen Social Media Addiction Scale (BSMAS; (Andreassen et al., 2016). This is a six-item instrument (*e.g., You spend a lot of time thinking about social media or planning how to use it*) with a 5-point Likert scale where responses range from 1 (*very rarely*) to 5 (*very often*). The total score ranges from 6 to 30. A higher risk of PSMU is reflected by a higher BSMAS score. BSMAS had a good internal consistency in the present study, with a Cronbach's $\alpha = 0.865$.

Smartphone Application-Based Addiction Scale (SABAS)

The risk of PSU was assessed using the Smartphone Application-Based Addiction Scale (SABAS; (Csibi et al., 2018). This is a six-item instrument (*e.g., My smartphone is the most important thing in my life*) with a 6-point Likert scale where responses range from 1 (*strongly disagree*) to 6 (*strongly agree*). The total score ranges from 6 to 36. A higher risk of PSU is reflected by a higher SABAS score. SABAS had a very good internal consistency in the present study, with Cronbach's $\alpha = 0.881$.

Nomophobia Questionnaire (NMPQ)

The risk of nomophobia was assessed using Nomophobia Questionnaire (NMP-Q; (Yildirim & Correia, 2015). This is a 20-item instrument comprising four factors (*i.e., losing connectedness, not being able to communicate, giving up convenience and not being able to access information*) with a 7-point Likert scale where responses range from 1 (*strongly disagree*) to 7 (*strongly*

agree). Example of items (e.g., *I would feel uncomfortable without constant access to information through my smartphone*). The total score ranges from 20 to 140. A higher risk of nomophobia is reflected by a higher NMP-Q score. NMP-Q had a very good internal consistency in the present study, with Cronbach's $\alpha = 0.965$.

Depression, Anxiety, Stress Scale (DASS-21)

The levels of psychological distress were assessed using the Depression, Anxiety, Stress Scale (DASS-21: Lovibond & Lovibond, 1995). This is a 21-item instrument (seven items on each of the depression, anxiety, and stress subscales) with a four-point Likert scale. Example of items (e.g., *I found it hard to wind down*) are rated from 0 (*not applied at all*) to 3 (*applied very much*). The total score ranges from 0 to 21 for each subscale. The higher risk of psychological distress is reflected by a higher DASS-21 score. DASS had very good internal consistency in the present study, with Cronbach's $\alpha = 0.963$.

Data analysis

In order to better understand the data, analyses were performed to determine the profiles of the participants and to examine the normality of the variables before testing the mediation model. In evaluating the presence of common method variance, Harman single factor analysis suggested by Podsakoff et al. (2003) was used. Findings showed that the largest variance explained for an individual factor was 43.22% based on the unrotated principal component factor analysis for all measurement items. Based on Podsakoff and Organ's (1986) recommendation, common method bias was not a concern in the present study because the percentage of variance explained by the first factor was less than 50%. To assess the assumption of multivariate normality, Kline et al. (2015) guidelines on Mardia's multivariate skewness and

kurtosis were adopted. The results indicated that the data were not normal with multivariate skewness and kurtosis reported at $\beta = 5.115, p < 0.01$ and $\beta = 49.470, p < 0.01$, respectively.

Following the suggestions of Hahn and Ang (2017), Hair et al. (2022), and Becker et al. (2022), the present study adopted the partial least squares structural equation modeling (PLS-SEM) technique using SmartPLS 4.0.8.5 (Ringle et al., 2022). Following the two-stage analytical procedures by Anderson and Gerbing (1988), the validity and goodness of the measurement model were evaluated using item factor loadings, composite reliability (CR), average variance extracted (AVE) and heterotrait-monotrait (HTMT) (Hair et al., 2022). Subsequently in the second stage, path coefficients, standard errors, *t*-values, confidence interval, *p*-values, and effect size for the structural model were reported using a 10,000-sample re-sample bootstrapping procedure.

