

Facebook addiction disorder and sleep quality: Loneliness as a mediator

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ABSTRACT

With the popularity of Facebook, researchers began to pay more attention to the problem of Facebook addiction disorder. Facebook addiction disorder was found to be associated high loneliness and poor sleep quality. Using a sample of 211 Vietnamese university students, this study examined the mediating mechanism of the pathway from Facebook addiction disorder to poor sleep quality among university students. The results indicated that loneliness partially mediated the effects of Facebook addiction disorder on sleep quality among Vietnamese university students $B = 0.040$, $SE = 0.020$, $CI = [0.002, 0.079]$.

Keywords

Facebook addiction disorder; loneliness; sleep quality; mediating effect; Vietnamese university students.

Introduction

In recent years, social media addiction has received much attention (Mamun & Griffiths, 2019). Facebook is a social networking site that makes it easy for users to connect and share things online with family and friends. For university students, Facebook helps students improve their cognitive abilities, social competencies, raise positive attitudes towards learning and develop communication with teachers outside the classroom (Zaremohzzabieh, Abu Samah, Zobidah Omar, Bolong, & Akhtar Kamarudin, 2014). Using Facebook can help university students become more knowledgeable, socially accepted and supportive, which can improve self-esteem and life satisfaction (Yu, Tian, Vogel, & Chi-Wai Kwok, 2010). In Vietnam, university students use Facebook to study, share knowledge and documents, make friends, communicate, update friends' and social information, and find career opportunities. Therefore, Facebook plays an important role in the

university life of Vietnamese students. However, the habit of using Facebook excessively will gradually lead to Facebook addiction disorder (FAD).

With the popularity of Facebook, researchers began to pay more attention to the problem of FAD. As a type of social media addiction, FAD aka problematic Facebook use is defined as excessive and uncontrolled use of Facebook (Griffiths et al., 2014, Mamun & Griffiths, 2019). Therefore, FAD has characteristics such as preoccupation with social media use (Facebook), over-involvement, loss of control (mood and usage), and withdrawal (Ryan, Reece, Chester, & Xenos, 2016). Evidence from recent studies has shown that the prevalence of FAD among university students tends to increase. It is estimated that 22.6% (Balci & Gölçü, 2013) to 40% (Mamun & Griffiths, 2019) of university students are at risk of being addicted to Facebook. Previous studies have shown that FAD is linked to low academic performance (Khan,

2018), high loneliness (Saleem, Irshad, Zafar, & Tahir, 2016) and sleep quality (Wolniczak et al., 2013).

Literature Review

Facebook addiction and sleep quality

Many previous studies have revealed that SMA reduces sleep quality of individuals (Lin et al., 2021; Wong et al., 2020). Individuals who are addicted to social media often report insomnia (Lin et al., 2021; Malaeb et al., 2021), sleep disturbances (Levenson, Shensa, Sidani, Colditz, & Primack, 2016) and daytime sleepiness (Lin et al., 2021). Similarly, it is proved that FAD is closely linked to sleep quality among Peruvian and Polish students (Wolniczak et al., 2013; Bowler & Bourke, 2019). In a sample of Vietnamese Facebook users, Ho (2021) found that individuals who are addicted to Facebook tended to report poor sleep quality (PSQ). Previous studies indicated that excessively using Facebook disrupted sleep-wake schedules. Moreover, light exposure (from electronic devices) at night can alter sleep circadian rhythms, which in turn leads to difficulty falling asleep, insomnia, and PSQ (Ho, 2021). Individuals who are addicted to Facebook tend to use it anywhere for a few hours, so if used at night, their sleep patterns can be disrupted. Individuals addicted to online video games on Facebook may experience more loneliness and this has been associated with the sleep fragmentation (Wolniczak et al., 2013). Therefore, FAD can negatively impact the sleep quality of users.

Loneliness as a mediator

Loneliness is a common human emotion (Tiwari, 2013). Loneliness refers to a distressing perceived

difference between an individual's social desires and their actual interactions with other individuals (Lara et al., 2019). Previous studies have provided evidence that there is a strong link between FAD and loneliness as well as loneliness and PSQ. First, there are many previous studies that have examined the relationship between FAD and loneliness (Błachnio et al., 2016; Kross et al., 2013; Turgut Karakose, Ramazan Yirci, 2016; Shettar et al., 2017; Satıcı, 2019). Among them, Shettar et al. (2017) and Satıcı (2019) reported that the loneliness level of users increases corresponding to the increase of the FAD score. According to Lou et al. (2012), FAD is seen as a vulnerability factor in the development of loneliness. Therefore, FAD was found to be a positive predictor of university students' loneliness (Saleem et al., 2016). To Facebook addicted individuals, online communication increases instead of the real world one and then produce problems in relationship with other individuals more frequently. Therefore, the higher the Facebook addicted level, the higher the loneliness feeling.

