



Fear of missing out and problematic social media use as mediators between emotional support from social media and phubbing behavior

Jie Fang^a, Xingchao Wang^{b,*}, Zhonglin Wen^c, Jianfeng Zhou^a

^a Department of Applied Psychology, Guangdong University of Finance & Economics, No. 21 Luntou Road, Haizhu District, Guangzhou 510320, China

^b School of Educational Science, Shanxi University, No. 92 Wucheng Road, Xiaodian District, Taiyuan 030006, China

^c Center for Studies of Psychological Application/School of Psychology, South China Normal University, No. 55 Zhongshan Avenue West, Tianhe District, Guangzhou 510631, China

HIGHLIGHTS

- Emotional support (ES) from social media (SM) was positively associated with phubbing behavior (PB).
- Fear of missing out (FoMO) mediated the relationship between ES from SM and PB.
- Problematic social media use (PSMU) mediated the relationship between ES from SM and PB.
- FoMO and PSMU sequentially mediated the relationship between ES from SM and PB.

ARTICLE INFO

Keywords:

Emotional support from social media
Fear of missing out
Problematic social media use
Phubbing behavior

ABSTRACT

Recent research has identified some risk factors for phubbing behavior. However, scarce research has examined the potential influence of emotional support from social media on phubbing behavior, and little is known regarding the mediating mechanisms underlying this relationship. The present study examined the predictive role of emotional support from social media on phubbing behavior among college students and investigated whether fear of missing out and problematic social media use both mediated the relationship between emotional support from social media and phubbing behavior. A sample of 501 Chinese college students (aged 17–23, $M_{age} = 19.6$ years, $SD = 1.24$) completed questionnaires regarding emotional support from social media, fear of missing out, problematic social media use, and phubbing behavior. The results indicated that (a) emotional support from social media was positively associated with phubbing behavior; (b) both fear of missing out and problematic social media use mediated the relationship between emotional support from social media and phubbing behavior; and (c) fear of missing out and problematic social media use sequentially mediated the relationship between emotional support from social media and phubbing behavior. These findings have important implications for the prevention and intervention of phubbing behavior among college students.

1. Introduction

With smartphones becoming an inseparable part of life, phubbing behavior has emerged as a common phenomenon and major academic concern (Chotpitayasunondh & Douglas, 2016; Roberts & David, 2016). Phubbing, which is a combination of “phone” and “subbing”, refers to the act of ignoring other people and using their smartphones during interpersonal communication (Roberts & David, 2016). Phubbing behavior can lead to a series of negative consequences, such as lower conversation intimacy (Roberts & David, 2016; Vanden Abeele, Hendrickson, Pollmann, & Ling, 2019; Wang, Zhao, & Lei, 2020) and

depression (Wang, Gao, Yang, Zhao, & Wang, 2020; Wang, Xie, Wang, Wang, & Lei, 2017; Xie & Xie, 2020). Consequently, it is of theoretical and practical importance to explore possible risk factors that may increase phubbing behavior.

Prior research has identified some predictive factors for phubbing behavior. Specifically, these risk factors for phubbing behavior include personality traits (e.g., neuroticism), addictive behaviors (e.g., Internet addiction, smartphone addiction, and social media addiction), fear of missing out (henceforth, FoMO), lack of self-control and anxiety (Al-Saggaf & O'Donnell, 2019; Gong, Chen, Xie, & Xie, 2019). These findings are important for understanding phubbing behavior. However,

* Corresponding author.

E-mail address: wangxch9@126.com (X. Wang).

<https://doi.org/10.1016/j.addbeh.2020.106430>

Received 23 February 2020; Received in revised form 1 April 2020; Accepted 3 April 2020

Available online 07 April 2020

0306-4603/ © 2020 Elsevier Ltd. All rights reserved.

little empirical research has explored the link between emotional support from social media and phubbing behavior and the understanding of the factors which can help account for this relationship is also limited. Thus, we utilized a sample of Chinese college students to examine whether emotional support from social media can significantly predict college students' phubbing behavior and explore whether fear of missing out and problematic social media use would significantly mediate this relationship.

1.1. Emotional support from social media and phubbing behavior

Emotional support is a type of social support that is most strongly related to mental health (Yao, Zheng, & Fan, 2015; Shensa et al., 2020). Face-to-face emotional support can significantly decrease the risk of symptoms of depression (Rueger, Malecki, Pyun, Aycock, & Coyle, 2016). However, the role of emotional support from social media is less consistent with the role of face-to-face emotional support (McCloskey, Iwanicki, Lauterbach, Giammittorio, & Maxwell, 2015; Meng, Martinez, Holmstrom, Chung, & Cox, 2017; Shensa et al., 2020). For example, emotional support from social media is significantly associated with higher depression and lower psychological quality of life (McCloskey et al., 2015; Shensa et al., 2020). Therefore, it is necessary to investigate the adverse effect of emotional support from social media on phubbing behavior.

We drew upon self-determination theory (Deci & Ryan, 2000) to predict that emotional support from social media may increase college students' phubbing behavior. According to the self-determination theory, relatedness (i.e., closeness or connectedness with others) is one of the three basic psychological needs of human beings and is critical to achieve the optimal development of the individual. The need of relatedness will induce college students' desire for seeking emotional support from social media, especially when the needs in the offline context are not well satisfied. The more emotional support provided by social media, the less desire college students seek face-to-face emotional support and the more likely they are to phub their offline interaction peers. Displacement hypothesis also proposes that an increase in overall time on social media makes less time available for more beneficial face-to-face emotional supports (Shensa, Sidani, Lin, Bowman, & Primack, 2016), which may exacerbate college students seeking emotional support from social media. Until now, the relationship between emotional support from social media and phubbing behavior has not yet been tested.

