

Social Media Addiction and Poor Mental Health: Examining the Mediating Roles of Internet Addiction and Phubbing

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Abstract

Many researchers have examined the potential detrimental role of problematic social media use (often referred as ‘social media addiction’) on mental health. The present study investigated how social media addiction is associated with three components of mental health: depression, anxiety, and stress. In addition, structural equation modeling was used to test the mediating roles of internet addiction and phubbing among a sample of young adults ($N = 603$). Results showed that social media addiction was associated with poorer mental health via internet addiction and phubbing. More specifically, associations between social media addiction and stress, and social media addiction and anxiety were explained by both internet addiction and phubbing. The association between social media addiction and depression was explained by internet addiction only. These results remained consistent after controlling for gender, age, frequency of internet use, frequency of social media use, and frequency of smartphone use. These findings extend the extant literature by providing evidence for the dual roles of internet addiction and phubbing in explaining the relationship between

Introduction

The use of social media (SM), the internet, and smartphones have markedly increased in the past decade. According to We Are Social (2022), worldwide there are 4.95 billion internet users, 4.62 billion SM users, and 5.31 billion smartphone users. These users spend an average of 6 hours 58 minutes a day on the internet and 92% of the internet users are connected

via smartphone. Research indicates that as access to smartphones has become more affordable to the general public, the use of the internet has markedly increased and that SM applications occupy the largest use (Ergün et al., 2020; We Are Social, 2022). Without smartphones, SM applications and the internet may not be used so often (Montag et al., 2018). These three technologies are highly inter-connected (Davey et al., 2018) and without any of them, their use, popularity, effects, and consequences would likely be different.

Apart from SM and internet addiction, the use of smartphone technologies could result in other problems, such as smartphone addiction and phubbing. The term ‘phubbing’ derives from a combination of two words: phone and snubbing (Al-Saggaf & O’Donnell, 2019). Phubbing is defined as the act of snubbing others in social settings by individuals looking at their smartphones instead of having face-to-face communication in social settings (Guazzini et al., 2019; Stop Phubbing, 2019). This behavior can negatively affect both smartphone users (phubbers) and those being phubbed. For example, research has shown that when individuals ignore someone during face-to-face communication and focus on their smartphone instead, those who are ignored may feel hostility towards the users (Ergün et al., 2020). Moreover, phubbing behavior is associated with mental health problems (Harwood et al., 2014; Wang et al., 2018) and can affect communication quality and relationship satisfaction (Chotpitayasunondh & Douglas, 2018a). Therefore, it is important to simultaneously examine these three behaviors (social media addiction, internet addiction, and phubbing) together to evaluate their associations with mental health (i.e., stress, anxiety, and depression).

Social media addiction and mental health

Various terms for social media use that causes problems have been used in the extant literature including ‘social media addiction’ (SMA; Ryan et al., 2014), compulsive social media use (Aladwani & Almarzouq, 2016), social media disorder (van den Eijnden et al., 2018), and problematic social media use (Huang, 2022). Although the term may be used differently,

studies indicate that problematic SM use is associated with increased mental health problems (Marino et al., 2018). Several studies report that excessive SM use is associated with both depression and anxiety (Barry et al., 2017; Viner et al., 2019). However, other studies have not found any association between time spent on SM and mental health problems. For example, some claim the association between SM use and mental health is blended or dubious at best (Best et al., 2014; Huang, 2018). In addition, an eight-year longitudinal study reported that there was no proof that time spent using SM impacted individuals' mental health (Coyne et al., 2020). Therefore, it is important to examine why research findings are mixed and the reasons underlying these findings. It is possible that other technology-based addictions (e.g., internet addiction) and technology-based behaviors (e.g., phubbing) might help clarify the reason.

