Smartphone addiction and psychological distress among Vietnamese college students: cyber-victimization as a mediator and academic stress as a moderator

Thi Truc Quynh Ho, Thi Khanh Linh Tran and Son Van Huynh

Abstract

Purpose – *The purpose of this paper is to examine the mediating effect of cyber-victimization (CV) and the moderating effect of academic stress (AS) in the link between smartphone addiction (SPA) and psychological distress (PD) among a sample of Vietnamese college students.*

Design/methodology/approach – *A total of 423 college students participated in this study. Measures of SPA, CV, AS and PD were used for data collection. Using PROCESS macro software (Model 4 and Model 1) and the bootstrapping method, the author performed a mediation analysis and a moderation analysis.*

Findings – *Results indicated a significant mediating effect of CV in the link between SPA and PD. Moreover, this relationship was moderated by AS.*

Originality/value – *The findings could serve as a guide for future research and mental health professionals.*

Keywords *Smartphone addiction, Cyber-victimization, Academic stress, Psychological distress, Mediator, Moderator*

Paper type *Research paper*

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1. Introduction

In Vietnam, there are 43.7 million smartphone users (44.9% of the population). As a handheld electronic device, a smartphone allows users to send text messages, make calls to others and access the internet. However, overuse of smartphones can lead to poor sleep quality (Mac Cárthaigh *et al.*, 2020; Zhang and Wu, 2020) and mental health problems (Alotaibi *et al.*, 2022; Ratan *et al.*, 2021). Smartphone addiction (SPA) refers to compulsive smartphone use that can lead to negative consequences that impair the daily functioning of the user (Busch and McCarthy, 2021). In Vietnam, Nhân *et al.* (2016) reported that 43.7% of college students are at risk of SPA.

Psychological distress (PD) refers to an individual's maladaptive psychological functioning in the face of stressful life events (Ridner, 2004). PD is characterized by feelings of unhappiness, anxiety and depression (Arvidsdotter *et al.*, 2016). In Vietnam, Ly and Vo (2018) reported that 96.2% of college students had symptoms of depression, anxiety and stress. Recently, many studies have reported that SPA increases the risk of PD (Lian *et al.*, 2021; Wang *et al.*, 2020). The factors of procrastination (Shuailei *et al.*, 2018), poor sleep quality (Mac Cárthaigh *et al.*, 2020),

loneliness (Hidayati, 2019), anxiety and depression symptoms (Yang *et al.*, 2019) can be seen as bridging the relationship between SPA and PD. A number of previous studies have demonstrated the intermediate effects of rumination and the moderating effect of the capacity to be alone on the path from SPA to PD (Lian *et al.*, 2021). In Vietnam, Nhân *et al.* (2016) revealed the relationship between SPA and sleep quality, PD and academic performance. However, Nhân *et al.* (2016) did not explore the mechanism of these relationships. In the world and in Vietnam, few studies have explored the effects of cyber-victimization (CV) and AS in the link between SPA and PD. The purpose of this paper is to explore the effects of CV and AS on the association between SPA and PD among Vietnamese college students. Accordingly, the following hypothesis is proposed:

> *H1.* SPA is positively related to PD.

1.1 Cyber-victimization as a mediator

CV refers to the process of using aggressive behaviors via smartphones or the internet (mainly including written-verbal, visual, impersonation and exclusion) to turn others into victims (Nocentini *et al.*, 2010). One of the factors associated with cyberspace victims is SPA. Recent studies have revealed that SPA increases the chances of becoming a victim (Herrero *et al.*, 2021; Qudah *et al.*, 2019). For example, Herrero *et al.* (2021) found that SPA was directly related to cybercrime victimization in a sample of smartphone users in Spain. Similar results were found in the sample of Saudi university students (Qudah *et al.*, 2019). Furthermore, victims in cyberspace are more likely to experience low self-esteem, anxiety, depression and PD (Cénat *et al.*, 2018; Zhang *et al.*, 2020). For example, Zhang and Wu (2020) found that being involved in cyberbullying – whether as a perpetrator or a victim – predicts greater PD in Chinese adolescents. Similar results for this direct association were also found in a sample of high school students in Quebec (Cénat *et al.*, 2018). Accordingly, the following three hypotheses are proposed:

> *H2.* SPA is positively related to CV.
>
> *H3.* CV is positively related to PD.
>
> *H4.* CV mediates the association between SPA and PD.

