



College students' social media addiction and sleep problems: Chain mediating effects of fear of missing out and nocturnal social media use

Tingrong Yu¹, Gen Zhang²

¹Student Administration Office, Yunnan Agricultural University, People's Republic of China

²School of Social Science, Universiti Sains Malaysia, Malaysia

How to cite: Yu, T., & Zhang, G. (2023). College students' social media addiction and sleep problems: Chain mediating effects of fear of missing out and nocturnal social media use. *Social Behavior and Personality: An international journal*, 51(6), e12176

This study investigated the effect of social media addiction on sleep problems in college students, and the chain mediating effects in this relationship of fear of missing out and nocturnal social media use. We conducted a survey of 907 college students in China using the Social Media Addiction Scale, the Fear of Missing Out Scale, the Nocturnal Social Media Use Scale, and the Pittsburgh Sleep Index Scale. Results showed that social media addiction significantly and positively predicted poor sleep quality, and that fear of missing out and nocturnal social media use had a chain mediating effect in this relationship. Reducing social media addiction and nocturnal social media use, and developing education-guided measures aimed at reducing fear of missing out will be beneficial to improving the sleep quality of college students.

Keywords

social media addiction, sleep quality, fear of missing out, anxiety, nocturnal social media use, college students

Article Highlights

- We used the chain mediation approach in structural equation modeling to explore the mechanisms between social media addiction, fear of missing out, nocturnal social media use, and poor sleep quality.
- Results demonstrated that social media addiction positively predicted poor sleep quality in college students through the chain mediating effects of fear of missing out and nocturnal social media use.
- Our findings support the theoretical viewpoint of the generation mechanism of fear of missing out in the user–emotion–cognition–behavior theoretical framework and provide a new perspective for further in-depth research.

Sleep is a physiological and psychological cyclical state that is essential for maintaining physical and mental health (Hestetun et al., 2018). Studies have found that the sleep problems of college students are becoming more serious, and the detection rate of sleep disorders is at a high level (Xu et al., 2022). In a survey of 3,522 college students in China, 13.1% were found to have problems with sleep quality (Zhao & Wang, 2022). A study of 631 adolescents between the ages of 12 and 18 years found that 22.9% of the sample reported suicidal ideation and 42% had sleep disturbances, and that those with suicidal ideation had higher rates of sleep disturbance and depression symptoms (Sami et al., 2018). A survey of college students from a medical school in Xinjiang found that 146 of 771 college students had sleep quality problems, accounting for 18.9% of the respondents (Shang et al., 2016). Poor sleep can pose serious threats to college students' physical and mental health and academic life (Dewald et al., 2010; Owen et al., 2014).

Chinese college students in the era of new media increasingly rely on online social media, such as WeChat, QQ, Weibo, Douyin, Kuaishou, Bilibili, and Zhihu, to receive information, share life and learning experiences, and express opinions. According to the *49th Statistical Report on Internet Development in China* released by the China Internet Network Information Center (2022), as of December 2021, the number of internet users in China had reached 1.03 billion, and the internet penetration rate was 73.0%. Among them, 30.6% of Chinese netizens are aged 10–29 years, 99.7% use cell phones to access the internet, and social media applications such as online video and instant messaging rank first in terms of number of users (China Internet Network Information Center, 2022). Studies have pointed out that excessive use of cell phones and social media can lead to higher levels of anxiety and depression, and also have a negative impact on sleep quality (Levenson et al., 2016; Woods & Scott, 2016; C. L. Zhang & Zhou, 2018); therefore, the influence and mechanism of social media on college students' sleep problems deserves further investigation.

Smart mobile terminals, such as smartphones, have been popularized among college students, which is an objective condition promoting social media addiction. Many social media users access Weibo, WeChat, Douyin, Kuaishou, and other such platforms whenever they have time (Z. S. Liu, 2013). Social media addicts experience *finger compulsion*, which means they are always reaching into their pocket for their phone (Z. S. Liu, 2013). Social media platforms with characteristics of simplicity, vividness, and timeliness can meet people's media needs for free and private information acquisition, entertainment, interpersonal interaction, and fingertip learning in a fast-paced life state by using fragmented time, so that more people gradually come to rely on these platforms (Z. S. Liu, 2013; X. Zhang et al., 2019). As one of the main user groups of social media, college students have poor discrimination ability of social media information, weak control over their own behavior, and a proneness to social media addition (Luo & Hu, 2021).