1.2. Fear of missing out as a mediator

The fear of missing out is a concept comprising a desire to keep up with what other people are doing and a belief that other people experience more interesting events when one is absent (Przybylski, Murayama, DeHaan, & Gladwell, 2013). Few studies have examined the relationship between emotional support from social media and fear of missing out. Despite the scant empirical evidence, it is possible that emotional support from social media can positively predict fear of missing out. According to the compensatory motivation perspective of self-determination theory (Deci & Ryan, 2000), basic psychological needs satisfaction is a key motivational mechanism that drives individuals to make compensation behavior when their needs are not satisfied. Therefore, college students who do not receive sufficient emotional support in the offline world may turn to social media to seek emotional support (Brailovskaia, Rohmann, Bierhoff, Schillack, & Margraf, 2019). If people keep getting emotional support from social media, they are therefore increasingly expecting and awaiting more emotional support (e.g., "likes" and positive comments from their friends). As a result, they are more likely to fear that they may miss out on this instant emotional support from their friends when temporarily leaving the social media, which can lead to a higher level of fear of missing out. In other words, emotional support from social media is

positively correlated with fear of missing out. This view is supported by one empirical study, which confirms that social support through online social networking sites is positively correlated with fear of missing out (Liu & Ma, 2018).

Moreover, some empirical studies indicate that fear of missing out can contribute to phubbing behavior (Balta, Emirtekin, Kircaburun, & Griffiths, 2018; Chotpitayasunondh & Douglas, 2016; Davey et al., 2018; Franchina, Vanden Abeele, van Rooij, Lo Coco, & De Marez, 2018). Based on the theoretical and empirical backgrounds, we proposed that fear of missing out might mediate the relationship between emotional support from social media and phubbing behavior. Consistent with this theoretical framework, three studies roughly support our argument by showing that fear of missing out mediates the relationships between four psychological variables (i.e., anxiety, depression, envy, and materialism) and smartphone addiction (Elhai, Gallinari, Rozgonjuk, & Yang, 2020; Wang et al., 2019; Long, Wang, Liu, & Lei, 2019). To our knowledge, no prior research to date has explored the mediating role of fear of missing out on the relationship between emotional support from social media and phubbing behavior.

1.3. Problematic social media use as a mediator

Problematic social media use, also known as social media addiction, is defined as an unhealthy excessive form of social media use, which is characterized by a lack of control over the behavior and continued behavior despite adverse life consequences (Franchina et al., 2018). According to uses and gratification theory (Ryan, Chester, Reece, & Xenos, 2014), college students use social media to fulfill specific needs such as seeking and obtaining online emotional support, which may lead to college students' psychological dependency on the social media (Wang & Wang, 2013). The more online emotional support provided by social media, the higher the frequency and intensity of online information exchanged; and the more emotional support college students gain, the more they want to use social media to maintain and to increase their level of emotional support (Brailovskaia, Schillack, & Margraf, 2018). Abusing good things (i.e., the benefits of using social media) can turn them into bad things (i.e., problematic social media use) (Yang, Liu, & Wei, 2016). In support of this notion, some empirical studies indicate that online social support is positively linked with internet addiction (Wang & Wang, 2013), Facebook addiction (Brailovskaia et al., 2019; Tang, Chen, Yang, Chung, & Lee, 2016), and social networking sites addiction (Liu & Ma, 2018; Yang et al., 2016). Accordingly, it is reasonable to expect that emotional support from social media would significantly predict problematic social media use.

Furthermore, according to the optimal flow theory (Salehan & Negahban, 2013), the experience with social media use is so enjoyable that college students will try to maintain the state of overusing social media and smartphone even at high costs such as negative consequences of phubbing behavior. In support of this notion, some empirical studies find that problematic social media use is positively associated with phubbing behaviors (Balta et al., 2018; Błachnio & Przepiórka, 2019; Franchina et al., 2018; Karadağ et al., 2015). Based on the theoretical and empirical backgrounds, we proposed that problematic social media use might mediate the relationship between emotional support from social media and phubbing behavior. Consistent with this theoretical framework, a growing number of studies have demonstrated that problematic social media use mediates the relationship between fear of missing out and phubbing behavior (Balta et al., 2018; Franchina et al., 2018). To our knowledge, no prior research to date has explored the mediating role of problematic social media use in the relationship between emotional support from social media and phubbing behavior.