Internet addiction and mental health

Studies have shown that there is a negative relationship between problematic internet use and individuals' social and mental health (Hadlington, 2017). Although the terminology regarding problems resulting from internet use remains a much debated issue (Griffiths et al., 2016), problematic internet use (like problematic social media use) has been defined by some scholars as a type of behavioral addiction (Aboujaoude, 2010; Griffiths, 2000; Kuss & Lopez-Fernandez, 2016). In defining the construct, Weinstein and Lejoyeux (2010) noted that *“problematic internet use, or addiction, is characterized by excessive or poorly controlled preoccupations, urges or behaviors regarding Internet use that lead to impairment or distress”* (p. 277). Problematic internet use has been described as addiction because many of its consequences are similar to more traditional addictions (e.g., conflict [compromising occupational, educational and/or social life], salience, withdrawal symptoms, tolerance, mood modification, relapse) (Ko et al., 2009; Kuss et al., 2014; Metin-Orta, 2020).

Research has shown that internet addiction is associated with several physical, social and psychological problems (e.g., Kuss et al., 2014). Evidence related to physical concerns

includes poor sleep, fatigue, unhealthy eating habits, and lack of physical activities (Bener et al., 2018; Karimy et al., 2020). Evidence related to psychological and mental health problems indicates that internet addiction is associated with depression and anxiety (Chou et al., 2017; Lemenager et al., 2018; Lu et al., 2017), borderline personality symptoms (Lu et al., 2017), perceived stress (Canale et al., 2019), and attention deficit hyperactivity disorder (Ko et al., 2009). Research has also shown that internet addiction is associated with social problems such as poor quality of communication (van den Eijnden et al., 2010), increased internet parental conflict (Ko et al., 2015), and poor quality of life in physical, social, psychological, and environmental domains (Chern & Huang, 2018)

According to the most recent systematic review of internet addiction, it most often occurs among the young adult population and is moderated by age and gender throughout the world population (Lozano-Blasco et al., 2022). Internet use is core to many technology use behaviors and in extreme cases can result in a variety of different types of online addiction (e.g., addictions to online gaming, online gambling, online pornography use) (Griffiths, 2000). Therefore, if technology-based addictions are to be studied, it is important to consider internet addiction as a control variable or to consider internet addiction as a mediating variable in specific online addictions (e.g., social media addiction).

Phubbing and mental health

Smartphones can alter individuals' habits significantly and in extreme cases can lead to addiction to smartphones (Ansari et al., 2016), nomophobia ('no mobile phone' phobia) (Ansari et al., 2016), and phubbing (Ansari et al., 2016; Chotpitayasunondh & Douglas, 2016, 2018b; Karadağ et al., 2016). Phubbing is a relatively new phenomenon that researchers have been investigating since 2013. Individuals generally engage in phubbing behavior by checking various social media platforms and playing mobile games while in front of other people in social situations (Franchina et al., 2018; Guazzini et al., 2019). Higher frequency of internet

use, problematic SM use, and uncontrollable playing of mobile games can increase phubbing behavior or vice versa (e.g., Nazir & Bulut, 2019; Tandon et al., 2022). Moreover, the increase of internet-based applications on smartphones has increased phubbing behavior (Karadağ et al., 2015, 2016).

Although phubbing behavior is generally perceived as inappropriate, rude, disrespectful, and aggravating for social interactions (T'gn et al., 2018; Vanden Abeele et al., 2016), individuals still engage in it. Previous research on phubbing has shown that it is associated with various psychological consequences including poor mental health (Frost & Rickwood, 2017; Harwood et al., 2014; Wang et al., 2017), increased anxiety and depression symptoms (McDaniel & Coyne, 2016), lack of self-control (Al-Saggaf & O'Donnell, 2019), and fear of missing out (Chotpitayasunondh & Douglas, 2016; Franchina et al., 2018). In addition, Ergün et al. (2020) found that phubbing behavior was positively associated with anxiety, depression, negative self, somatization, and hostility. Overall, phubbing can be an important behavior in determining life quality. Therefore, studying problematic SMA, internet addiction, and phubbing behavior together is important for determining their contributory roles in mental health.