Social media addiction refers to individuals paying too much attention to social media and devoting too much time and energy to these platforms, thereby impairing their physical, psychological, and social functioning (Andreassen & Pallesen, 2014). Sleep disturbance process theory states that sleep problems are caused by cognitive arousal when the brain is very active during sleep as people think, worry, plan, analyze, and solve problems, and have difficulty controlling their thoughts (Lundh & Broman, 2000). Empirical studies have shown that social media addiction can seriously impair individual sleep quality, which triggers inductive fatigue and neurasthenia, and reduces individual performance in achieving goal tasks in daily life (Liu et al., 2022). Social media addiction can affect individual sleep quality and lead to sleep disturbances (Cain & Gradisar, 2010; Hu et al., 2021).

Most previous studies on the factors influencing college students' sleep problems focused only on negative emotions, such as academic, employment, and interpersonal stress; loneliness; and depression (Geng et al., 2014). In contrast, few have explored the mechanism between social media addiction and sleep problems. *Nocturnal social media use* refers to an individual's specific nighttime active use of social media, or passive use at night in response to social media cues (Woods & Scott, 2016). On the one hand, social media addiction may affect nocturnal social media use. Those who are (vs. are not) dependent on social media are more likely to use these platforms at night. During the daytime, college students mainly complete their study tasks and have relatively little free time, while at night they can use social media to meet their psychological needs (Z. S. Liu, 2013). On the other hand, nocturnal social media use can lead to sleep problems. Sleep disturbance process theory postulates that excessive emotional arousal can cause excitation of neurons in the brain and interfere with the sleep process (Liu et al., 2022). Studies have found that nocturnal social media use produces cognitive and emotional arousal that can lead to sleep problems (Hu et al., 2021; Scott & Woods, 2018; Woods & Scott, 2016).

Fear of missing out refers to diffuse anxiety caused by individuals worrying about missing novel experiences or positive events experienced by others (Casale et al., 2018). With the advancement of networking and intelligence, anxiety about missing out will become increasingly common. People dependent on social media are accustomed to paying attention to messaging updates at any time, prone to fearing missing out, and willing to sacrifice sleep time, so they passively use social media at night (Scott et al., 2019). Studies have shown that people who frequently use social media experience higher levels of fear of missing out (Y. L. Zhang et al., 2021). Fear of missing out has a positive impact on social media addiction: the stronger is this fear, the higher is the likelihood of developing a social media addiction (Y. Liu, 2020). People may replace sleep with social media use due to expectations and fear of missing out (Cain & Gradisar, 2010; Scott et al., 2019).



The interaction of person–affective–cognition–execution (I-PACE) theoretical model framework proposed by Brand et al. (2016) analyzes the influencing factors and elaborates on the interaction relationship of social media users' fear of missing out. We used the I-PACE model to explore the relationships between the internal emotional change, cognition, and external performance behavior of social media users who experience fear of missing out. Our findings will provide theoretical and practical guidance for research on the psychological behavior of individuals with social media addiction. Accordingly, this study proposed the following hypotheses:

Hypothesis 1: College students' social media addiction will be positively associated with their sleep problems.

Hypothesis 2: Fear of missing out will mediate the relationship between college students' social media addiction and sleep problems.

Hypothesis 3: Nocturnal social media use will mediate the relationship between college students' social media addiction and sleep problems.

Hypothesis 4: Fear of missing out and nocturnal social media use will play a chain mediating role in the relationship between college students' social media addiction and sleep problems.

Method

Participants and Procedure

We distributed 920 questionnaires to randomly selected college students from five universities in China and recovered 907 valid forms (rate of return = 98.59%). There were 482 men and 425 women in the sample, all of whom used social media (e.g., WeChat, QQ, Weibo, Douyin, Bilibili, Zhihu, Kuaishou). In terms of grade distribution, there were 221 freshmen, 127 sophomores, 236 juniors, and 323 seniors. In terms of study major, there were 554 people in science and engineering, 285 in agriculture and forestry, 28 in liberal arts, 28 in arts and sports, 11 in economics and management, and one in medicine. This study conformed to the ethical principles of Universiti Sains Malaysia and the participants gave informed consent to take part in the investigation.