1.4. A multiple mediation model

As reviewed above, both fear of missing out and problematic social

media use may mediate the relationship between emotional support from social media and phubbing behavior. However, little is known about how the two mediators work together in this relationship. Some indirect evidence suggests a sequential mediation model may exist, in which the association between emotional support from social media and phubbing behavior would be mediated sequentially by fear of missing out and problematic social media use. According to compensatory internet use theory (Karddefelt-Winther, 2014), individuals often try to reduce their negative emotions (e.g., fear of missing out, loneliness, and anxiety) by excessive use of social media and smartphone. In support of this notion, a growing number of studies have indicated that fear of missing out can positively and significantly associate with and problematic social media use (Błachnio & Przepiórka, 2018; Casale, Rugai, & Fioravanti, 2018; Dempsey, O'Brien, Tiamiyu, & Elhai, 2019; Fabris, Marengo, Longobardi, & Settanni, 2020). A cross-sectional study further indicates that fear of missing out is more effective than other variables in predicting social media addiction (Blackwell, Leaman, Tramosch, Osborne, & Liss, 2017). Specifically, extraversion, neuroticism, and attachment anxiety and avoidance can significantly predict social media use and addiction, but this effect becomes no longer significant when controlling for fear of missing out and only fear of missing out significantly predicts social media addiction. Thus, the association between emotional support from social media and phubbing behavior may be mediated sequentially by fear of missing out and problematic social media use.

1.5. The present study

Taken together, we aim to test four research questions in the study: (a) to test whether emotional support from social media could positively and significantly associate with phubbing behavior, (b) to test the mediating role of fear of missing out in the relationship between emotional support from social media and phubbing behavior, (c) to examine problematic social media use as a mediator in the link between emotional support from social media and phubbing behavior, and (d) to investigate the sequential mediation model that fear of missing out and problematic social media use work together in pathway from emotional support from social media to phubbing behavior. Based on the literature review, we proposed the following hypotheses:

Hypothesis 1. *Emotional support from social media was positively and significantly associated with phubbing behavior.*

Hypothesis 2. *Fear of missing out mediated the relationship between emotional support from social media and phubbing behavior.*

Hypothesis 3. *Problematic social media use mediated the relationship between emotional support from social media and phubbing behavior.*

Hypothesis 4. *Fear of missing out and problematic social media use sequentially mediated the relationship between emotional support from social media and phubbing behavior.*

2. Method

2.1. Participants

Five hundred and one college students recruited from China. The sample was 70.66% of females. The average age was 19.60 (SD = 1.24), ranging from 17 to 23. We chose college students because they move away from their familiar environment home, and thus receive insufficient face-to-face emotional support (Brailovskaia et al., 2019). College students often intensively use social media, where they can get online emotional support.

2.2. Measures

2.2.1. Emotional support from social media

Emotional support from social media was assessed by the Facebook Measure of Social Support developed by McCloskey et al. (2015). Although the original scale includes four dimensions, only emotional support dimensions (4 items) were used in the present study. This scale has been used in Chinese college students and shows good reliability and validity (Liu & Ma, 2018). College students rated each item (e.g., "I'm happy when people "Like" my posts") on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Responses to all items were averaged, with higher scores indicating higher levels of emotional support from social media. Cronbach's α was 0.80 in this study.

2.2.2. Fear of missing out

Fear of missing out was assessed by the Fear of Missing Out Scale (10 items) developed by Przybylski et al. (2013). This scale has been used among the Chinese participants and shows good reliability and validity (Wang, Xie, et al., 2018; Wang et al., 2019). College students rated each item (e.g., "It bothers me when I miss an opportunity to meet up with friends") on a five-point scale ranging from 1 (*not at all true of me*) to 5 (*extremely true of me*). Responses to all items were averaged, with higher scores indicating higher levels of fear of missing out. Cronbach's α was 0.79 in this study.

2.2.3. Problematic social media use

Problematic social media use was assessed by the Facebook Intrusion Questionnaire (8 items) developed by Elphinston and Noller (2011). This scale has been used in the Chinese sample and shows good reliability and validity (Błachnio et al., 2016; Wang, Wang et al., 2018). College students rated each item (e.g., "I often use social media for no particular reason") on a seven-point scale ranging from 1 (*never*) to 7 (*always*). Responses to all items were averaged, with higher scores indicating higher levels of problematic social media use. Cronbach's α was 0.81 in this study.

2.2.4. Phubbing behavior

The nine-item Phubbing Scale, which was adapted from the Partner Phubbing Scale (Roberts & David, 2016), was used to examine college students' phubbing behavior. The Partner Phubbing scale has been used in the Chinese sample (Wang et al., 2017) and adapted to examine Chinese adolescents' perceived parents' phubbing behavior (Wang et al., 2020). College students rated each item (e.g., "I use my cell phone when we are out together") on a five-point scale ranging from 1 (*never*) to 5 (*always*). Responses to all items were averaged, with higher scores indicating higher levels of phubbing behavior. Cronbach's α was 0.79 in this study. Furthermore, confirmatory factor analysis suggested that all the factor loadings ranged from 0.35 to 0.72, and the one-factor model fitted the data well: $\chi^2/df = 3.88$, TLI = 0.90, CFI = 0.93, RMSEA = 0.076, SRMR = 0.044.

2.3. Procedure

This investigation was approved by the first author's University Ethics Committee. Trained research assistants conducted the survey with standardized instructions in classrooms. Informed consent was obtained from the participants before data collection. Participants were informed that their participation was voluntary and they could decline to participate at anytime they want.

2.4. Data analysis

First, data screening revealed that there were no outliers in our data. Second, mean imputation was used to handle missing data because of < 1% of missing data for all variables (Little & Rubin, 2002). Third, descriptive statistics and Pearson correlations were calculated among

Table 1
Descriptive statistics and correlations among variables of interest.

