The Mediating Effect of Attachment Anxiety in College students' Mobile Social Media Dependence and Sleep Disturbance

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Abstract: The overuse of college students' mobile phones has become a hot topic. The social media dependence on mobile phones should also be paid attention to by the public. In this study, 487 Chinese freshmen were selected as the sample to explore the mediating effect of attachment anxiety in college students' mobile social media dependence and sleep disturbance. Through the establishment of mediation model and related statistical analysis, the results exhibited that (1) mobile social media dependence is significantly positively correlated with attachment anxiety and sleep disturbance ($r = 0.264$, $P<0.01$; $r = 0.327$, $P<0.01$), attachment anxiety is significantly positively correlated with sleep disturbance ($r=0.258$, $P<0.01$). (2)College students' mobile social media dependence can not only directly predict sleep disturbance, but also indirectly predict sleep disturbance through the mediating effect of attachment anxiety. The direct effect value and the indirect effect value are 0.132 and 0.023 respectively.

1. Introduction

Social media is an interactive way for people to create, share, and exchange information and ideas in virtual communities on the web [1]. Kietzmann et al. believed that social media was a highly interactive platform based on mobile and technology, which was created by individuals and communities to share, build, discuss and modify user-generated content [2]. If mobile devices and social media combined, they will become to be mobile social media, which is a set of mobile applications that allows users to create and exchange generated content [3].

With the popularity of smartphones, more and more people are using mobile social media and even produce dependent behavior. For instance, 8067 college students aged between 18 and 30 years from seven countries/regions participated in a study and the results illustrated that the overall prevalence rates were 8.9% for Internet addiction, 19.0% for online gaming addiction, and 33.1% for online social networking addiction. Compared with the US students, Asian students are more likely to emerge higher risks of online social networking addiction [4]. A questionnaire survey of 1038 middle school students with experience in using social networking sites (QQ space) in Wuhan city demonstrated that the average frequency of using social networking sites was 4.07 ±1.03 times a week, and 47.8% of adolescents used social networking sites at least once a day[5]. There is a large growth in use of mobile phones among the youth, which may lead to social networking addiction .Using social networking services mobile applications is an important predictor of mobile phone addiction [6].Addiction-like symptoms in relation to social networking site use are prevalent and may adversely affect users [7]. Through a sample of 1011 Facebook users from Poland, Turkey and Ukraine, it found that in the total sample Facebook addiction is positively associated with Internet addiction [8]. Mobile social media dependence is a type of mobile phone dependence, and excessive use of mobile social media may bring some negative effects [9].

In addition to negative effects on emotion and academic, social media dependence may have some negative effects on sleep quality. College students' overuse mobile social media network is potentially addictive and will bring sleep disturbance [10]. Increased dependence on social networking is correlated with decreased sleep quality and increased everyday cognitive failures [11].

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The risk of being addicted to Facebook may predict less involvement in physical activities, sleep disturbance, more time spent on Facebook and depression symptoms [12]. Individuals addicted to the internet will have significant sleep problems and reduce sleep duration significantly [13]. Thus, the overuse of social media or the smartphone can negative affect sleep quality. And then, will the overuse of mobile social media adversely affect sleep quality? This study tries to explore the mechanism of mobile social media dependence on sleep disturbance in college students.

Attachment refers to the emotional connection between an individual and his or her caregiver or guardian. Both the direct association between attachment anxiety and mobile phone dependence and the indirect association through loneliness are moderated by rumination [14].People with high attachment anxiety and feeling negative emotion like to use Facebook more frequently. [15]. There are mediating effects of loneliness and depression in the relationship between attachment anxiety and smartphone addiction. There are significant positive relationships between attachment anxiety, loneliness, depression, and smartphone addiction [16]. Thus, attachment anxiety is associated with smartphone addiction. Meanwhile, many studies suggest there is a relationship between attachment styles and sleep difficulties in all ages. Secure attachment is associated with better sleep quality, but insecure attachment styles often link with bad sleep quality [17]. Adolescents who feel insecure attachment with their parents often produce more sleep problems, such as poor sleep quality and low sleep efficiency [18]. Therefore, from existing studies it can be demonstrated that insecure attachment may affect sleep quality and lead to sleep disturbance.