1.2 Academic stress as a moderator

Academic stress (AS) refers to the body's responses to learning-related demands that are beyond the person's ability to adapt or available resources (internal or external) (Alsulami *et al.*, 2018). Studying in a university environment can create AS for college students. Previous research found that as AS increased, so did people's anxiety, depression and psychological distress (Abiola *et al.*, 2015; Rodriguez, 2016; Won and Lee, 2019). According to Abiola *et al.* (2015), college students suffer from PD due to AS. Similar results were found in the samples of college students in China (Zhong and Ren, 2009) and Pakistan (Abid *et al.*, 2021). Furthermore, past studies have often shown a strong association between SPA and PD (Lian *et al.*, 2021; Wang *et al.*, 2020). Therefore, we assume that students with both high SPA and high AS have a higher risk of PD than other students. Accordingly, the following hypothesis is proposed:

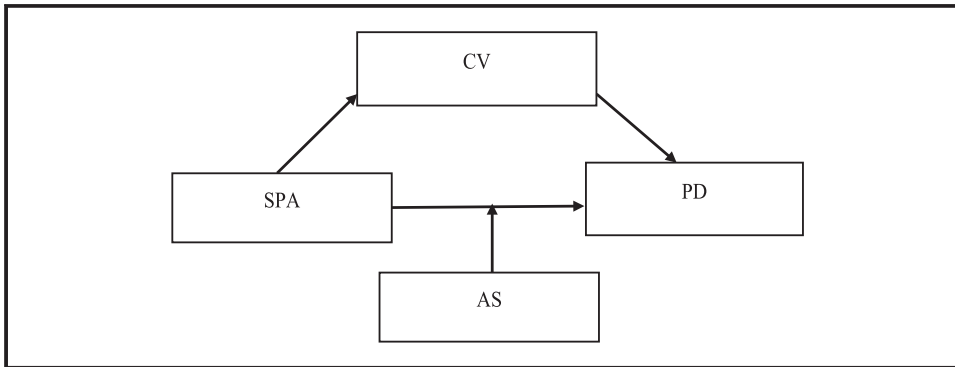> *H5.* AS moderates the association between SPA and PD.

All the hypotheses of this study are shown in Figure 1.

2. Method

2.1 Sample

The participants were Vietnamese college students. The information was gathered at a university for Economics in central Vietnam. Total participants included 459 college

students; 36 questionnaires were invalid and removed from the data set. The final data set consisted of 423 college students (accounting for 92.2%). The mean age was 18.78 years old (SD = 0.925), with an age range of 18–23 years old. The sample consisted of 77.8% female students and 22.2% male students. There were 217 first-year students (51.3%), 156 second-year students (36.9%) and 50 third-year students (11.8%).

2.2 Procedure

All the data were collected between January and February 2021. Slovin's formula was used to determine the sample size ($N = 7,000$, $e = 5\%$, $n \geq 378$). Inclusion criteria included college students who were 18 years of age or older and smartphone use. The survey process proceeds in the following sequence of steps: First, the university leadership approved our conducting the survey. Second, the meeting with the academic advisors took place face-to-face. At the meeting, we announced the purpose of the study and asked for help from the academic advisors. The academic advisors then scheduled us to meet their students in the classrooms. Third, at the face-to-face meeting with students, we once again informed them about the research purpose and how to participate in the study. Students have the right to voluntarily participate in the research and can also withdraw from the study without criticism. Fourth, all participants signed the consent form to participate in the study. Finally, students used pens to complete the questionnaire in 15–20 min. A small gift was given to each student to thank them for participating in the survey.

2.3 Measures

Smartphone Addiction Scale – Short Version (SAS-SV) (Kwon *et al.*, 2013): The students' levels of SPA are assessed with the Vietnamese version of SAS-SV. The scale includes 10 items examining the symptoms of PD. Responses were based on a six-point Likert scale, ranging from "strong disagree" (1) to "strong agree" (6). Sample items like "I won't be able to stand not having a smartphone." The total score ranges from 10 to 60, with lower scores indicating lower levels of addiction. Items 9 and 10 on the scale had unsatisfactory factor loadings, so we did not use them in the measurement model.

Education Stress Scale for Adolescents (ESSA) (Sun *et al.*, 2011): AS was assessed by the Vietnamese version of ESSA (Truc *et al.*, 2015). Sixteen items measured five dimensions of AS on a scale from "strongly disagree" (1) and "strongly agree" (5). Sample items like "I feel a lot of pressure in my daily studying." The AS scores range from 16 to 80. Higher scores indicated that participants experienced higher AS. Because the factor loadings of the three items (Items 8, 11 and 13) of the scale were unsatisfactory, we excluded them from the measurement model.