	M	SD	1	2	3	4
1. ES	3.49	0.64	1			
2. FoMO	3.05	0.60	0.44**	1		
3. PSMU	4.46	0.96	0.43**	0.45**	1	
4. PB	3.38	0.54	0.25**	0.29**	0.42**	1
Skewness	—	—	-0.44	-0.23	-0.30	-0.37
Kurtosis	—	—	1.27	0.51	0.35	0.77

Note: $N = 501$. ES = Emotional Support from social media. FoMO = Fear of Missing Out. PSMU = Problematic Social Media Use. PB = Phubbing Behavior. ** $p < 0.01$.

the study variables. Fourth, we used Model 4 of the PROCESS macro for SPSS to test the mediating effects of fear of missing out and problematic social media use separately (Hayes, 2013). Fifth, the PROCESS macro for SPSS (Model 6) was applied to examine the mediating effect of fear of missing out and problematic social media use in the relationship between emotional support from social media and phubbing behavior (Hayes, 2013). The bootstrap confidence intervals (CIs) determine whether the effects in Model 4 and 6 are significant, based on 5000 random samples (Hayes, 2013). An effect is regarded as significant if the CIs do not include zero. All study variables were standardized in Model 4 and 6 before data analyses.

3. Results

3.1. Preliminary analyses

The means, SDs, Skewness, kurtosis, and Pearson correlations for the study variables are reported in Table 1. The skewness and kurtosis values showed that all variables were normally distributed (i.e., skewness $< |2.0|$ and kurtosis $< |7.0|$; Hancock & Mueller, 2010). As expected, emotional support from social media was positively correlated with fear of missing out, problematic social media use, and phubbing behavior. Fear of missing out was positively correlated with problematic social media use and phubbing behavior. Problematic social media use was positively correlated with phubbing behavior.

3.2. The mediating role of fear of missing out

We used Model 4 of the PROCESS macro (Hayes, 2013) to test the mediating role of fear of missing out on the relationship between emotional support from social media and phubbing behavior. After controlling for gender and age, emotional support from social media was positively associated with fear of missing out ($\beta = 0.44, t = 10.88, p < 0.001$), which in turn was positively related to phubbing behavior ($\beta = 0.22, t = 4.74, p < 0.001$). The positive direct association between emotional support from social media and phubbing behavior remain significant ($\beta = 0.14, t = 2.94, p = 0.004$). Therefore, fear of missing out partially mediated the relationship between emotional support from social media and phubbing behavior (indirect effect = 0.10, SE = 0.03, 95%CI = [0.06, 0.15]). The mediation effect accounts for 41.47% of the total effect of emotional support from social media and phubbing behavior. Thus, Hypothesis 1 and 2 were supported.

3.3. The mediating role of problematic social media use

Similarly, the same procedures were performed to test the mediating effect of problematic social media use on the relationship between emotional support from social media and phubbing behavior. After controlling for gender and age, emotional support from social media was positively associated with problematic social media use ($\beta = 0.43, t = 10.67, p < 0.001$), which in turn was positively related

Table 2
Testing the pathways of the multiple mediation model.

Effect	β	BCa95%CI	
		Lower	Upper
Direct effects			
ES \rightarrow FoMO	0.44***	0.36	0.52
FoMO \rightarrow PSMU	0.32***	0.23	0.40
ES \rightarrow PSMU	0.30***	0.21	0.38
FoMO \rightarrow PB	0.11*	0.02	0.21
PSMU \rightarrow PB	0.35***	0.26	0.44
ES \rightarrow PB	0.04	-0.06	0.13
Indirect effects			
ES \rightarrow FoMO \rightarrow PB	0.05	0.01	0.10
ES \rightarrow PSMU \rightarrow PB	0.10	0.07	0.15
ES \rightarrow FoMO \rightarrow PSMU \rightarrow PB	0.05	0.03	0.08

Note. $N = 501$. ES = Emotional Support from social media. FoMO = Fear of Missing Out. PSMU = Problematic Social Media Use. PB = Phubbing Behavior. Gender and age were controlled.

* $p < 0.05$, *** $p < 0.001$.

to phubbing behavior ($\beta = 0.39, t = 8.67, p < 0.001$). The positive direct association between emotional support from social media and phubbing behavior became not significant ($\beta = 0.07, t = 1.54, p = 0.12$). Therefore, problematic social media use mediated the relationship between emotional support from social media and phubbing behavior (indirect effect = 0.17, SE = 0.03, 95%CI = [0.12, 0.23]). Thus, Hypothesis 3 was supported.

3.4. Examining the multiple mediation model

Model 6 of the PROCESS macro (Hayes, 2013) was adopted to test the mediating effect of fear of missing out and problematic social media use. As shown in Table 2 and Fig. 1, all pathways were significant, except for the residual direct pathway of emotional support from social media \rightarrow phubbing behavior ($\beta = 0.04, p > 0.05$). First, the pathway of “emotional support from social media \rightarrow fear of missing out \rightarrow phubbing behavior” was significant (indirect effect = 0.05, 95%CI = [0.01, 0.10]). Second, the pathway of “emotional support from social media \rightarrow problematic social media use \rightarrow phubbing behavior” was significant (indirect effect = 0.10, 95%CI = [0.07, 0.15]). Third, the sequential pathway of “emotional support from social media \rightarrow fear of missing out \rightarrow problematic social media use \rightarrow phubbing behavior” was significant (indirect effect = 0.05, 95%CI = [0.03, 0.08]). Thus, more emotional support from social media was serially associated with higher fear of missing out ($\beta = 0.44, p < 0.001$), problem social media use ($\beta = 0.32, p < 0.001$), and finally phubbing behavior ($\beta = 0.35, p < 0.001$). This multiple mediation model accounted for a significant amount of variance in college students’ phubbing behavior ($R^2 = 0.21$). Thus, Hypothesis 4 was supported.