The present study

The present study examined how SMA, internet addiction, and phubbing were associated with mental health (i.e., anxiety, depression, and stress) among university students. Among all ages, research in this area indicated that young adults are the most likely to engage with mobile electronic devices and have the most mental health problems associated with such use (Lozano-Blasco et al., 2022). Therefore, the focus of the present study was emerging adults. In addition, it is known that (when investigated separately) internet addiction, SMA, phubbing, and mental health separately have strong associations with each other (e.g., Davey et al., 2018; Nazir & Bulut, 2019; Tandon et al., 2022). Previous research has found that internet addiction

and smartphone addiction are significant predictors of depression and distress among phubbers (Davey et al., 2018). However, knowledge on how (and the extent to which) these three technology-based behaviors (SMA, internet addiction, and phubbing) are associated together with mental health is lacking.

In addition, previous studies indicate that (i) age, (ii) gender, and (iii) time spent using the internet, social media and smartphones have relationships with SMA, internet addiction, and phubbing (e.g., Balcı & Gölcü, 2013; Nazir & Bulut, 2019; Tandon et al., 2022). Therefore, the present study developed a model to determine how SMA, internet addiction, and phubbing are associated with mental health by controlling for age and gender, as well as the time spent on the internet, social media, and smartphones. It was hypothesized that SMA, internet addiction, and phubbing would each be positively associated with poor mental health after controlling for the aforementioned variables. Moreover, a recent review indicated that empirical studies (both cross-sectional and longitudinal) associate the use of smartphones and social media with increased mental health distress (Abi-Jaoude et al., 2020). As a smartphone-based behavior, phubbing is associated with mental health problems (Ergün et al., 2020). Internet addiction is another important factor in poorer mental health (Chou et al., 2017; Lemenager et al., 2018). Therefore, it is important to inspect all these three technology-based behaviors together to examine their associations with depression, anxiety, and stress in a model.

Previous research in Turkey has examined the relationship between technology-based behavior and psychosocial factors. For example, one study reported an associations between social media addiction and increased mental health problems including depression, somatization, and obsessive-compulsive disorder (Karadağ & Akçınar, 2019). A content analysis of 153 Turkish studies on internet addiction published between 2010-2019 concluded that it has detrimental psychosocial effects including poorer family relationships, poorer academic performance, depression, sleep problems, and loneliness (Boyacı, 2019). In the past

few years, Turkish studies have shown that phubbing is associated with depression, anxiety, somatization, feelings of hostility, and loneliness (e.g., Ergün et al., 2020; Parmaksız, 2021).

However, there has been little research examining all these technology-based behaviors simultaneously. In the Turkish literature, several studies have examined technology-based behaviors simultaneously. One study examined the relationship between problematic social media use, internet addiction, depression, and anxiety. It found no direct relationship between depression and internet addiction, but internet addiction was a strong predictor of problematic social media use (Üzer & Kurtşes Gürsoy, 2022). Another study examined the extent to which internet addiction, social media addiction, digital game addiction, and smartphone addiction predicted social connectedness. The results indicated that all technology-based addictions were predictors of social connectedness (Savcı & Aysan, 2017). Although these studies highlighted an association between social media use and negative outcomes, they did not explain *how* this association is connected. By investigating the relationship between phubbing and mental health while examining the mediating role of internet addiction and social media addiction, the present study specifically contributes to the related Turkish literature and the international literature more generally.

Previous research has shown that there is an association between SMA and poor mental health (e.g., Huang, 2018; Viner et al., 2019). However, further research is needed to understand this relationship. Individuals who use social media platforms require internet access and most young people access social media sites through Wi-Fi-enabled smartphones. Inappropriate smartphone use, while socially interacting in face-to-face situations (i.e., phubbing), has also been associated with mental health problems (Ergün et al., 2020). Consequently, the association between SMA and mental health problems may be explained through the interaction of various technology-based behaviors. In addition, Kuss et al. (2014) suggested that investigating other technology-based behaviors with internet addiction is

important because the internet is used for engaging in many different activities. Consequently, internet addiction may be a valuable indicator and mediator for specific internet activities. When studying specific technology-based behaviors, internet use (including internet addiction), smartphone use, and smartphone-based behaviors (e.g., phubbing) should be examined as mediators or control variables. Therefore, the present study developed a model to explain these technology-related behaviors in more detail and their relationships with level of mental health.