Cyberbullying Victimization Scale (CVS) ([Patchin and Hinduja, 2010](#)): CV was assessed using the Vietnamese version of CVS ([Phạm and Trần, 2016](#)). The Vietnamese version of CVS contains six items and runs on a five-point scale, ranging from "never" (one point) to "every day" (five points). Sample items like "someone threatened to hurt me online or through a cell phone text message." The scores range from 6 to 30. Higher scores indicate that the participants are being cyberbullied more seriously.

The Kessler Psychological Distress Scale (K-10) ([Kessler *et al.*, 2002](#))*:* PD was evaluated by the Vietnamese version of K-10 ([Pham, 2015](#)). It consists of 10 statements that are rated using a five-point Likert scale, with scale scores ranging from 10 to 50. Sample items like "About how often did you feel hopeless?" Responses were based on a five-point Likert scale, ranging from "never" (1) to "always" (5). A higher total score indicates a higher PD.

All scales have been used with good reliability in Vietnamese students ([Nhân *et al.*, 2016](#); [Pham, 2015](#); [Phạm and Trần, 2016](#); [Truc *et al.*, 2015](#)). [Table 1](#) presents the psychometric properties of all scales.

Table 1	Psychometric properties of the scales			
Construct	*Measurement items*	*Factor loadings*	*Variance extracted*	*α*
SAS–SV	Item 1	0.83	0.59	0.76
	Item 2	0.85		
	Item 3	0.68		
	Item 4	0.77		
	Item 5	0.80		
	Item 6	0.72		
	Item 7	0.76		
	Item 8	0.64		
ESSA	Item 1	0.70	0.64	0.81
	Item 2	0.87		
	Item 3	0.89		
	Item 4	0.64		
	Item 5	0.74		
	Item 6	0.71		
	Item 7	0.60		
	Item 9	0.86		
	Item 10	0.81		
	Item 12	0.65		
	Item 14	0.71		
	Item 15	0.76		
	Item 16	0.70		
CVS	Item 1	0.64	0.54	0.82
	Item 2	0.74		
	Item 3	0.69		
	Item 4	0.80		
	Item 5	0.73		
	Item 6	0.81		
K-10	Item 1	0.60	0.58	0.87
	Item 2	0.69		
	Item 3	0.67		
	Item 4	0.77		
	Item 5	0.57		
	Item 6	0.55		
	Item 7	0.70		
	Item 8	0.78		
	Item 9	0.71		
	Item 10	0.75		

2.4 Statistical analysis

First, we calculated the Cronbach's alpha coefficients for all scales. Second, we calculated the mean, the standard deviation and the correlation matrix among the variables in SPSS. Finally, we use the PROCESS macro in SPSS v3.3 to determine the mediating role of CV (Model 4) and the moderating role of AS (Model 1) in the association between SPA and PD. In the mediation model, the SPA score was entered as the X variable (an independent variable), the PD score was entered as the Y variable (a dependent variable) and the CV score was entered as the M variable (a mediator variable). The effect from SPA to PD through CV is significant when the confidence interval (CI) for indirect effects does not contain zero. In the moderation model, the SPA score was entered as the X variable, the PD score was entered as the Y variable and the CV score was entered as the W variable (moderator variable). In both models, gender was entered as the control variable. The CI of the interaction between SPA and AS does not contain zero, indicating that AS moderates the association between SPA and PD.

3. Findings

3.1 Correlation analysis

As shown in Table 2, SPA was positively related to AS, CV and PD ($r = 0.30$, $r = 0.15$ and $r = 0.30$, $p < 0.01$, respectively). AS was found to be related to PD ($r = 0.38$, $p < 0.01$). CV was positively related to PD ($r = 0.26$, $p < 0.01$).