Measures

We used the existing Chinese versions of all measures for data collection in this study.

Social Media Addiction Scale

We adopted the measure of social networking site addiction compiled by Milošević-Đorđević and Žeželj (2014) and the Weibo addiction scale for assessing college students that was compiled by Z. S. Liu (2013), and revised these to fit the purpose of this study. The revised scale we used includes six items: "I constantly refresh Weibo, expecting new messages or notifications," "I sometimes sleep a lot less than normal because I'm spending more time on social media," "Sometimes I have the impression that I have two lives: one private and the other virtual," "I'd rather spend an afternoon or evening on social media than spend that time on any other activity," "I feel uncomfortable, anxious, and uneasy when I can't use social media," and "I often temporarily interrupt ongoing study work or escapism tasks by using social media to alleviate negative emotions." Items are rated on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*, where the higher the score, the greater is the degree of social media addiction and disruption to the individual's life. Cronbach's alpha in this study was .98.

Fear of Missing Out Scale

We measured fear of missing out with the scale developed by Q. Qi et al. (2019), which includes two factors: fear of missing information and fear of missing situations. There are eight items (e.g., "I am afraid that other people have more wonderful online experiences and gains than I do" and "Having fun and sharing online what happens in my life is important to me"). Items are rated on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*, where a higher overall score represents a higher level of individual anxiety about missing out (Q. Li et al., 2019). Cronbach's alpha in this study was .97.

Nocturnal Social Media Use Scale

The Nocturnal Social Media Use Scale was developed by Woods and Scott (2016). It includes seven items (e.g., “I feel restless and empty when I can’t use social media on my phone at night” and “I often have no clear purpose in using social media on my phone at night, but it is difficult to stop”). Items are rated on a 6-point Likert scale ranging from 1 = *very inconsistent* to 6 = *very consistent*. The higher the score, the more often the individual actively uses social media before going to bed or passively uses social media after being awakened by a notification sound. Cronbach’s alpha in this study was .98.

Pittsburgh Sleep Quality Index Scale

We measured sleep problems with the Pittsburgh Sleep Quality Index Scale (Buysse et al., 1989), translated into Chinese by X. C. Liu et al. (1996), which assesses seven components of sleep quality: subjective sleep quality, sleep onset time, sleep duration, sleep efficiency, sleep disturbance, hypnotic medication, and daytime dysfunction. There are 18 self-assessed items in this scale (e.g., “In the last month, have you been troubled by the following conditions affecting your sleep, and, if so, to what extent?” and “In the last month, how many hours per night did you sleep?”). Response options vary for each question and the cumulative score for each component represents the total score for sleep quality. The higher the score, the worse is the sleep quality (X. C. Liu et al., 1996; Wang et al., 1999). Cronbach’s alpha in this study was .75.

Data Analysis

We used SPSS 25.0 to calculate descriptive statistics for each variable and test the reliability of the scales. Correlations between variables were determined by Pearson correlation analysis, then Model 6 of the SPSS PROCESS macro was used to estimate the model of this study, with $p < .05$ considered statistically significant.

Results

Descriptive Statistics

Before performing correlation analysis and model estimation, descriptive statistics for each variable are required. Table 1 shows that the degree of addiction to social media and the frequency of nighttime social media use of the research participants were relatively high. Students also had a high level of fear of missing out, as well as poor sleep quality.

Table 1. *Descriptive Statistical Analysis Results for Study Variables*

Variables	<i>N</i>	Min.	Max.	<i>M</i> ± <i>SD</i>
Social media addiction	907	1.00	5.00	4.06 ± 1.25
Fear of missing out	907	1.00	5.00	3.59 ± 1.39
Nocturnal social media use	907	1.00	5.00	3.76 ± 1.28
Sleep quality	907	3.00	21.00	14.21 ± 5.76

Correlation Analysis Between Variables

Next, we explored the preliminary relationships between the variables. Pearson product-difference correlation test results are shown in Table 2.