Method

Participants and procedure

The sample comprised 603 participants (451 females, 152 males, $M_{\text{age}} = 22.25$ years, $SD = 3.93$). To collect a representative Turkish sample as possible, the study recruited participants throughout Turkey. The participants came from 20 different cities and were university students from 30 different universities and 70 different academic departments including engineering, social sciences, medicine, theology, and physical education (among others).

Participants who were adults, studying at a university, and had Turkish nationality were invited to take part in an online survey concerning social media and mental health. Their participation was voluntary and anonymous. The survey took approximately 10 minutes to complete. Students who studied at the Turkish researchers' institutions were given partial course credit upon their participation ($n=150$) whereas all the remaining students completed the surveys without any incentive. All students were asked which university they studied at. Students who studied at different universities were recruited via social media sites and through snowball sampling. An *a priori* sample size calculation for structural equation modeling indicated that a minimum of 156 participants was needed to detect medium-size effects with

.80 statistical power with six latent and 20 observed variables (Soper, 2022). Therefore, the sample of 603 participants was more than adequate.

Before collecting the data, ethical approval was obtained from Mardin Artuklu University Scientific Research and Publication Ethics Committee (34233153-050.06.04). The survey data were collected via *Google Forms*. Participants provided their informed consent to take part in the study.

Measures

Social media addiction was assessed using the 20-item Social Media Addiction Scale for Adults (SMAS-A; Şahin & Yağcı, 2017). Items (e.g., “*I see social media as an escape from the real world*”) are rated on a five-point scale from 1 (*not applicable to me at all*) to 5 (*very applicable to me*). Higher scores indicate a greater risk of social media addiction. The internal consistency in the present study was very good ($\alpha = .89$).

Internet addiction was assessed using the 20-item Internet Addiction Test (IAT; Young (1998; Turkish version: Boysan et al., 2017). Items (e.g., “*How often do you find that you stay online longer than you intended?*”) are rated on a six-point scale from 1 (*does not apply*) to 5 (*always applies*). Higher scores indicate greater problematic internet use. The internal consistency in the present study was excellent ($\alpha = .92$).

Phubbing was assessed with the 15-item Generic Scale of Phubbing (GSP; Chotpitayasunondh & Douglas (2018b); Turkish version: Ergün et al. (2020). Items (e.g., “*I feel anxious if my phone is not nearby*”) ask individuals how often they experience the given situations in their face-to-face social interactions with others and are rated on a seven-point scale from 1 (*never*) to 7 (*always*). Higher scores indicate greater phubbing behavior. The internal consistency in the present study was excellent ($\alpha = .92$).

Depression, anxiety, and stress were assessed using the 21-item Depression Anxiety Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995; Turkish version: Yıldırım et al.,

2018). Items (e.g., “*I couldn't seem to experience any positive feeling at all*” for depression [seven items]; “*I felt I was close to panic*” for anxiety [seven items]; and “*I found it hard to wind down*” for stress [seven items]) ask participants the severity and frequency of symptoms over the past week on a four-point scale from 0 (*never*) to 3 (*always*). Higher scores indicate greater symptomology on each subscale. Internal consistencies of the subscales in the present study were all very good: depression ($\alpha = .87$), anxiety ($\alpha = .85$), and stress ($\alpha = .83$).

Data were also collected on the amount of average daily time spent on (i) the internet in total, (ii) social media specifically, and (iii) their smartphone. They responded on a six-point scale from 1 (*0-1 hours*) to 6, (*9 hours or more*).

Data analysis

For analysis of the data, first, independent samples *t*-tests were used to determine whether SMA, internet addiction, phubbing, and mental health scores differed according to participant gender. Second, the Pearson correlation coefficient was used to calculate correlations between variables. Third, the proposed model was tested in which social media addiction was treated as the independent variable, depression, anxiety, and stress were the dependent variables, and internet addiction and phubbing were the mediators. The analysis controlled for age, gender, and time spent on the internet, social media, and smartphones in the model. *Mplus* software was used to test the theoretical model in structural equation modeling with robust maximum likelihood robust estimation (Muthén & Muthén, 1998–2017).