3.2 Mediation analysis

As shown in Table 3, the direct effects of SPA on CV and PD were statistically significant ($\beta = 0.16$, SE = 0.04, 95% CI = [0.06; 0.21] and $\beta = 0.26$, SE = 0.04, 95% CI = [0.15; 0.32], respectively). CV had a statistically significant direct effect on PD ($\beta = 0.24$, SE = 0.05, 95% CI = [0.16; 0.37]). SPA had a statistically significant indirect effect on PD via CV ($\beta = 0.04$, SE = 0.01, 95% CI = [0.01; 0.06]). The total effect of SPA on PD was significant ($\beta = 0.30$,

Table 2	Correlation between variables					
Variables	1	2	3	4	Mean	SD
1. SPA	1					3.37	0.76
2. AS	0.30**	1			3.35	0.63
3. CV	0.15**	0.06	1		0.42	0.61
4. PD	0.30**	0.38**	0.26**	1	2.75	0.69
5. Gender	0.07	0.10*	−0.18**	0.06	1.78	0.42

Notes: **$p < 0.01$; *$p < 0.05$

Table 3	The direct and indirect effects of SPA on PD		
Paths	β	SE	95%CI
SPA – CV	0.16***	0.04	[0.06; 0.21]
Gender – CV	−0.19***	0.07	[−0.42; −0.15]
SPA – PD	0.26***	0.04	[0.15; 0.32]
CV – PD	0.24***	0.05	[0.16; 0.37]
Gender – PD	0.01	0.07	[−0.01; 0.29]
Indirect effect of SPA on PD via CV	0.04	0.01	[0.01; 0.06]
Total effect of SPA on PD	0.30***	0.04	[0.19; 0.35]

Note: ***$p < 0.001$

SE = 0.04, 95% CI = [0.19; 0.35]. Therefore, CV mediated the association between SPA and PD (see Figure 2).

3.3 Moderation analysis

As shown in Table 4, the interaction term between SPA and AS significantly and positively predicted PD ($B = 0.14$, $p < 0.05$, SE = 0.06, 95% CI = [0.03, 0.25]). This result indicated that AS moderated the link between SPA and PD. Simple slope analysis (see Figure 3) showed that students with higher levels of SPA had higher levels of PD. The link between SPA and PD was weaker and not significant in students with low AS ($B = 0.08$, SE = 0.06, 95% CI = [−0.04, 0.20]) and this relationship was stronger in students with high AS ($B = 0.25$, SE = 0.05, 95% CI = [0.16, 0.35]). These results indicated that high AS increases the positive effects of SPA on PD.

4. Discussion

College students are increasingly susceptible to SPA. SPA among college students can negatively impact their academic achievement (Mafla et al., 2021) and mental health (Alotaibi et al., 2022; Ratan et al., 2021). This study investigates the direct and indirect relationship between SPA and PD in a sample of Vietnamese college students, as well as the role of AS in the association between SPA and PD. Here are the key findings of this study:

We found that SPA positively predicts PD in college students, which is consistent with the first hypothesis. This result has also been confirmed in previous studies (Lian et al., 2021; Wang et al., 2020). According to some researchers, individuals addicted to smartphones often lack the need and time to communicate with others, which in turn leads to self-isolation and increased feelings of loneliness (Hidayati, 2019). Moreover, due to the uncontrolled use
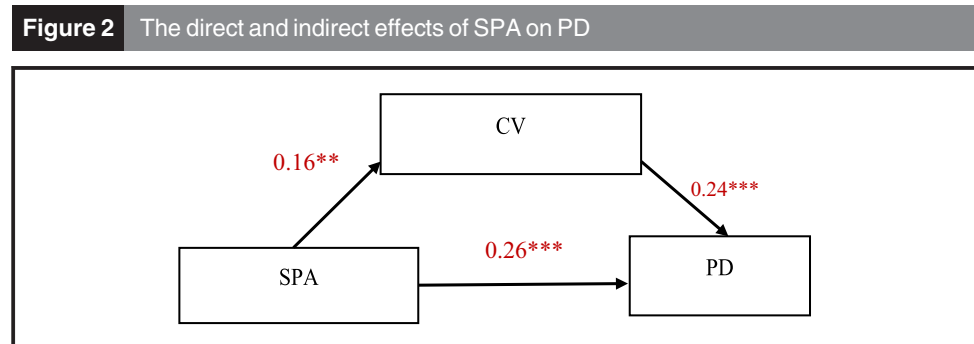
Figure 2 The direct and indirect effects of SPA on PD

Table 4 Regressions testing as a moderator in the link between SPA and PD

Regression models Outcome variable: PD	B	SE	95% CI
SPA	−0.30	0.20	[−0.69, 0.09]
AS	−0.09	0.19	[−0.46, 0.27]
SPA * AS	0.14*	0.06	[0.03, 0.25]
Gender	0.03	0.07	[−0.12, 0.17]
Conditional effects			
AS value	Effect	SE	95% CI
Low AS	0.08	0.06	[−0.04, 0.20]
Moderate AS	0.17***	0.04	[0.08, 0.25]
High AS	0.25***	0.05	[0.16, 0.35]