CR was used in the present study to test the construct reliability. Adopting the recommendation of Hair et al. (2022), item loadings values obtained, which ranged from (0.700–0.819), were more than 0.7. The results indicated that all Cronbach's alpha values, which ranged from (0.865–0.965), were more than the recommended value of 0.7 (Hair et al., 2022). In assessing convergent validity, the AVE was examined. The results showed that all the AVE values ranging from (0.595–0.627) were higher than the recommended value of 0.5 (Hair et al., 2022). As for depression, anxiety, and stress, it was modelled as a single indicator construct (SIC). The model met all these criteria, as shown in Table 2. Subsequently, to assess the discriminant validity, the HTMT ratio of correlations approach was proposed as an alternative technique based on the multitrait-multimethod matrix (Henseler et al., 2015). If HTMT values are more than 0.90, it indicates that there is a serious issue with discriminant validity according to Kline (2015). In this study, all HTMT values were less than 0.90 signifying no major concerns with discriminant validity.

Results

Table 4 summarizes the results of the structural equation model. According to Chin (1998), the exogenous variable in the structural model explained the weak amount of variance of depression ($R^2 = 0.202$), anxiety ($R^2 = 0.182$), stress ($R^2 = 0.212$), and nomophobia ($R^2 = 0.318$). In terms of the structural model findings, all path coefficients in the present study were significant. PSMU was found to be positively associated with depression ($\beta = 0.267, t = 5.045$), anxiety ($\beta = 0.217, t = 4.148$), stress ($\beta = 0.275, t = 5.315$), and nomophobia ($\beta = 0.275, t = 5.459$). PSU was found to be positively associated with depression ($\beta = 0.129, t = 2.397$), anxiety ($\beta = 0.129, t = 2.318$), stress ($\beta = 0.104, t = 1.986$), and nomophobia ($\beta = 0.335, t = 6.094$). Nomophobia was found to be positively associated with depression ($\beta = 0.125, t = 2.814$), anxiety ($\beta = 0.157, t = 3.379$), and stress ($\beta = 0.160, t = 3.430$).

Table 5 shows the mediation effect which was tested using the Preacher and Hayes' (2008) bootstrapping indirect effects method. Results indicated that nomophobia significantly mediated the relationship between PSMU and depression ($\beta = 0.034, p < 0.05$), PSMU and anxiety ($\beta = 0.043, p < 0.05$), PSMU and stress ($\beta = 0.053, p < 0.05$), PSU and depression ($\beta = 0.042, p < 0.05$), PSU and anxiety ($\beta = 0.053, p < 0.05$) and PSU and stress ($\beta = 0.044, p < 0.05$).

Discussion

The mediating role of nomophobia was confirmed in the relationship of problematic social media use (PSMU) and problematic smartphone use (PSU) with psychological distress among university students in Malaysia. PSMU, PSU, and nomophobia were found to be positively related to psychological distress. This indicates that when PSMU and PSU increases, nomophobia increases, potentially worsening psychological distress among university students.

One of the possible explanations for the relationship between PSMU and PSU with nomophobia found in the present study could be the excessive reliance on the devices and

applications, which could lead to fear of missing out (FOMO) especially regarding various notifications, messages or updates, which in turn lead to the fear of losing access to this information or not having their smartphone (Çobano, 2021; Daraj et al., 2023; Rodríguez-García et al., 2020). Another explanation is that when time spent on social media and smartphone devices increases, individuals' face-to-face interaction with the social environment decreases. Because social connectedness (i.e., the sense of belonging and closeness) is essential to human life, these platforms can become the main means of communication and interaction for many individuals. This reliance could lead to individuals' fear of losing their phone because it serves as an important means of connection and interaction (Çırak & Dost, 2022; Çobano, 2021).

FOMO could further integrate with other established theories on psychology theories (e.g., self-determination theory and attachment theory) and obsessive-compulsive symptoms (e.g., online reassurance-seeking behaviors) to explain the mediating role of nomophobia. More specifically, Self-determination theory proposes that individuals are influenced by their social and cultural environment (Ryan & Deci, 2000). In the context of the present study, individuals with PSMU or PSU are in the online environment, and may be influenced by the mobile and portable nature of their smartphone and the applications they can access on it in the development of FOMO, which can lead to nomophobia. Attachment theory indicates that individuals have affectional bonds to their significant friends/relatives (Bowlby, 1978). Those with PSMU or PSU are likely to develop affectional bond to their friends/relatives by connecting with them through social media apps and platforms on their smartphones. Subsequently, their PSMU and PSU may cause their nomophobia and consequently result in psychological distress because they may fear that their affectional bond cannot be satisfied if they are unable to access their online social networks. Moreover, PSMU and PSU could cause obsessive-compulsive symptoms (i.e., habitual checking and seeking behaviors on their

smartphone) because of such fear (Parsons & Alden, 2022). Therefore, self-determination theory, attachment theory, and online reassurance-seeking behaviors all support the association (and possible link) between FOMO and nomophobia.