On the other hand, prior studies indicated that individuals who experience dissatisfaction with their relationships (loneliness) over a long period of time are often associated with PSQ (Griffin, Williams, Ravyts, Mladen, & Rybarczyk, 2020). Loneliness was found to be related to sleep disturbances, subjective sleep quality and insomnia symptoms (Griffin et al., 2020), sleep adequacy (Segrin & Passalacqua, 2010; Jaremka et al., 2014), sleep satisfaction (Jacobs, Cohen, Hammerman-Rozenberg, & Stessman, 2006), change in sleep habits (Hom et al., 2017), sleep duration (Christiansen, Larsen, & Lasgaard, 2016).

Supporting previous findings, several studies have demonstrated a positive correlation between loneliness and poor sleep quality in a sample of university students (Zawadzki et al., 2013; Sha et al., 2020). Cacioppo et al. (2006) reported that being embedded in a group can give an individual a sense of security, while awareness of being cut off from society leads to feelings of vulnerability. Feeling of vulnerability increased alertness to threatening stimuli, which in turn leads to PSQ (McHugh & Lawlor, 2013). In a state of sleep, individuals cannot maintain vigilance; however, loneliness brings a feeling of insecurity (Matthews et al., 2017). Therefore, individuals with high loneliness often report PSQ.

From the above analysis, it can be seen that the impact of FAD on PSQ as well as the impact of FAD on loneliness and the impact of loneliness on PSQ have been confirmed. In the literature, previous studies examined the mediating role of self-regulation and bedtime procrastination in the association between FAD and PSQ (M. X. Zhang & Wu, 2020). In Vietnam, we found that there are several studies on FAD, sleep quality and loneliness. These above studies focused on determining the reliability and validity of the scales (Chương et al., 2020; To & Nguyen, 2015; Ho, 2021) and the relationship between FAD and sleep quality, between FAD and loneliness (M. W. B. Zhang et al., 2017) among university students, youths, patients and Facebook users. However, we have not found any studies investigating the mediating effect of loneliness on the relationship between FAD and PSQ among university students.

This study

To fill the above mentioned gap in the literature, this article focuses on the mediating effect of loneliness in the connection between FAD and PSQ among Vietnamese university students. With the guidance of previous studies, we propose the following hypotheses:

H1. FAD would positively related to PSQ.

H2. Loneliness would mediate the connection between FAD and PSQ.

Methods

Sample

Data were collected from university students studying at a university in North Central Vietnam. The non-probability sampling method was used. To recruit participants, we contacted the academic advisors to ask for their help. The academic advisors then arranged researcher to meet with the students. At the meeting, the researcher asked students for help, the students were informed about the purpose of the study. Students who agree to participate in the study will then report to their academic advisors. With the consent of the students, academic advisors provided a list of students who could participate in the study and how to contact them. Students who agree to participate in the study will then receive an invitation to complete the questionnaire in an online survey. A total of 211 Vietnamese university students (out of 300 invited students) have completed the FAD, loneliness and sleep quality scales through an online survey. The final sample consisted of 211 students (59.2 % female and 40.8% male), $M_{age} = 20.12$ ($SD_{age} = 2.473$, 17-25 years). The rates of freshman, sophomore and junior

students are 31.3%, 30.3% and 38.4%, respectively. 48.8% of students are from rural areas and 51.2% of students are from urban areas. Each participant received 50,000 VND for completing the questionnaire.

Instruments

FAD was measured through the Bergen Facebook Addiction Scale - BFAS (Andreassen, Torsheim, Brunborg, & Pallesen, 2012). The scale includes 6 items such as “You use Facebook in order to forget personal problems” and “You become restless or troubled if you are prohibited from using Facebook”. Items are rated on a five point scale, ranging from 1 (very rarely) to 5 (very often). FAD scores ranged from 6 to 30, with lower scores indicating lower levels of FAD. In Vietnam, the Cronbach's alpha of BFAS was 0.86 (Chuong et al., 2020). In our study, the Cronbach's α was 0.80.

The UCLA loneliness scale (Russell, 1996) is a 20-item scale used to assess loneliness level. Sample items include “How often do you feel that you are no longer close to anyone” and “How often do you feel that you are "in tune" with the people around you”. For UCLA loneliness scale, the answer to each item will be coded as following: 4 = often, 3 = sometimes, 2 = rarely and 1 = never. The total score for UCLA loneliness scale ranges between 20 and 80, with higher scores indicates higher levels of loneliness in general. Regarding the reliability coefficient of the UCLA loneliness scale, Ho (2021) reported $\alpha = 0.87$ and in this study, $\alpha = 0.89$.