The fitness of the proposed model was evaluated with the chi-square test, the root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), and the comparative fit index (CFI). A good fit is achieved by $\chi^2/df < 3$, a CFI value $> .95$, an RMSEA of $< .06$, and an SRMR of $< .08$ (Hu & Bentler, 1999). For all six variables in the model, and to achieve a better indication of sample size ratio and normality of distribution, latent variables

were created by item parceling to indicate the corresponding latent variables (Little et al., 2002).

Results

Results of the study showed that scores on the scales assessing SMA, internet addiction, phubbing, and mental health did not significantly differ according to gender (see Table 1). In addition, descriptive statistics and correlations between variables are shown in Table 2. Social media addiction, internet addiction, and phubbing were all significantly and positively correlated with mental health variables of depression, anxiety, and stress.

Table 1

Independent Samples t-Test Results of Gender Comparisons in Relation to Key Study

Variables

Variables	Gender	N	<i>M</i>	<i>SD</i>	<i>t</i>	df	<i>p</i>																																												
Internet addiction	Male	152	1,64	0.87	1.37	601	0.171																																												
	Female	451	1.54	0.81				Social media addiction	Male	152	2.50	0.72	-1.67	601	0.096	Female	451	2.61	0.67	Phubbing	Male	152	2.83	1.20	0.53	601	0.597	Female	451	2.77	1.15	Depression	Male	152	1.08	0.71	0.89	601	0.372	Female	451	1.01	0.78	Anxiety	Male	152	0.80	0.66	1.00	601	0.316
Social media addiction	Male	152	2.50	0.72	-1.67	601	0.096																																												
	Female	451	2.61	0.67				Phubbing	Male	152	2.83	1.20	0.53	601	0.597	Female	451	2.77	1.15	Depression	Male	152	1.08	0.71	0.89	601	0.372	Female	451	1.01	0.78	Anxiety	Male	152	0.80	0.66	1.00	601	0.316	Female	451	0.74	0.66								
Phubbing	Male	152	2.83	1.20	0.53	601	0.597																																												
	Female	451	2.77	1.15				Depression	Male	152	1.08	0.71	0.89	601	0.372	Female	451	1.01	0.78	Anxiety	Male	152	0.80	0.66	1.00	601	0.316	Female	451	0.74	0.66																				
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	Female	451	1.01	0.78				Anxiety	Male	152	0.80	0.66	1.00	601	0.316	Female	451	0.74	0.66																																
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	Female	451	0.74	0.66																																															

Table 2*Means, Standard Deviations, and Correlations between Variables.*

	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9	10
1. Social media addiction	2.58 (.69)	-	.75***	.73***	.39***	.35***	.40***	-.15***	.43***	.50***	.40***
2. Internet addiction	1.56 (.82)		-	.75***	.48***	.40***	.45***	-.09*	.47***	.47***	.433***
3. Phubbing	2.79 (1.58)			-	.42***	.42***	.46***	-.17***	.44***	.50***	.41***
4. Depression	1.03 (.76)				-	.71***	.76***	-.08*	.25***	.22***	.25***
5. Anxiety	.76 (.66)					-	.75***	-.07	.19***	.20***	.17***
6. Stress	1.03 (.67)						-	-.05	.26***	.26***	.25***
7. Age	22.25 (3.93)							-	-.11**	-.16***	-.11**
8. Internet use time	3.42 (1.25)								-	.67***	.82***
9. Social media use time	2.76 (1.19)									-	.66***
10. Smartphone use time	3.51 (1.17)										-