4. Discussion

Little research has investigated the relationship between emotional support from social media and phubbing behavior, and the mediating mechanisms underlying this relationship remain largely unknown. The present study investigated the predictive role of emotional support from social media to college students’ phubbing behavior, and the mediating roles of fear of missing out and problematic social media use in this relationship. The results showed that emotional support from social media could positively predict college students’ phubbing behavior, and this relationship was sequentially mediated by fear of missing out and problematic social media use.

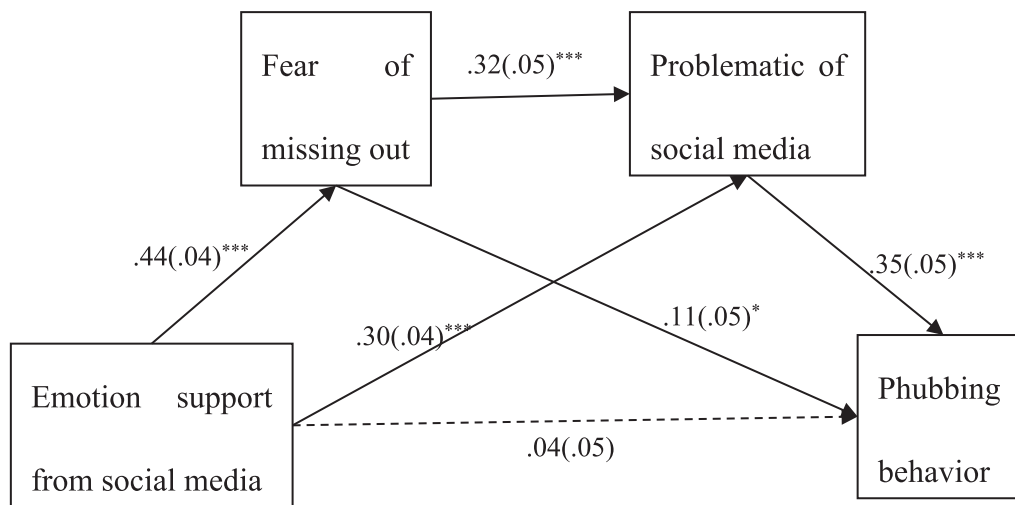


Fig. 1. The multiple mediation model. The link between emotional support from social media and phubbing behavior is mediated by fear of missing out and problematic of social media. Gender and age are controlled during this analysis but are not presented for reasons of simplicity. Path values are the path coefficients (standard errors). * $p < 0.05$. *** $p < 0.001$.

4.1. Emotional support from social media and phubbing behavior

The current study explored for the first time the relationship between emotional support from social media and college students' phubbing behavior. Our result showed that emotional support from social media could trigger college students' phubbing behavior. This result has particular meaning for college students, due to the fact that college students spend more time on mobile phones and social media. Specifically, there are about 847 million mobile phone netizens in China by the end of June 2019, of which 25% are between the ages of 20–29, and this group includes many college students (Center, 2019). Moreover, our findings could advance the understanding of the college students' phubbing behavior and enlighten interventions and preventions regarding digital product overuse.

4.2. The mediating role of fear of missing out

Consistent with our hypothesis, we found that fear of missing out mediated the relationship between emotional support from social media and college students' phubbing behavior. That is, emotional support from social media would strengthen fear of missing out, which in turn facilitates phubbing behavior among college students. Therefore, fear of missing out is not only an outcome that is affected by emotional support from social media, but also an internal motivation of phubbing behavior. Specifically, according to the compensatory motivation perspective of self-determination theory (Deci & Ryan, 2000), college students move away from their home and receive low levels of offline emotional support, which can trigger college students to compensate for the lack of emotional support on social media. Providing that need deficits could lead to sensitivity to fear of missing out (Przybylski et al., 2013). As a result, college students will worry about losing emotional support on social media once they leave social media temporarily and emerge fear of missing out. In fact, young adults tend to experience higher levels of fear of missing out (Przybylski et al., 2013). For the second part of the mediation process, fear of missing out could arouse college students' insecurity and promote them to overuse of social media to alleviate negative moods, eventually causing them to phub their offline interaction peers (Franchina et al., 2018). This interpretation is supported by previous research (Balta et al., 2018; Chotpitayasonondh & Douglas, 2016; Franchina et al., 2018). Last but not least, the present study to our knowledge is the first to confirm that fear of missing out as a mediator increases the adverse effect of emotional support from social media on college students' phubbing

behavior. This finding goes beyond the previous studies by uncovering why college students with emotional support from social media are more likely to phub their offline peers.