Such fear is associated with elevated anxiety levels (and in extreme cases, panic attacks) when they are unable to use their mobile phones to obtain information and/or access to other services. This fear has been shown to disrupt sleep cycles (e.g., inducing symptoms of insomnia) and foster anxiety among adolescents, university students, and adults in general (Daraj et al., 2023). Consequently, nomophobia could lead to a variety of negative short-term and long-term psychological impacts (Achangwa et al., 2023; Ratan et al., 2021; Tung et al., 2022) which were also found in the present study. The fear of being out of reach or not being able to use the smartphone (Yildirim & Correia, 2015) could lead individuals to experience nervousness when smartphone devices are disconnected or have low batteries. These behaviors have been observed among individuals who often prefer non-face-to-face communication through smartphone devices and social media platforms (Farchakh et al., 2021).

Consequently, this study tested the potential role of nomophobia as the mediator of addiction in social media and smartphone with psychological distress. The findings confirmed the effects to be significant across all domains of psychological distress (i.e., stress, anxiety and depression). To date, this study is the first to test nomophobia and confirm its effects as a mediating variable. Previous studies have instead examined boredom proneness, fear of missing out (FoMO) (Wolniewicz et al., 2019), loneliness and anxiety (Kara et al., 2021) as mediators in this relationship.

One possible reason why university students are nomophobic could be due to the phenomenon of FoMO. Feelings of fear, worry and concern of missing out from experiencing socially rewarding information have led to the uses of smartphone devices and social media as a platform to keep up with the latest information, experiences or trends (Kamolthip et al., 2022).

This has led to young adults continuously checking and responding to friends' messages and constantly checking for notifications (Elhai et al., 2020; Wolniewicz et al., 2018, 2019) or wanting to be constantly connected through social networks and smartphone devices. Notably, FoMO has also been reported to act as a mediator for online gaming and PSU (Kamolthip et al., 2022). Given that FoMO was not examined, future studies could consider including this variable for testing of the possible serial mediation effects of nomophobia and FoMO in the relationship.

The present study hypothesized that the antecedents of psychological distress were PSMU and PSU, whereas previous literature suggests that the relationship could be bidirectional (Kim et al., 2015b). However, given the cross-sectional study in nature, it was unable to confirm the bidirectional hypothesis and longitudinal studies in the future are needed to examine causal relationships. Another issue to consider when comparing the present findings with prior studies is that the instruments used to assess psychological distress in most literature specifically focus on fear, stress, panic or anxiety related to the absence of the devices, low battery levels or loss of connectivity to the internet (Ayar et al., 2018) rather than in general. Therefore, interpretation and comparison with these studies must be treated with caution.

Study limitations

Some of the limitations of this study include the participants being recruited conveniently, limiting the generalizability. Second, the study design does not allow for causal inferences in the findings of the relationships. Third, all data collected were self-reported, which may introduce biases in the responses provided, such as recall and social desirability biases. However, all psychometric instruments used have been previously validated (Tung et al., 2022). Nevertheless, longitudinal studies could further confirm the relationship and the mediation effects of nomophobia and its related factors. Fourthly, other conditions (e.g., learning disabilities and diagnosed mental health conditions such as depression, generalized

anxiety, AHHD and sleep issues) may also have explained the self-reported symptoms. However, these were not screened in the present study which could have influenced the study variables and affected the results. Despite the aforementioned limitations, nomophobia fully mediated the relationship PSMU and PSU with psychological distress relationship in this study. Future studies could test the serial mediation effects of the relationship and identify the points of intervention for the improvement of psychological well-being of young adults. In addition, other commonly used activities on smartphone such as gaming (Ghazi et al., 2023) can also be tested to confirm if similar mediation results can be found among different activities. Given the literature suggesting that male and females may have different patterns of social media and smartphone use (Alnjadat et al., 2019; Chen et al., 2017), understanding the role of gender could provide additional information on the strength and direction of the relationship and on how interventions could be tailored according to gender.