Notes: *$p < 0.05$; ***$p < 0.001$

Figure 3 AS as a moderator in the link between SPA and PD
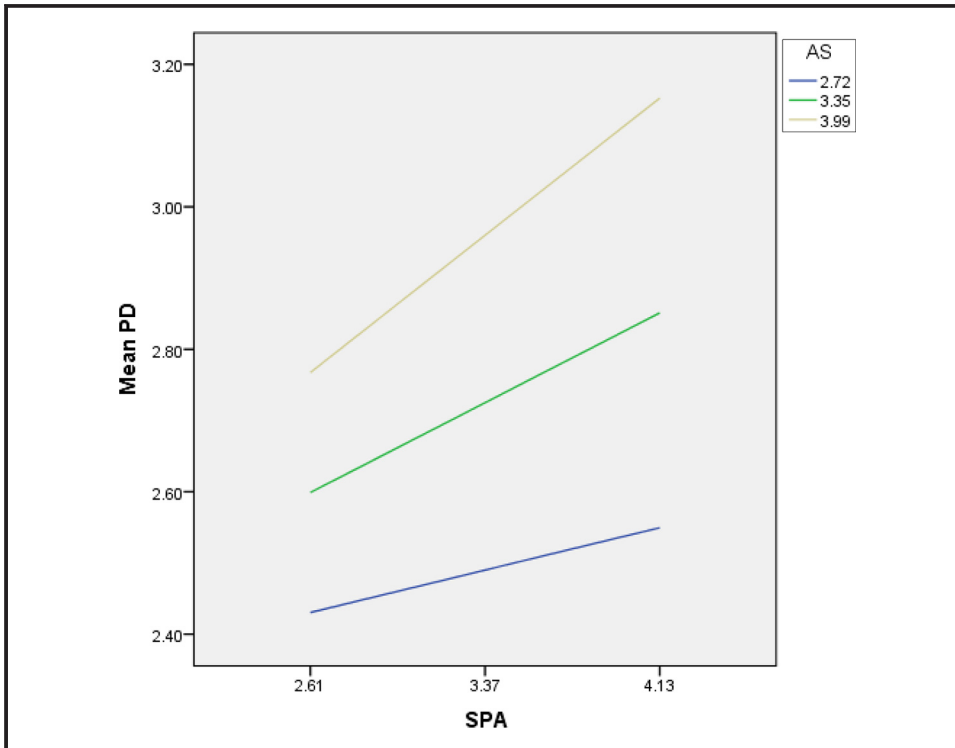
of smartphones, individuals use them anytime and anywhere, which can lead to sleep disturbances, changes in the circadian rhythm of sleep and poor sleep quality (Mac Cárthaigh *et al.*, 2020). Thus, SPA leads to loneliness and poor sleep quality, while loneliness and poor sleep quality can increase feelings of PD (Yıldırım, 2021; Rezaei *et al.*, 2018). On the other hand, Yang *et al.* (2019) indicated that individuals with SPA tended to report mental health problems (Alotaibi *et al.*, 2022; Ratan *et al.*, 2021) such as symptoms of anxiety and depression (Yang *et al.*, 2019). Hence, SPA can increase the level of PD among college students.

Consistent with *H2*, we found that SPA positively predicts CV. This result has also been found in the literature (Herrero *et al.*, 2021; Qudah *et al.*, 2019). Individuals with high levels of SPA are more likely to exhibit cyberbullying behavior. Many individuals use smartphones and the internet to share personal information on social networking sites. This sharing feature provides a platform for cybercriminals to engage in cyberbullying or other forms of online aggression toward others (Çimke and Cerit, 2021). Therefore, SPA is often reported to be involved in CV.

This study confirms *H3*, finding that CV positively predicts PD in college students. In the literature, there is evidence that people who are cyberbullied experience higher levels of PD than people who are not cyberbullied (Cénat *et al.*, 2018; Zhang and Wu, 2020). In addition, cyberbullying can be viewed as a behavior of social exclusion or negative assessment, so victims in cyberspace can suffer self-esteem damage and develop anxiety and depressive symptoms (van den Eijnden *et al.*, 2014). Victims in cyberspace may experience internalization problems such as anxiety or depression (Hu *et al.*, 2019). Therefore, CV has been found to be linked to increased PD.