* $p < .05$. ** $p < .01$. *** $p < .001$

The overall fit of the measurement model was good ($\chi^2[225] = 461.387$, $\chi^2/df = 2.05$, CFI = .97, RMSEA = .04 [.04, .05], SRMR = .03). Additional tests showed that multicollinearity was not a concern (for all predictors and mediators the tolerance values > .30 and variance inflation factor [VIF] values < 3.00)¹. The results of the findings are summarized in Figure 1. Social media addiction was positively and significantly related to both internet addiction ($\beta = .75$, [.68, .82]) and phubbing ($\beta = .75$, [.68, .82]). Internet addiction was positively and significantly related to depression ($\beta = .49$, [.28, .69]), anxiety ($\beta = .23$, [.03, .43]), and stress ($\beta = .27$, [.07, .48]). Phubbing was significantly and positively related to both anxiety ($\beta = .33$, [.16, .50]) and stress ($\beta = .29$, [.13, .45]), but was not significantly related to depression. The model explained 68% of the variance in internet addiction, 62% in phubbing, 29% in depression, 24% in anxiety, and 30% in stress.

Even though social media addiction was not significantly related to the dependent variables in the model directly, as summarized in Table 3, there were mediation effects for internet addiction and phubbing. Internet addiction fully explained the association between social media addiction and depression ($\beta = .36$, [.20, .52]). The association between social media addiction and anxiety was explained by internet addiction ($\beta = .17$, [.02, .32]) and phubbing ($\beta = .25$, [.11, .38]). Lastly, the association between social media addiction and stress was explained by internet addiction ($\beta = .20$, [.05, .36]) and phubbing ($\beta = .22$, [.10, .34]). All these associations were in the same direction and stayed significant after controlling for age, gender, and the time spent on the internet, social media, and smartphones (see Supplementary Materials Figure 2).

Table 3

Indirect effects of social media addiction on mental health variables

Path	Mediator	PE (β)	95%CI
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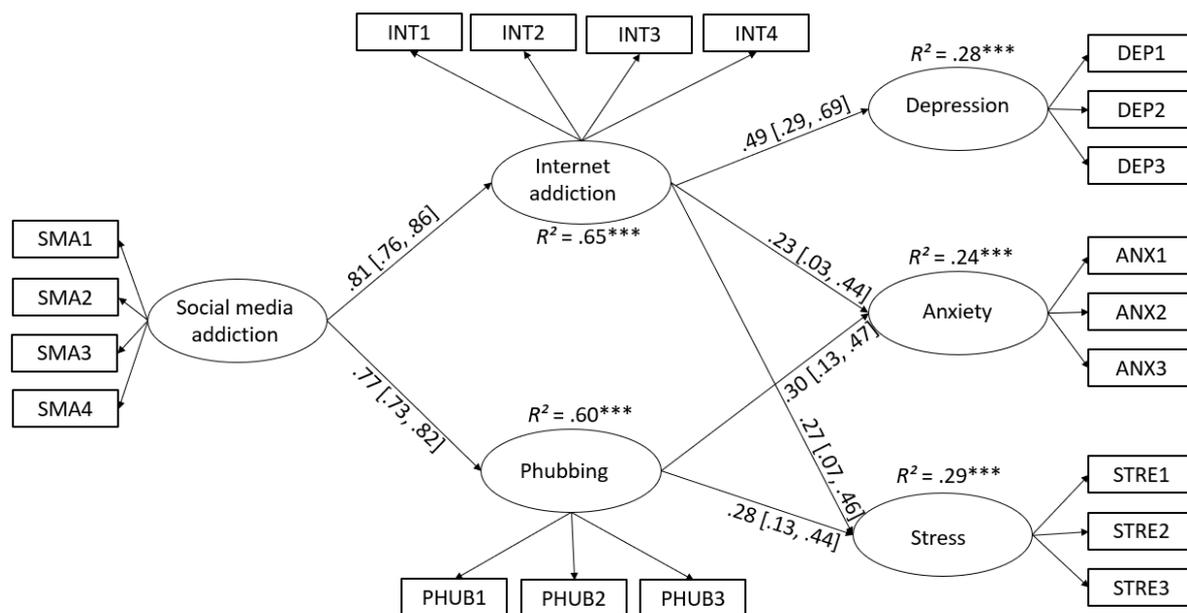
¹ Social media addiction: Tolerance = .38, VIF = 2.63; Internet addiction: Tolerance = .35, VIF = 2.87; Phubbing: Tolerance = .37, VIF = 2.68.