Table 2 shows that there were significant positive correlations between social media addiction and fear of missing out, between social media addiction and nocturnal social media use, and between social media addiction and poor sleep quality. Further, there were significant positive correlations between fear of missing out and nocturnal social media use, between fear of missing out and poor sleep quality, and between nocturnal social media use and poor sleep quality.

These results indicated that structural equation modeling could be used to further explore the relationships between the study variables.

Table 2. Correlation Analysis Results Between Variables

	1	2	3	4
1. Social media addiction	1			
2. Fear of missing out	.53**	1		
3. Nocturnal social media use	.63**	.55**	1	
4. Sleep quality	.71**	.72**	.64**	1

Note. ** $p < .01$.

Chain Mediating Test of Fear of Missing Out and Nocturnal Social Media Use

We conducted a bias-corrected percentile bootstrapping analysis with 5,000 repeated samples to estimate the chain mediating effects of fear of missing out and nocturnal social media use in the relationship between social media addiction and poor sleep quality. The results are shown in Figure 1 and Table 3. Social media addiction had a significant positive predictive effect on poor sleep quality. Fear of missing out mediated the relationship between social media addiction and poor sleep quality, with an effect size of .23, 95% confidence interval (CI) [0.19, 0.26]. Nocturnal social media use mediated the relationship between social media addiction and poor sleep quality, with an effect size of .07, 95% CI [0.05, 0.10]. Fear of missing out and nocturnal social media use had a chain mediating effect on the relationship between social media addiction and poor sleep quality, with an effect size of .03, 95% CI [0.02, 0.04].

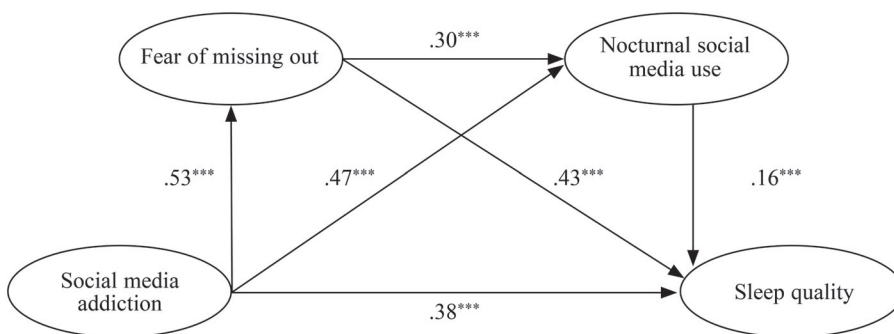


Figure 1. Model Diagram of the Chain Mediating Effect of Fear of Missing Out and Nocturnal Social Media Use

Note. *** $p < .001$.

Table 3. Results of Bootstrapped Mediation Effects Test

Path	Mediating effect	95% CI	
		LL	UL
Social media addiction → Fear of missing out → Poor sleep quality	.23	0.19	0.26
Social media addiction → Nocturnal social media use → Poor sleep quality	.07	0.05	0.10
Social media addiction → Fear of missing out → Nocturnal social media use → Poor sleep quality	.03	0.02	0.04

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Discussion

This study examined the relationships between social media addiction, fear of missing out, nocturnal social media use, and poor sleep quality. The results showed that fear of missing out and nocturnal social media use played a chain mediating role in the influence of social media addiction on sleep quality among college students. Our quantitative study based on the I-PACE theoretical model supported the relationships between person, affective regulation, cognitive control, and behavioral feedback from the perspective of sleep problems caused by social media addiction. The results will provide solutions and practical guidance for intervening in college students' social media addiction and fear of missing out.

Direct Impact of Social Media Addiction on Sleep Quality

We found that social media addiction positively predicts sleep problems, which supported Hypothesis 1. Social media addiction has a significant, direct effect on sleep problems, indicating that the higher the degree of social media addiction of college students, the more likely they are to have sleep problems. This is consistent with previous research results (Hu et al., 2021; Levenson et al., 2016) and supports the idea of sleep disturbance process theory. College students who rely on social media may be immersed in it because continuous use means they are constantly thinking about the content they have watched and planned to publish, causing cognitive arousal, disturbing their sleep, and even inducing eye fatigue and other adverse effects (Y. L. Zhang et al., 2020). This is consistent with previous study findings that stress perception negatively affects sleep quality through the mediator of cognitive arousal (X. Y. Li et al., 2019).