4.3. The mediating role of problematic social media use

Consistent with our hypothesis, we found that problematic social media use is another important explanatory mechanism through which emotional support from social media is linked to college students' phubbing behavior. To be specific, for the first part of the mediation process, emotional support from social media would induce more problematic social media use. There are two possible explanations. First, the satisfaction with college students' emotional support from social media may make college students addict social media use and gradually losing control of their use of social media, and therefore ultimately lead to problematic social media use, according to uses and gratification theory (Ryan et al., 2014). Second, when college students receive "likes" or supportive comments from social media, they report more happiness and higher self-esteem (Zell & Moeller, 2018), and this positive reinforcement will drive them to continuously use social media and eventually lead to problematic social media use. This interpretation is supported by one study showing that subjective happiness experienced during intensive Facebook use is a positive predictor of the level of Facebook addiction (Brailovskaia et al., 2018).

For the second part of the mediation process, problematic social media use is positively associated with college students' phubbing behavior. This finding is consistent with previous research (Balta et al., 2018; Błachnio & Przepiórka, 2019; Franchina et al., 2018; Karadağ et al., 2015). The possible explanations are as follows. David and Roberts (2017) indicated that the dopamine released by a "Like" or posting a positive comment is similar to the impulse we get from face to face hug or smile. Accordingly, emotional support from social media is especially important as compensation for the lack of offline emotional support. Furthermore, the instant gratification feature of social media, such as updating personal status, sending messages, posting and viewing comments at any time, make it easier for college students to keep in touch with others and receive emotional support without face-to-face communication. Thus, the experience in social media is so enjoyable that college students will try to maintain the state of overusing social media even at high costs such as adverse effects of phubbing behavior, according to optimal flow theory (Salehan & Negahban, 2013). To the best of our knowledge, the current study is the first to confirm the mediating role of problematic social media use on the

relationship between emotional support from social media and college students' phubbing behavior. Therefore, our results fill this gap in understanding the importance of problematic social media use in exacerbating the negative effects of emotional support from social media.

4.4. The multiple mediation model

Finally, the results showed that fear of missing out and problematic social media use mediated the association between emotional support from social media and college students' phubbing behavior not only parallelly but also sequentially. First, emotional support from social media is significantly associated with fear of missing out and problematic social media use, both of which in turn impact college students' phubbing behavior. Second, the effect of emotional support from social media on phubbing behavior was sequentially mediated by fear of missing out and problematic social media use. These findings uncover that college students with higher emotional support from social media are more likely to have higher levels of fear of missing out, which in turn leads to problematic social media use, and eventually leads to increased risk of phubbing behavior.

Taken together, the present study examined the predictive role of emotional support from social media on college students' phubbing behavior, and the mediating role of fear of missing out and problematic social media use in this relationship. Our result showed a sequential mediating that emotional support from social media affecting college students' phubbing behavior through fear of missing out and problematic social media use. This integrated sequential mediation model offers new insights into the literature and provides a more comprehensive process account for how emotional support from social media is associated with college students' phubbing behavior.

4.5. Limitations and future directions

Several limitations need to be considered when interpreting the findings. First, our cross-sectional data limit causal inferences. However, when the mediation models are based on theory and are partially supported by previous empirical research, cross-section mediation can provide valuable information about the relationship of variables. Future research should use longitudinal designs to test this multiple mediation model. Second, the present study used college student self-report to collect data. In order to assess the possible common method bias, Harman's one-factor test (Podsakoff & Organ, 1986) was performed on all measurement items. If the bias is large, either a single factor will emerge or one general factor will account for most of the variance (> 40%). In the present study, the results showed that the first factor did not account for the majority of the variance (only 23%) and there was no general factor in the unrotated factor structure. Therefore, common method variance was unlikely to be a serious threat in this study. Third, this study was conducted with a sample of Chinese college students, and the majority of the participants were female college students (70.66%), so generalization of the findings to other cultures or populations should be done with caution. Future studies should be conducted by using samples with a more equal proportion of both genders, and other samples.

Despite these limitations, this study has both theoretical and practical implications. From a theoretical perspective, the results offer some evidence to the relationship between emotional support from social media and college students' phubbing behavior, which enriches the literature in phubbing field. It also provides an empirical framework through testing the multiple mediating effects of fear of missing out and problematic social media use. These results can shed light on the underlying mechanism between emotional support from social media and college students' phubbing behavior. From a practical perspective, our findings can help to design effective preventions and interventions aimed at reducing college students' phubbing behavior. For example, increasing offline emotional support (e.g., teacher-student and

student-student emotional support) should be the focus of interventions that aimed at decreasing the risk of college students' phubbing behavior. Furthermore, the educators and practitioners should focus more on college students with a high level of fear of missing out and let college students know the negative effect of fear of missing out and teach them to alleviate fear of missing out in cyberspace.

5. Conclusion

In summary, the current study contributes to the literature by conducting a multiple mediation model, which provides a sophisticated understanding of how emotional support from social media can contribute to college students' phubbing behavior. The results showed that emotional support from social media was positively related to college students' phubbing behavior. Mediating analyses showed that fear of missing out and problematic social media use could separately mediate the link between emotional support from social media and college students' phubbing behavior. Moreover, fear of missing out and problematic social media use could sequentially mediate the relationship between emotional support from social media and college students' phubbing behavior.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This research was funded by grants from the National Social Science Foundation of China (17BTJ035), the National Natural Science Foundation of China (31771245), the Ministry of Education of Humanities and Social Science Project of China (20YJC190021), and the Program for the Innovative Talents of Higher Education Institutions of Shanxi (PTIT). There is no financial interest.