Sleep quality was collected via the Pittsburgh Sleep Quality Index - PSQI (Buysse, Reynolds, Monk, Berman, &

Kupfer, 1989). PSQI consists of 18 items (e.g., “during the past month, how would you rate your sleep quality overall” and “during the past month, how much of a problem has it been for you to keep up enthusiasm to get things done”) presenting the 7 basic components of sleep quality. The answer to each item will be coded as following: 3 = bad, 2 = quite bad, 1 = quite good and 0 = very good. According to Buysse et al., (1989), the total score for PSQI ranges from 0 to 21, with total scores ≥ 5 indicating poor sleep quality. The Vietnamese version of the PSQI scale has good reliability $\alpha = 0.71$ (To & Nguyen, 2015). In this study, the Cronbach's alpha was 0.65.

Data analysis

First, research data was collected through Excel then transferred to IBM SPSS version 20.0. Second, IBM SPSS v.20.0 was applied to conduct correlations and descriptive statistics for all studied variables. Finally, PROCESS macro v.3.3 (Model 4) (Hayes, 2018) was selected to analyze the mediating role of loneliness in the link between FAD and PSQ. In Model 4, gender and age were considered as control variables; FAD was the independent variable, loneliness was the mediator variable, sleep quality was the predictor variable. If the 95% confidence interval for indirect effect does not include 0, the indirect effect test is significant.

Results

Preliminary analysis

Table 1 provided details of descriptive statistics and Pearson correlations of variables. Table 1 indicated that the mean FAD score was 15.53 ± 4.529 . The mean

loneliness score was 45.54 ± 10.389 . The mean sleep quality score was 7.70 ± 3.503 . FAD was positively related to loneliness ($r = 0.153$, $p < 0.05$) and sleep quality ($r = 0.268$, $p < 0.01$). Loneliness was positively related to sleep quality ($r = 0.406$, $p < 0.01$).

Mediation model of loneliness

Table 2 and Fig 1 presents the unstandardized regression coefficients of the mediation models between FAD and PSQ. Table 2 indicated that the direct effects of FAD on PSQ was significant $B = 0.161^{***}$, $SE = 0.048$, $p < 0.001$, $CI = [0.067, 0.255]$. On the other hand, the indirect effect of FAD on PSQ via loneliness $B = 0.040$, $SE = 0.020$, $CI = [0.002, 0.079]$ was found to be significant while

controlling for gender and age. These results showed that loneliness partially mediated the connection between FAD and PSQ.

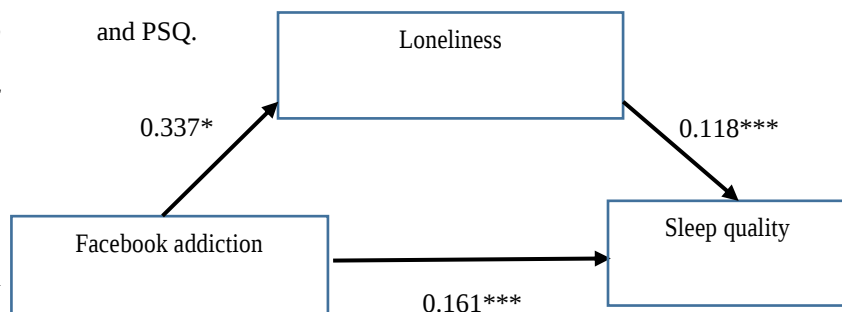


Fig 1. The path model of Facebook addiction, loneliness and sleep quality.

Table 1. Mean, SD and correlations between variables

	Mean (SD)	Facebook addiction disorder	Loneliness
Facebook addiction disorder	15.53 (4.529)	—	
Loneliness	45.54 (10.389)	0.153*	—
Sleep quality	7.70 (3.503)	0.268**	0.406**

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

Table 2. The indirect and direct effects of Facebook addiction on sleep quality

Paths	B	SE	95%CI	
			Low	High
Model 1. Outcome: Loneliness				
Facebook addiction - Loneliness	0.337*	0.156	0.300	0.643
Age - Loneliness	-0.681*	0.285	-1.243	-0.118
Gender - Loneliness	0.034	1.432	-2.788	2.857
Model 2. Outcome: Sleep quality				
Facebook addiction - Sleep quality	0.161***	0.048	0.067	0.255
Loneliness - Sleep quality	0.118***	0.021	0.077	0.160
Age - Sleep quality	-0.192*	0.088	-0.365	-0.019
Gender - Sleep quality	0.635	0.434	-0.221	1.490
Facebook addiction - Loneliness - Sleep quality	0.040	0.020	0.002	0.079
The total effect	0.201***	0.051	0.101	0.300

Notes. CI: confidence interval . ***: $p < 0.001$. **: $p < 0.01$.