The Mediating Effect of Fear of Missing Out in the Relationship Between Social Media Addiction and Sleep Problems

Fear of missing out plays a partial mediating role in the relationship between social media addiction and sleep problems. Social media addiction directly predicts sleep disturbances and also indirectly predicts sleep disturbances through fear of missing out, which supported Hypothesis 2. When college students use social media, they are stimulated by the content, which awakens their addiction and causes them to experience fear of missing out. These factors promote excessive use of social media, resulting in late sleep time and poor sleep quality. These findings are consistent with previous research results and support the theoretical view of person–affective–cognitive–execution generating fear of missing out in the framework of the I-PACE model (Y. L. Zhang et al., 2021).

The Mediating Effect of Nocturnal Social Media Use in the Relationship Between Social Media Addiction and Sleep Problems

Social media addiction indirectly predicts sleep disturbance through nocturnal social media use, such that nocturnal social media use plays a partial mediating role, supporting Hypothesis 3. Specifically, people who are addicted to social media have poor sleep quality because of their nocturnal social media use, which is consistent with previous research results (Hu et al., 2021; Scott & Woods, 2018; Woods & Scott, 2016). These results validate the idea of self-control resources and compensatory psychology, revealing that nocturnal social media use has a transitive role between social media addiction and sleep problems. If social media use is insufficient during the day, compensatory psychology (Hu et al., 2021) means users who are addicted to these platforms will continue to use social media at night due to fear of missing out (Scott et al., 2019), which, in turn, is more likely to cause sleep problems. At the same time, our findings confirm the theory of the sleep disturbance process, where social media use replaces sleep through cognitive and emotional arousal (Cain & Gradisar, 2010). Therefore, nocturnal social media use by college students negatively affects their sleep, and the higher the level of their social media use at night, the more serious are their sleep problems.

Chain Mediating Effects of Fear of Missing Out and Nocturnal Social Media Use in the Relationship Between Social Media Addiction and Sleep Problems

Recent studies have shown that nocturnal social media use plays a partial mediating role in the effect of short video social media addiction on sleep disorders (Hu et al., 2021), and that fear of missing out plays a partial mediating role in the relationship between social media addiction and sleep disorders (H. P. Liu et al., 2022). Our study further found that social media addiction can predict sleep problems through the chain mediating effect of fear of missing out and nocturnal social media use, which supported Hypothesis 4. College students with social media addiction experience stress, self-blame, disseminated anxiety, and other negative emotions due to the fear of missing out (Y. L. Zhang et al., 2020). To alleviate this fear they may use social media at night, which affects their sleep quality, resulting in physical and mental exhaustion. Our findings show that reducing fear of missing out helps drive individual cognitive control to strengthen decision making and behavioral control. Therefore, it is particularly important to alleviate social media addiction by improving self-control.

Limitations and Future Research Directions

This study has some limitations. First, although the research hypotheses were confirmed, our participants comprised only college students. In the future, cross-lagged model analysis could be used to conduct longitudinal tracking research on different age and occupation groups to increase the generalizability of the results and allow for interpretation of the causal relationships between variables. Second, there is room for further research and improvement in the application of the measures of nighttime social media use, fear of missing out, social media addiction, and sleep quality in different groups. Future studies could focus on the standardization of measurement tools to more accurately grasp the relationship between social media addiction and sleep problems, and the underlying variables influencing this link.

Acknowledgments

The data that support the findings of this study are available on request from the corresponding author.