Authors' contribution

Jie Fang contributed to collect and analyze all data and write the first draft of the paper. Xingchao Wang contributed to the conception of the study and the critical revision of the paper. Zhonglin Wen contributed to the critical revision of the paper. Jianfeng Zhou contributed to collect all data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.addbeh.2020.106430>.

References

- Al-Saggaf, Y., & O'Donnell, S. B. (2019). Phubbing: Perceptions, reasons behind, predictors, and impacts. *Human Behavior and Emerging Technologies*, *1*, 132–140.
- Balta, S., Emirtekin, E., Kircaburun, K., & Griffiths, M. D. (2018). Neuroticism, trait fear of missing out, and phubbing: The mediating role of state fear of missing out and problematic Instagram use. *International Journal of Mental Health and Addiction*.
- Błachnio, A., & Przepiórka, A. (2018). Facebook intrusion, fear of missing out, narcissism, and life satisfaction: A cross-sectional study. *Psychiatry Research*, *259*, 514–519.
- Błachnio, A., & Przepiórka, A. (2019). Be aware! If you start using Facebook problematically you will feel lonely: Phubbing, loneliness, self-esteem, and Facebook intrusion. A cross-sectional study. *Social Science Computer Review*, *37*(2), 270–278.
- Błachnio, A., Przepiórka, A., Benvenuti, M., Cannata, D., Ciobanu, A. M., Senol-Durak, E., et al. (2016). Cultural and personality predictors of Facebook intrusion: A cross-cultural study. *Frontiers in Psychology*, *7*, 01895.
- Blackwell, D., Leaman, C., Tramosch, R., Osborne, C., & Liss, M. (2017). Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction. *Personality and Individual Differences*, *116*, 69–72.
- Brailovskaia, J., Rohmann, E., Bierhoff, H.-W., Schillack, H., & Margraf, J. (2019). The