Social media addiction → Depression	Internet addiction	.36	[.20, .52]
Social media addiction → Anxiety	Internet addiction	.17	[.02, .32]
Social media addiction → Anxiety	Phubbing	.25	[.11, .38]
Social media addiction → Stress	Internet addiction	.20	[.05, .36]
Social media Addiction → Stress	Phubbing	.22	[.10, .34]

Note: Only significant indirect effects are reported. Confidence intervals without zero indicate a significant indirect effect (Preacher & Hayes, 2008)

Figure 1

The Structural Equation Model for Association between Variables



Nonsignificant paths, correlations between social media addiction, correlations between mediators, control measures and correlations between dependent variables are not presented for presentation purposes. Model fit: $\chi^2(155) = 335.53$, $p < .05$, $\chi^2/df = 2.29$, CFI = 98, RMSEA = .04 [.04, .05], SRMR = .03. Path coefficients are standardized estimates. * $p < .05$. ** $p < .01$. *** $p < .001$

Discussion

The present study examined how social media addiction, internet addiction, and phubbing are related to mental health outcomes. First, the associations between internet

addiction, SMA, phubbing, and mental health (depression, anxiety, stress) were tested. Second, a model was developed to examine how SMA is associated with mental health outcomes by testing the mediating roles of internet addiction and phubbing. While testing the model, the analysis controlled for gender, age, and time spent on the internet, social media, and smartphones.

The most novel aspect of the study was the mediating roles of internet addiction and phubbing in the relationship between social media addiction and poorer mental health. The model showed that internet addiction and phubbing fully explained the associations between social media addiction and higher anxiety and stress. In other words, individuals who scored higher on social media addiction reported more internet addiction and phubbing, and these (in turn) were related to increased anxiety and stress. The analysis also showed that only internet addiction (and not phubbing), fully explained the association between social media addiction and depression. Individuals with greater social media addiction reported more internet addiction, and this (in turn) was related to increased depression. These results stayed consistent after controlling for gender, age, and time spent on the internet, social media, and smartphones.

The findings of the present study concur with previous research that reported the association between SMA and mental health (depression, anxiety, and stress) (Huang, 2022; Malaeb et al., 2021). Some previous studies indicated that problematic SM use differs in terms of gender (Balcı & Gölcü, 2013; Çam & İşbulan, 2012) while other studies showed the opposite (Köse & Doğan, 2019; Tutgun-Ünal & Deniz, 2016; Wu et al., 2013). The present study did not find SMA differences according to gender. However, age and amount of time spent on SM, the internet, and smartphones are significantly associated with SMA, and this result is also in line with previous research findings (Nazir & Bulut, 2019; Tandon et al., 2022).

The potential confounding roles of these variables were controlled for in the model. The model indicated that SMA was not directly associated with depression, anxiety, and stress. The

controlled variables (gender, age, and amount of time spent on SM, internet, and smartphones) did not provide a significant difference in the model. These results are in line with the findings of an eight-year longitudinal study that did not find an effect on the amount of time spent on social media (Coyne et al., 2020). Therefore, SMA may not have a direct effect on mental health, but via other technology-based behaviors, such as internet addiction and phubbing, it could lead to poorer mental health.

In the present study, positive medium-level associations between internet addiction and depression, anxiety, and stress were found and these findings concur with previous research (Canale et al., 2019; Chou et al., 2017; Lemenager et al., 2018). Previous research also indicated that males are generally more addicted to the internet than females (Griffiths, 1999; Ko et al., 2005; Mo et al., 2020). However, the present study did not find any gender differences or any effect in the model. The present study also found a positive and medium-level association between the frequency of internet use and internet addiction, and this result is similar to previous studies (Ben-Yehuda et al., 2016; Kumar et al., 2019; Weinstein & Lejoyeux, 2010). Overall, internet addiction had a strong relationship with mental health alone and it was a key mediator for the association between SMA and mental health.