As expected, CV mediates the association between SPA and PD. This result supports the fourth hypothesis of the current study. Like previous studies, the direct relationships

between SPA and PD (*H1*), SPA and CV (*H2*) and CV and PD (*H3*) were confirmed in this study. More importantly, these findings have shown that SPA influences PD through CV. This finding suggests that CV is an important factor in the association between SPA and PD. As with previous studies, we assume that excessive use of smartphones may increase the risk of being victims of cyberbullying (Herrero *et al.*, 2021; Qudah *et al.*, 2019). Subsequently, cyberbullying damages the victim's self-esteem, and this can lead to the development of symptoms of anxiety and depression (PD) (Cénat *et al.*, 2018; Schneider *et al.*, 2012).

Consistent with *H5*, we have found that AS moderated the link between SPA and PD. The link between SPA and PD was stronger among students with higher levels of AS. This implies that AS may be a risk factor that strengthens the link between SPA and PD, thus increasing the level of PD among college students. Our study confirmed that SPA increases the risk of PD in students. At the same time, this study also found that AS positively predicted PD. This finding is consistent with previous research (Abiola *et al.*, 2015; Wang *et al.*, 2020). Previous studies have explained that after experiencing stressful events, the balance between the individual and the environment is disrupted, thereby causing the individual to experience psychological distress (Wang *et al.*, 2020). This is especially true for individuals who do not have an effective stress coping strategy. Previous research also found that as AS increased, so did people's levels of anxiety and depression (Rodriguez, 2016; Won and Lee, 2019). Furthermore, several studies have demonstrated that AS is positively correlated with SPA (Wang *et al.*, 2020; Xu *et al.*, 2019). Students with high AS tend to experience negative emotions such as depression and anxiety, and to release these negative emotions, students tend to display an excessive use of smartphones (Wang *et al.*, 2020; Xu *et al.*, 2019), which is difficult to control (SPA). The above analysis has shown that students with high levels of SPA and AS tend to report the highest levels of PD. On the contrary, students with low levels of SPA and AS tend to report the lowest levels of PD.

Wu *et al.* (2022) found that cyberbullying victimization mediated the link between mobile phone addiction and depression in high school students. Earlier, Lian *et al.* (2021) and Geng *et al.* (2021) also showed that rumination and bedtime procrastination mediate the link between mobile phone/SPA and PD/anxiety, and depression in Chinese adolescents and college students. In addition, several studies have revealed that the relationship between SPA and PD is moderated by the capacity to be alone (Lian *et al.*, 2021). However, this study examines for the first time the mediating function of cyber victimization and the moderating function of AS in the link between SPA and PD in a sample of college students. These are the significant contributions made by our study. The fundamental mediating and moderating mechanisms in the association between SPA and PD have now been better understood thanks to this study. Furthermore, in terms of the current situation in Vietnam, college students use smartphones more than adolescents aged 15–18. Therefore, it makes sense to examine these complex relationships with a sample of college students. More significantly, the results of this study may be useful in assisting psychologists and counselors in creating interventions to lessen PD for students in high-risk groups. This study found that reducing SPA, the chance of being a victim of cybercrime, and AS all at once can significantly lessen students' PD.

Future research has to take some of the study's limitations into account. First, convenience sampling was adopted in this study due to time and financial constraints. As a result, sampling error cannot be identified, and no generalizations about the population can be made from the sample data. Therefore, to optimize accuracy, future studies should consider using random sampling. Second, this study used the self-report method to collect data. Although self-reporting can help researchers collect data quickly and easily, participants were more likely to report experiences perceived as socially acceptable or preferred. Therefore, to avoid self-report bias, future studies should consider using a variety of research methods to collect data (such as teacher reports and observational methods).

Third, a cause-and-effect relationship between SPA, cyber victimization, AS, and PD cannot be established because this is a cross-sectional study. Therefore, a longitudinal study design may be helpful in addressing the drawbacks of a cross-sectional study. Finally, these research findings are specific to smartphone use. Therefore, caution should be exercised when generalizing the findings of this study to the use of the internet or other electronic devices, such as laptops and tablets. In fact, in terms of functionality, smartphones can replace laptops. However, smartphones are usually lighter in weight and smaller in size than laptops or tablets. The advantage of a smartphone for accessing the Internet is that it is more mobile when there is a need for network access outside the home. Due to their convenience and portability, smartphones can be used anywhere and anytime.

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