Practical Implications

The present findings provide new insights for healthcare professionals aiming to reduce the negative psychological impacts of PSMU and PSU, and that altering nomophobic behaviors could be considered in the design of intervention programs. In order to foster a healthier relationship with technology more generally, and to enhance psychological well-being among young adults, education and awareness interventions, behavioral modification and psychological interventions could be considered to address the underlying nomophobic behaviors.

More specifically, in the practical implications in real-world settings, consulting centers or healthcare providers in universities can help screen students who report high levels of psychological distress if they have an issue with nomophobia. Also, some programs on PSMU and PSU reduction could be implemented in universities to help prevention from nomophobia for university students. For example, cognitive behavioral therapy could be a potential

intervention for PSMU and PSU reduction (Safaria et al., 2023). Apart from PSMU and PSU reduction, healthcare providers could also work on nomophobia reduction using spiritual mindfulness-based intervention, a program found to be effective in reducing nomophobia (Zhu et al., 2023).

Conclusion

The present study is novel and showed that there were significantly positive relationships found for addiction to social media and smartphones with nomophobia, and psychological distress among university students, reinforcing the interplay between technology-related behaviors and mental well-being. Furthermore, nomophobia was found to mediate PSMU/PSU and psychological distress relationships, adding a novel insight to the existing body of knowledge. Reducing nomophobic behaviors could improve mental health and increase awareness of nomophobia through intervention strategies. Moreover, intervention programs could reduce the negative psychological impacts of nomophobia among university students.

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Conflict of interest

The authors declare there is no conflict of interest.

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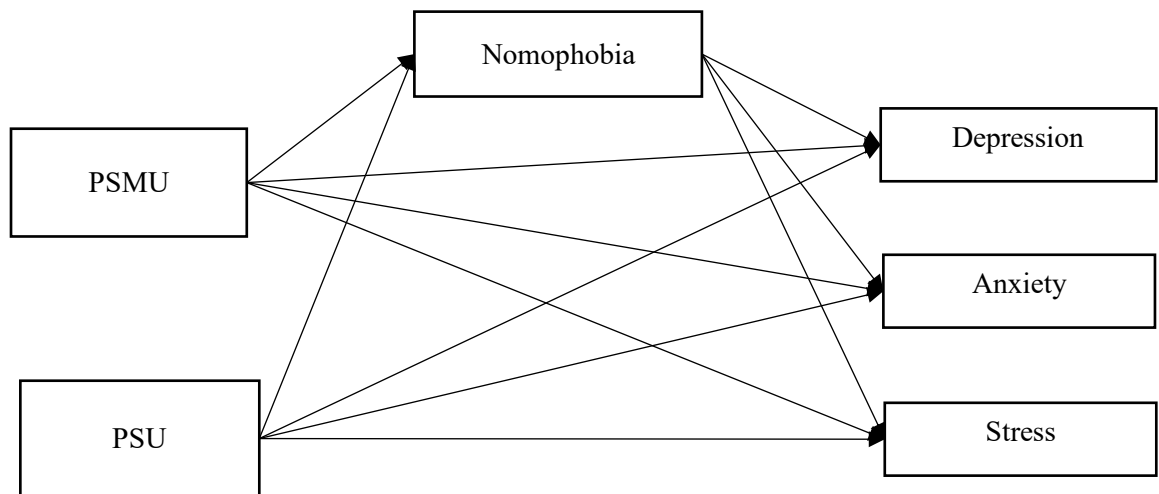


Fig. 1. The hypothesized mediation model to explain the mediating role of nomophobia in the relationship between problematic social media use (PSMU), problematic smartphone use (PSU), and psychological distress among university students.

Table 1. *Characteristics of the participants (N= 622)*

Characteristics	n (%) or M (SD)
Age	23.68 (4.35)
Gender	
Male	166 (26.7)
Female	456 (73.3)
Education Level	
Undergraduate	483 (77.7)
Postgraduate	139 (22.3)
Field of Study	
Liberal Arts and Social Sciences	126 (20.3)
Sciences	189 (30.4)
Medical and Health Sciences	102 (16.4)
Business	149 (24.0)
Others	56 (9.0)
Problematic smartphone use	22.10 (6.67)
Problematic social media use	17.51 (5.51)
Nomophobia	81.55 (28.58)
Psychological distress	
Depression	13.96 (10.74)
Anxiety	12.68 (10.14)
Stress	12.81 (11.02)