Another important finding of the present study was the positive and medium associations between phubbing and depression, anxiety, and stress which are in line with previous research (Chiu, 2014; Ergün et al., 2020; Frost & Rickwood, 2017). Previously, some studies have found that females report more phubbing than males (Chotpitayasunondh & Douglas, 2016; Ivanova et al., 2020), but other studies have reported no gender differences in phubbing (Grieve et al., 2021) which is in accord with the findings of the present study. However, in line with previous research (e.g., Chotpitayasunondh & Douglas, 2016; Nazir & Bulut, 2019), the present study found that the amount of time spent on the internet, SM, and smartphones were significantly and positively associated with phubbing. However, as

aforementioned, gender, age, and amount of time spent on the internet, SM, and smartphones did not have a significant effect on the model which is in contrast to previous findings. This suggests that phubbing, as a strong determinant of communication quality in social settings, may also influence mental health. The central role of phubbing as a mediator for variables such as stress and anxiety are also in line with previous research (Ivanova et al., 2020).

To sum up, the present study had the novel finding that phubbing and internet addiction are important mediators in the associations between SMA and mental health. When these three problematic technology-based behaviors were examined simultaneously in relation to the impact on mental health, findings indicated that SMA was not directly associated with depression, anxiety, and stress. These findings provide an in-depth new perspective in which SMA may not be directly related to mental health consequences even though it has a medium association with depression, anxiety, and stress. However, SMA appears to be associated with mental health outcomes via internet addiction and phubbing.

Limitations and implications

Although the present study provided a meaningful contribution to the technology-based addiction research field, it is not without limitations. The most notable limitation of the study was that it only focused on the roles of three technology-based behaviors on mental health (depression, anxiety and stress). Future research should compare and replicate the findings here with other types of technology-based behaviors such as smartphone addiction, online gaming addiction, online gambling addiction, and online pornography addiction, and their impact on other psychosocial outcomes. Second, due to the cross-sectional nature of the present study, causal inferences cannot be made from our results. Therefore, longitudinal studies would be an appropriate way to examine the causal associations between technology-based addictions and mental health over time. Third, the participant group in the present study was young adults because they are the ones who are most likely to have such behaviors. However, future studies

should examine other age groups such as high school students or adults aged over 30 years. Fourth, the data collected in the study was based on self-report methods and utilized convenience sampling. Therefore, future studies should use more representative samples and include other methodological approaches for assessing the key constructs.

Conclusion

The present study examined how social media addiction was related to poorer mental health. The model showed that social media addiction was associated with poor mental health through two variables. Internet addiction and phubbing fully explained the association between social media addiction and stress, and the association between social media addiction and anxiety. Internet addiction also fully explained the association between social media addiction and depression. These results remained even after controlling for age, gender, and amount of time spent on the internet, social media, and smartphones. These findings contribute to the related literature by showing the important roles of internet addiction and phubbing in explaining the relationship between social media addiction and poor mental health.

In addition, the findings show that SMA did not directly influence poorer mental health but did via internet addiction and phubbing. This finding suggests that to improve poor mental health, the level of negative technology-based behavior needs to be decreased. More specifically, the impact of SMA on poorer mental health needs to be overcome by decreasing the level of internet addiction and phubbing. Therefore, greater awareness of the inter-relationships between technology-based behaviors and their impact on mental health is needed among a wide range of stakeholders, and these inter-relationships need considering in the prevention and treatment of technology-based disorders.

The present study contributes novel findings to the literature by showing the important roles of internet addiction and phubbing in explaining the relationship between social media addiction and poor mental health. These variables have never been examined previously as

mediators in the relationship between SMA and poorer mental health. It is recommended that technology-based behaviors are considered together when examining associations with impact on mental health. However, practitioners should think about this issue in detail. Therefore, practitioners need to raise awareness of technology-based behaviors' impact. They may give psychoeducation during their professional activities. More importantly, psychiatrists and clinical psychologists should consider the influence of technology-based behaviors on mental health during diagnosis and treatment. The findings of the present study may also contribute to developing effective intervention strategies by showing that internet addiction is an important variable in other problematic use of technologies

Availability of data and material: The datasets generated during and/or analyzed during the present study are available from the corresponding author on reasonable request.

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