Discussions

In recent years, many studies have focused on users' FAD behavior (Sayeed et al., 2020; Brailovskaia et al., 2020; Brailovskaia et al., 2018; Wolniczak et al., 2013; Atroszko et al., 2018; Bowler & Bourke, 2019). However, studies examining factors that could explain the connection between FAD and PSQ are rare, especially in Vietnam. This study is the first one which investigates the role of loneliness in the connection between FAD and PSQ among university students. This study found the following important findings:

We found that FAD was positively related to PSQ in the researched sample of Vietnamese university students, which supports Hypothesis 1. This finding is consistent with previous findings in university students in Peru and Polish (Bowler & Bourke, 2019; Wolniczak et al., 2013). This suggests that although there are cultural differences between countries, the findings on the relationship between FAD and PSQ was found to be similar. Previous studies indicated that university students tend to use Facebook to communicate and discuss academic content (Chu & Meulemans, 2008), gaining knowledge, and social recognition and social support. These activities can help students increase self-esteem and life satisfaction (Yu et al., 2010). However, using Facebook excessively can increase the risk of FAD (Brailovskaia & Margraf, 2017). Previous studies have confirmed that FAD has negative effects on sleep quality (Wolniczak et al., 2013; Atroszko et al., 2018; Bowler & Bourke, 2019), such as daytime dysfunction (Wolniczak et al., 2013), insomnia (Lin et al., 2021) and daytime

sleepiness (Lin et al., 2021). Using Facebook excessively has disrupted sleep-wake schedules, altered sleep circadian rhythms, difficulty in falling asleep, insomnia (Ho, 2021). Therefore, in this study, university students with a high level of FAD reported lower sleep quality than non-addicted students.

Loneliness partially mediated the effects of FAD on PSQ among Vietnamese university students, which supports Hypothesis 2. In line with earlier studies (Błachnio et al., 2016; Kross et al., 2013; Turgut Karakose, Ramazan Yirci, 2016; Shettar et al., 2017; Satıcı, 2019), this study has confirmed that FAD was positively correlated with loneliness. In the sample of university students, Saleem et al. (2016) reported that students who are addicted to Facebook had a higher level of loneliness than non-addicted students. University students who are addicted to Facebook tended to spend time on Facebook rather than having real-life relationships, leading to problems in relationships (Ryan, Chester, Reece, & Xenos, 2016). As a result, they have higher levels of loneliness than non-addicted students. On the other hand, we found that loneliness was positively related to PSQ, students with high loneliness have lower sleep quality than students with low loneliness. This finding supports previous findings (Griffin et al., 2020; Christiansen et al., 2016). As a feeling of vulnerability, loneliness can increase alertness to threatening stimuli, making individuals feel insecure, which in turn leads to PSQ (McHugh & Lawlor, 2013; Matthews et al., 2017). The above findings have shown that loneliness mediated the link between FAD and sleep quality.

Conclusion

Our findings play a basis role for developing intervention programs to improve sleep quality for Facebook addicted university students. Interventions which improve sleep quality for Facebook addicted university students should focus on measures to reduce dependence on Facebook and reduce loneliness for them. Previous studies have demonstrated that increasing opportunities for social interaction, enhancing social support, improving social skills and addressing maladaptive social cognition can reduce loneliness (Masi, Chen, Hawkey, & Cacioppo, 2011). Therefore, interventions should aim to increase opportunities for social exposure, increase social support, improve social skills and address maladaptive social cognition for students. On the other hand, Hou et al. (2019) have reported that the cognitive-behavioral therapy can reduce social media addiction among university students. Therefore, cognitive behavioral therapy can be used as a measure to reduce FAD for Vietnamese university students.

Limitations and Future Studies

This study also consists of limitations. Firstly, non-experimental design does not allow this study to infer the causal effects between the variables studied. Therefore, experimental studies are needed to consider the hypothetical causal effects of FAD on PSQ, FAD on loneliness and loneliness on PSQ. Secondly, this study used a non-probability sampling method. Therefore, we cannot determine sampling error and cannot conclude the population from the research results. Probabilistic sampling

techniques are needed in order to be able to draw the necessary conclusions for the population from the study results. Finally, this study used a self-reporting method, hence participants were able to give answers that were dishonest and highly introspective. Future research should pay attention to address these shortcomings of the self-reporting method.

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