Table 2. *Loadings, Cronbach's alpha, composite reliability, and average variance extracted*

		Loadings	α	CR	AVE		Loadings	α	CR
Nomophobia	Item 1	0.716	0.965	0.968	0.604		Item C1	0.726	0.865
	Item 2	0.721				Problematic social media use	Item C2	0.770	
	Item 3	0.768					Item C3	0.773	
	Item 4	0.746					Item C4	0.775	
	Item 5	0.733					Item C5	0.808	
	Item 6	0.738					Item C6	0.776	
	Item 7	0.759	0.881	0.881	0.881		Item D1	0.700	0.881
	Item 8	0.819				Problematic smartphone use	Item D2	0.814	
	Item 9	0.778					Item D3	0.791	
	Item 10	0.819					Item D4	0.826	
	Item 11	0.762					Item D5	0.802	
	Item 12	0.816					Item D6	0.817	
	Item 13	0.800	NA	NA	NA	Anxiety	Anxiety	SIC	NA
	Item 14	0.830				Depression	Depression	SIC	NA
	Item 15	0.791				Stress	Stress	SIC	NA
	Item 16	0.785							
	Item 17	0.813	NA	NA	NA				
	Item 18	0.807							
	Item 19	0.751							
	Item 20	0.780							

Note(s): CR = Composite Reliability, AVE = Average Variance Extracted, α = Cronbach's Alpha, SIC = Single indicator construct

Table 3. *Heterotrait-monotrait (HTMT) ratio analysis*

	1	2	3	4	5	6
1. Anxiety						
2. Depression	0.756					
3. Nomophobia	0.340	0.332				
4. Problematic smartphone use	0.387	0.402	0.570			
5. Problematic social media use	0.413	0.445	0.554	0.808		
6. Stress	0.756	0.780	0.358	0.403	0.456	

Table 4. *Direct relationship hypothesis testing*

Relationship	β	Std. Error	<i>t</i> - value	<i>p</i> - value	BCI LL	BCI UL	f^2
Problematic social media use -> Anxiety	0.21 7	0.052	4.148	<0.00 1	0.115	0.31 9	0.02 6
Problematic social media use -> Depression	0.26 7	0.053	5.045	<0.00 1	0.162	0.37 1	0.04 1
Problematic social media use -> Nomophobia	0.27 5	0.050	5.459	<0.00 1	0.179	0.37 4	0.05 4
Problematic social media use -> Stress	0.27 5	0.052	5.315	<0.00 1	0.176	0.37 8	0.04 4
Problematic smartphone use -> Anxiety	0.12 9	0.056	2.318	0.020	0.020	0.23 8	0.00 9
Problematic smartphone use -> Depression	0.12 9	0.054	2.397	0.017	0.023	0.23 3	0.00 9
Problematic smartphone use -> Nomophobia	0.33 5	0.055	6.094	<0.00 1	0.225	0.44 0	0.08 0
Problematic smartphone use -> Stress	0.10 4	0.052	1.986	0.047	0.001	0.20 3	0.00 6
Nomophobia -> Anxiety	0.15 7	0.047	3.379	0.001	0.069	0.25 0	0.02 1
Nomophobia -> Depression	0.12 5	0.045	2.814	0.005	0.039	0.21 3	0.01 3
Nomophobia -> Stress	0.16 0	0.047	3.430	0.001	0.069	0.25 2	0.02 2

Note: A 95% confidence intervals was used with a bootstrapping of 10,000

Table 5. *Mediation effects of nomophobia*

Relationship	β	Std. Error	<i>t</i> -value	p value	BCI LL	BCI UL
Problematic social media use -> Nomophobia -> Depression	0.034	0.014	2.446	0.014	0.010	0.064
Problematic social media use -> Nomophobia -> Anxiety	0.043	0.016	2.785	0.005	0.017	0.077
Problematic smartphone use -> Nomophobia -> Stress	0.053	0.019	2.820	0.005	0.021	0.095
Problematic social media use -> Nomophobia -> Stress	0.044	0.015	2.902	0.004	0.018	0.077
Problematic smartphone use -> Nomophobia -> Depression	0.042	0.017	2.482	0.013	0.013	0.079
Problematic smartphone use -> Nomophobia -> Anxiety	0.053	0.018	2.855	0.004	0.021	0.093

Note: 95% confidence intervals were used with a bootstrapping of 10,000