In summary, this study intends to explore the influence of college students' social media dependence on sleep disturbance, and the mediating effects of attachment anxiety between social media dependence and sleep disturbance. Several hypotheses have been proposed.

H1: Mobile social media dependence can positively predict sleep disturbance,

H2: Mobile social media dependence can positively predict attachment anxiety,

H3: Attachment anxiety can positively predict sleep disturbance,

H4: Attachment anxiety has a mediating effect in college students' mobile social media dependence and sleep disturbance.

2. Method

2.1 Participants and Procedure

In order to collect data more conveniently, the questionnaire survey was conducted among freshmen of a university in Sichuan province. In this survey, the two-dimensional code of questionnaire survey was issued to the students in the classroom. There were 492 college students completed our survey, finally, there were 487 valid questionnaires to collect information regarding mobile phone social media dependence, sleep quality, attachment anxiety and demographic variables, whose effective recovery rate was 98.98%.The participants were between 15 and 28 years old, the mean age of the participants was 18.19 years old (M=18.19, SD=0.829). The demographic data of the participants are shown in Table 1.

2.2 Measures

2.2.1 Mobile Social Media Dependence

In this study, college students' mobile social media dependence was measured by College Students' Mobile Social Media Dependence Scale (CSMSMDS) which was authorized by Wu [19]. The CSMSMDS measures five factors (Salience, Social Benefit, Compulsivity, Conflict and Withdrawal) of mobile phone dependence with 23 items, such as "Playing mobile social media is my daily habit", "When I cannot use social media,I still want to know what's happening on it." "Spending too much time on mobile social media will led me to sleep less."etc. Participants use Likert five point scale to answer these items (1=never, 5=always), the higher the score of the scale is, the more seriously the participants rely on mobile social media. Cronbach's α coefficient of the scale this study is 0.937.

2.2.2 Attachment Anxiety

Attachment anxiety was measured by Chinese version [20] of Adult Attachment Scale (AAS) [21], which includes 18 items. Participants use Likert five point scale (1=never, 5=always) to answer these items such as “I find it easier to get close to people.” “I found that when I needed help, no one would help me.” AAS includes three sub scales: anxiety, intimacy and dependence .According to the scores from AAS, attachment can be divided into four types: safety, preemption, rejection and fear. Cronbach’s α coefficient for AAS this study is 0.765, and Cronbach’s α coefficient for anxiety sub scale is 0.827.

2.2.3 Sleep Disturbance

Sleep disturbance was measured by the Chinese version [22] of Pittsburgh Sleep Quality Index (PSQI) [23]. The PSQI is used to assess the subjects' sleep quality in the last month, which consists of 19 self-evaluation items and 5 other evaluation items. And the 19th self-rated item and 5 other rated items are not scored. The 18 self-evaluation items can be divided into seven components: subjective sleep quality, the time to fall asleep, bed time, sleep efficiency, sleep disorder, hypnotic drug application and influence on daytime function. Each component is rated with four grades of 0, 1, 2 and 3, and the cumulative score of each component is the total score of PSQI. The higher the total score of the scale, the worse the sleep quality of the participant. The scale score is inversely proportional to sleep quality. Cronbach’s α coefficient for PSQI this study is 0.719.

2.2.4 Data Analyses

In this study, IBM SPSS statistics v23.0 was used for descriptive statistics and relevant statistical analysis of variables and the SPSS macro PROCESS (Hayes, 2003) was used to calculate the mediation effect of attachment anxiety.

3. Results

3.1 Common Method Biases Test

Data collection by self-report method may lead to common method bias. Harman single factor test was used for common method bias test, and exploratory factor analysis was performed for all items of attachment anxiety, mobile phone social media dependence and sleep disturbance. The results exhibited that there were nine factors with an eigenvalue greater than 1, and the cumulative variation explained by the first factor was 28.84%, which was far less than the critical standard of 40%, indicating that there was no common method deviation problem in this study [24].

3.2 Demographical and Characteristics of the Participants

There were 282 male and 205 female participants, accounting for 57.9% and 42.1% of the total number of participants, respectively. And then, 50.1% of the participants were born in urban (N=244), 21.4% of the participants were born in suburban (N=104) and 28.5% of the participants were born in rural (N=139). In addition to the information, the study also examined the participants' family economic level and their parents’ educational level, etc. The relevant data is described in Table 1.