- relationship between daily stress, social support and Facebook addiction disorder. *Psychiatry Research*, 276, 167–174.
- Braillouskaia, J., Schillack, H., & Margraf, J. (2018). Facebook addiction disorder in Germany. *Cyberpsychology, Behavior, and Social Networking*, 21(7), 450–456.
- Casale, S., Rugai, L., & Fioravanti, G. (2018). Exploring the role of positive metacognitions in explaining the association between the fear of missing out and social media addiction. *Addictive Behaviors*, 85, 83–87.
- China Internet Network Information Center (2019). The 44th statistic report of China Internet network development state <http://www.cnnic.net.cn>.
- Chotpitayasunondh, V., & Douglas, K. M. (2016). How “phubbing” becomes the norm: The antecedents and consequences of snubbing via smartphone. *Computers in Human Behavior*, 63, 9–18.
- Davey, S., Davey, A., Raghav, S. K., Singh, J. V., Singh, N., Blanchio, A., et al. (2018). Predictors and consequences of “phubbing” among adolescents and youth in India: An impact evaluation study. *Journal of Family and Community Medicine*, 25(1), 35–42.
- David, M. E., & Roberts, J. A. (2017). Phubbed and alone: Phone snubbing, social exclusion, and attachment to social media. *Journal of the Association for Consumer Research*, 2(2), 155–163.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- Dempsey, A. E., O'Brien, K. D., Tiarniyu, M. F., & Elhai, J. D. (2019). Fear of missing out (FoMO) and rumination mediate relations between social anxiety and problematic Facebook use. *Addictive Behaviors Reports*, 9, 100150.
- Elhai, J. D., Gallinari, E. F., Rozgonjuk, D., & Yang, H. (2020). Depression, anxiety and fear of missing out as correlates of social, non-social and problematic smartphone use. *Addictive Behaviors*, 105, 106335.
- Elphinston, R. A., & Noller, P. (2011). Time to face it! Facebook intrusion and the implications for romantic jealousy and relationship satisfaction. *Cyberpsychology, Behavior, and Social Networking*, 14(11), 631–635.
- Fabris, M. A., Marengo, D., Longobardi, C., & Settanni, M. (2020). Investigating the links between fear of missing out, social media addiction, and emotional symptoms in adolescence: The role of stress associated with neglect and negative reactions on social media. *Addictive Behaviors*, 106, 106364.
- Franchina, V., Vanden Abeele, M., van Rooij, A. J., Lo Coco, G., & De Marez, L. (2018). Fear of missing out as a predictor of problematic social media use and phubbing behavior among Flemish adolescents. *International Journal Environment Research and Public Health*, 15(10), 2319.
- Gong, Y., Chen, Z., Xie, J., & Xie, X. (2019). Phubbing: Antecedents, consequences and functioning mechanisms. *Advances in Psychological Science*, 27(7), 1258–1267.
- Hancock, G. R., & Mueller, R. O. (2010). *The reviewer's guide to quantitative methods in the social sciences*. New York, NY: Routledge.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Karadağ, E., Tosuntaş, Ş. B., Erzen, E., Duru, P., Bostan, N., & Şahi n, B. M., Babadağ, B. (2015). Determinants of phubbing, which is the sum of many virtual addictions: A structural equation model. *Journal of Behavioral Addictions*, 4(2), 60–74.
- Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior*, 31(1), 351–354.
- Little, R. J., & Rubin, D. B. (2002). *Statistical analysis with missing data* (2nd Ed.). New Jersey: Wiley.
- Liu, C., & Ma, J. (2018). Social support through online social networking sites and addiction among college students: The mediating roles of fear of missing out and problematic smartphone use. *Current Psychology*. <https://doi.org/10.1007/s12144-018-0075-5>.
- Long, J., Wang, P., Liu, S., & Lei, L. (2019). Materialism and adolescent problematic smartphone use: The mediating role of fear of missing out and the moderating role of narcissism. *Current Psychology*. <https://doi.org/10.1007/s12144-019-00526-0>.
- McCloskey, W., Iwanicki, S., Lauterbach, D., Giammittorio, D. M., & Maxwell, K. (2015). Are Facebook “friends” helpful? Development of a Facebook-based measure of social support and examination of relationships among depression, quality of life, and social support. *Cyberpsychology, Behavior, and Social Networking*, 18, 499–505.
- Meng, J., Martinez, L., Holmstrom, A., Chung, M., & Cox, J. (2017). Research on social networking sites and social support from 2004 to 2015: A narrative review and directions for future research. *Cyberpsychology, Behavior, and Social Networking*, 20, 44–51.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12, 531–544.
- Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, 29(4), 1841–1848.
- Roberts, J. A., & David, M. E. (2016). My life has become a major distraction from my cell phone: Partner phubbing and relationship satisfaction among romantic partners. *Computers in Human Behavior*, 54, 134–141.
- Rueger, S. Y., Malecki, C. K., Pyun, Y., Aycocock, C., & Coyle, S. (2016). A meta-analytic review of the association between perceived social support and depression in childhood and adolescence. *Psychological Bulletin*, 142, 1017–1067.
- Ryan, T., Chester, A., Reece, J., & Xenos, S. (2014). The uses and abuses of Facebook: A review of Facebook addiction. *Journal of Behavioral Addictions*, 3(3), 133–148.
- Salehan, M., & Negahban, A. (2013). Social networking on smartphones: When mobile phones become addictive. *Computers in Human Behavior*, 29, 2632–2639.
- Shensa, A., Sidani, J. E., Escobar-Viera, C. G., Switzer, G. E., Primack, B. A., & Choukas-Bradley, S. (2020). Emotional support from social media and face-to-face relationships: Associations with depression risk among young adults. *Journal of Affective Disorders*, 260, 38–44.
- Shensa, A., Sidani, J. E., Lin, L. Y., Bowman, N. D., & Primack, B. A. (2016). Social media use and perceived emotional support among US young adults. *Journal of Community Health*, 41, 541–549.
- Tang, J.-H., Chen, M.-C., Yang, C.-Y., Chung, T.-Y., & Lee, Y.-A. (2016). Personality traits, interpersonal relationships, online social support, and Facebook addiction. *Telematics and Informatics*, 33(1), 102–108.
- Vanden Abeele, M. M. P., Hendrickson, A. T., Pollmann, M. M. H., & Ling, R. (2019). Phubbing behavior in conversations and its relation to perceived conversation intimacy and distraction: An exploratory observation study. *Computers in Human Behavior*, 100, 35–47.
- Wang, E. S.-T., & Wang, M. C.-H. (2013). Social support and social interaction ties on internet addiction: Integrating online and offline contexts. *Cyberpsychology, Behavior, and Social Networking*, 16(11), 843–849.
- Wang, P., Xie, X., Wang, X., Wang, X., Zhao, F., Chu, X., et al. (2018). The need to belong and adolescent authentic self-presentation on SNSs: A moderated mediation model involving FoMO and perceived social support. *Personality and Individual Differences*, 128, 133–138.
- Wang, P., Wang, X., Wu, Y., Xie, X., Wang, X., Zhao, F., et al. (2018). Social networking sites addiction and adolescent depression: A moderated mediation model of rumination and self-esteem. *Personality and Individual Differences*, 127, 162–167.
- Wang, P., Wang, X., Nie, J., Zeng, P., Liu, K., Wang, J., et al. (2019). Envy and problematic smartphone use: The mediating role of FoMO and the moderating role of student-student relationship. *Personality and Individual Differences*, 146, 136–142.
- Wang, X., Gao, Y., Yang, J., Zhao, F., & Wang, P. (2020). Parental phubbing and adolescents' depressive symptoms: Self-esteem and perceived social support as moderators. *Journal of Youth and Adolescence*, 49, 427–437.
- Wang, X., Xie, X., Wang, Y., Wang, P., & Lei, L. (2017). Partner phubbing and depression among married Chinese adults: The roles of relationship satisfaction and relationship length. *Personality and Individual Differences*, 110, 12–17.
- Wang, X., Zhao, F., & Lei, L. (2020). Partner phubbing and relationship satisfaction: Self-esteem and marital status as moderators. *Current Psychology*. <https://doi.org/10.1007/s12144-019-00275-0>.
- Xie, X., & Xie, J. (2020). Parental phubbing accelerates depression in late childhood and adolescence: A two-path model. *Journal of Adolescence*, 78, 43–52.
- Yang, S., Liu, Y., & Wei, J. (2016). Social capital on mobile SNS addiction: A perspective from online and offline channel integrations. *Internet Research*, 26(4), 982–1000.
- Yao, T., Zheng, Q., & Fan, X. (2015). The impact of online social support on patients' quality of life and the moderating role of social exclusion. *Journal of Service Research*, 18(3), 369–383.
- Zell, A. L., & Moeller, L. (2018). Are you happy for me... on Facebook? The potential importance of “likes” and comments. *Computers in Human Behavior*, 78, 26–33.