3.3 Conditional Process Analysis

In this study, independent sample T-test was used to compare the gender differences in various variables, and analysis of variance was used to compare the differences in various variables in region of birth, family economic level and parents' educational level. The results are shown in Table 2.

Table 1 Demographic and Characteristics of the Sample

Age(M;SD)	18.19	0.829
	N	%
Gender		
male	282	57.9
female	205	42.1
Region of birth		
urban	244	50.1
suburban	104	21.4
rural	139	28.5
Family's economic level		
very well	3	0.6
well	81	16.6
common	281	57.7
bad	105	21.6
very bad	17	3.5
Mother's educational level		
master or above	10	2.1
university education	195	40
high school	62	12.7
middle school	128	26.3
elementary school	72	14.8
illiterate	20	4.1
Father’s educational level		
master or above	20	4.1
university education	183	37.6
high school	88	18.1
middle school	141	29
elementary school	48	9.9
illiterate	7	1.4

Table 2 Analysis of Differences in Variables

Variable	Gender		Region of birth		Family economic level		Mother’s educational level		Father’s educational level	
	t	*P*	*F*	*P*	*F*	*P*	*F*	*P*	*F*	*P*
Mobile social media dependence	0.136	0.892	2.852	0.059	0.853	0.492	0.838	0.523	0.906	0.477
Attachment anxiety	-1.200	0.231	0.807	0.447	1.902	0.109	0.911	0.474	0.216	0.956
Sleep disturbance	1.211	0.227	0.592	0.553	1.319	0.262	2.563*	0.027	0.644	0.651

Note.* *P<0.05*

It can be illustrated from Table 2 that there was significant difference in sleep disturbance among the mothers with different levels of education (*F=2.563, P<0.05*). Sleep disturbance, mobile phone social media dependence and attachment anxiety had no significant differences in gender, family economic level, region of birth and father's educational level(P>0.05).

To verify whether attachment anxiety has mediating effect between mobile social media dependence and sleep disturbance, it is necessary to test the correlations between these three variables. This study adapted person correlation analysis by SPSS 23.0, and the result was demonstrated in Table 3.

Table 3 Correlation Analysis Between Variables

Variables	$\bar{x} \pm s$	1	2	3
1.Mobile social media dependence	73.32±16.99	1		
2.Attachment anxiety	18.09±5.01	0.264**	1	
3.Sleep disturbance	5.64±2.44	0.327**	0.258**	1

Note. **P<0.01(two-tailed)

It was obvious from Table 3 that mobile social media dependence was positively correlated with attachment anxiety and sleep disturbance(*r=0.264, P<0.01; r=0.327, P<0.01*), attachment anxiety was positively correlated with sleep disturbance*(r=0.258, P<0.01*).

3.4 Testing for the Mediation Model

This study adapted SPSS macro PROCESS to explore the mediating effect of attachment anxiety in college students' mobile social media dependence and sleep disturbance. In this mediating effect model, mobile social media dependence was regarded as independent variable, sleep disturbance was dependent variable and attachment anxiety was mediating variable. It can be exhibited from Table 2 that mother's educational level had influence on SQ, so mother's educational level was regarded as control variable this study.

In this study, Bootstrap method was used to estimate the 95% confidence interval for 1000 samples to test the mediating effect. When attachment anxiety was regarded as mediation variable, the regression coefficients between independent variable, dependent variable and mediating variable were demonstrated in Table4.

Table 4 Regression Analysis of the Variables in Mediation Model

Regression equation		Global fitting coefficient			Estimated Coefficient	
Outcome variable	Predictor variable	*R*	*R2*	*F*	*β*	*t*
AA	ME	0.265	0.070	18.315	0.019	0.681
	MSMD				0.298	6.022***
SD	ME	0.382	0.146	27.516	0.023	2.009*
	AA				0.076	4.169***
	MSMD				0.132	6.434***

Note: ME =mother's educational level, MSMD = mobile social media dependence, AA=attachment anxiety, SD=sleep disturbance. **P*<0.05,****P*<0.001.

It can be indicated from Table 4 that the overall effect of college students' mobile social media dependence on sleep disturbance was significant, and mobile social media dependence could positively predict sleep disturbance and attachment anxiety((β=0.132,P<0.001;β=0.298,P<0.001). Attachment anxiety can also positively predict sleep disturbance(β=0.076,P<0.001). Mother's educational level can positively predict sleep disturbance (β=0.023,P<0.05)

Table 5 Mediating Effect Analysis

The effect and path way	Effect value	Effect SE	LLCI	ULCI	Relative mediating effect (%)
Direct effect: MSMD→SD	0.132	0.021	0.092	0.173	93.07
Indirect effect: MSMD→AA→SD	0.023	0.007	0.012	0.037	6.93

Note: N = 487, Bootstrap sample size =1000. LL = low limit, CI =confidence interval, UL = dipper limit.

Table5 exhibited the path ways of the direct effect and indirect effect. The direct effect value brought by the path MSMD→SD is 0.132, and 95%CI [0.092, 0.173] does not contain 0, which indicated that this effect is significant. Mobile social media dependence can directly affect sleep disturbance. The effect value of the path MSMD→AA→SD is 0.023 and 95%CI [0.012,0.037] does not contain 0, which indicated that this effect is also significant. Mobile social media dependence can have a direct impact on sleep disturbance, and can also have an indirect impact on sleep disturbance through attachment anxiety. Attachment anxiety plays a partial mediating role between mobile social media dependence and sleep disturbance, and the mediating effect accounts for 6.93% of the total effect.

4. Discussion

In this study, a mediating model was constructed to explore the influence of attachment anxiety as a mediating variable and the mechanism of mobile phone social media dependence affects the sleep quality of college students. We observed that 10.06% of the 487 participants were reached a

severe level of mobile social media dependence and 32.03% of the participants were at a moderate level of dependence. The above phenomenon was consistent with previous studies on that a substantial portion of college students were excessively social networking in smartphones. For example, 33.1% of the 8067 college students had online social media addiction [4], and 35.2% of Chinese college students' mobile social media use were at a moderate to severe dependence level [19].

Moreover, the results of this study also demonstrated that mobile social media dependence was a positive predictor of college students' poor sleep quality, such as difficulty in falling asleep and short sleep time , which was similar to previous studies[11] [25], so H1 was verified. The results of mediation test showed that attachment anxiety played a mediating role in the influence of mobile social media dependence on sleep quality of college students, which was with a relative mediating effect of 6.93%, H4 was verified.

In addition, for early adolescents, the relationships between them and their parents most influence the levels of Facebook addiction, whereas peer relationships are the most relevant for adolescents [26]. There are significant positive relationships between attachment anxiety, loneliness, depression, and smartphone addiction [16]. According to a study of college students, it indicates self-control and attachment anxiety play multiple mediation roles in the relationship between shyness and mobile phone addiction. Attachment anxiety and mobile phone addiction have significant, positive correlations with each other [27]. These conclusions are consistent with the conclusions of this study. There is a significant correlation between social media addiction and attachment anxiety. Moreover, this study also suggested that mobile phone social media dependence can positively predict attachment anxiety, which verified H2.

Previous studies have found that one hundred thirty-one non depressed female hospital workers completed self-report measures of adult attachment, sleep disturbance, depressive symptoms and health outcomes, and the result manifested that attachment insecurity was associated with sleep disturbance [28] .Seventy-seven teachers took part in an experiment that found that people with high attachment anxiety spent more time awake during the night after negative emotional interactions with their spouses. Individuals with low attachment anxiety showed the opposite pattern. The results confirmed the role of attachment orientation and negative communication with a partner in regulating sleep patterns [29]. It can be seen that attachment anxiety has an impact on sleep disturbance, which is consistent with the conclusion of this study. Therefore, attachment anxiety may play a mediating role in sleep problems.H3 was verified.

5. Study Limitation

The limitation of this study is that the samples are freshmen from one university, which may affect the accuracy of the survey results because of the single sampling. Therefore, in the future, we will try to select students from different schools and different grades as samples to carry out the differential study of college students.

6. Conclusion

This study investigated the relationship between college students' mobile social media dependence and sleep disturbance, and introduced attachment anxiety as mediating variable. The results illustrated that mobile social media dependence can not only positively predict sleep disturbance, but also affect sleep disturbance through the mediating effect of attachment anxiety. In the future education work, we should carry out more studies on students' mobile social media dependence and attachment anxiety which are both positive predictors of sleep disturbance. More attention should also be paid to students from mobile social media dependence and family relationships so as to reduce their help them to improve their sleep quality.

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