References

- Andreassen, C. S., & Pallesen, S. (2014). Social network site addiction - An overview. *Current Pharmaceutical Design*, 20(25), 4053–4061.
<https://doi.org/10.2174/13816128113199990616>
- Buysse, D. J., Reynolds, C. F., III, Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, 28(2), 193–213.
[https://doi.org/10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4)
- Brand, M., Young, K. S., Laier, C., Wöfling, K., & Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An interaction of person-affect-cognition-execution (I-PACE) model. *Neuroscience & Biobehavioral Reviews*, 71, 252–266.
<https://doi.org/10.1016/j.neubiorev.2016.08.033>
- Cain, N., & Gradisar, M. (2010). Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Medicine*, 11(8), 735–742.
<https://doi.org/10.1016/j.sleep.2010.02.006>
- Casale, S., Rugai, L., & Fioravanti, G. (2018). Exploring the role of positive meta cognitions in explaining the association between the fear of missing out and social media addiction. *Addictive Behaviors*, 85, 83–87.
<https://doi.org/10.1016/j.addbeh.2018.05.020>
- China Internet Network Information Center. (2022, February 25). *The 49th statistical report on internet development in China*.
<https://bit.ly/3O4xA5w>

- Dewald, J. F., Meijer, A. M., Oort, F. J., Kerkhof, G. A., & Bögels, S. M. (2010). The influence of sleep quality, sleep duration and sleepiness on school performance in children and adolescents: A meta-analytic review. *Sleep Medicine Reviews, 14*(3), 179–189.
<https://doi.org/10.1016/j.smrv.2009.10.004>
- Geng, L. G., Xia, C. C., & Sun, G. R. (2014). Analysis of sleep quality and its influencing factors among college students in Xuzhou [In Chinese]. *Chinese School Health, 35*, 1089–1091.
<https://doi.org/10.16835/j.cnki.1000-9817.2014.07.049>
- Hestetun, I., Svendsen, M. V., & Oellingrath, I. M. (2018). Sleep problems and mental health among young Norwegian adolescents. *Nordic Journal of Psychiatry, 8*, 578–585.
<https://doi.org/10.1080/08039488.2018.1499043>
- Hu, W., Jiang, Y. H., Wang, Q., & Wang, N. (2021). The relationship between short video social media addiction and college students' sleep disorders: The mediating effects of nocturnal social media use and gender differences [In Chinese]. *Chinese Journal of Clinical Psychology, 29*, 46–50.
<https://doi.org/10.16128/j.cnki.1005-3611.2021.01.009>
- Levenson, J. C., Shensa, A., Sidani, J. E., Colditz, J. B., & Primack, B. A. (2016). The association between social media use and sleep disturbance among young adults. *Preventive Medicine, 85*, 36–41.
<https://doi.org/10.1016/j.ypmed.2016.01.001>
- Li, Q., Wang, J. N., Zhao, S. Q., & Jia, Y. R. (2019). Validity and reliability of the Fear of Missing Out Scale in evaluating college students [In Chinese]. *Chinese Journal of Mental Health, 33*, 312–317.
<https://bit.ly/3UHPj4I>
- Li, X. Y., Wei, X. Y., & Chen, H. D. (2019). The relationship between stress perception and sleep quality in college students: A two-stage moderated mediation model [In Chinese]. *Chinese Journal of Clinical Psychology, 27*, 351–355.
- Liu, H. P., Sun, H. L., & Wang, H. Q. (2022). The influence of college students' social media addiction tendency on sleep disturbance: The mediating role of fear of missing out [In Chinese]. *Chinese Journal of Clinical Psychology*. Advance online publication.
- Liu, X. C., Tang, M. Q., Hu, L., Wang, A. Z., Wu, H. X., Zhao, G. F., & Li, W. S. (1996). The reliability and validity of the Pittsburgh Sleep Quality Index [In Chinese]. *Chinese Journal of Psychiatry, 29*, 103–107.
- Liu, Y. (2020). Motivation to use, fear of missing out and social media addiction: A comparative study in normal society and crisis situations [In Chinese]. *Journalism and Writing, 10*, 57–67.
- Liu, Z. S. (2013). Research on social media addiction and media demand—Taking college students' Weibo addiction as an example [In Chinese]. *News University Science, 1*, 119–129.
- Lundh, L.-G., & Broman, J.-E. (2000). Insomnia as an interaction between sleep-interfering and sleep-interpreting processes. *Journal of Psychosomatic Research, 49*(5), 299–310.
[https://doi.org/10.1016/S0022-3999\(00\)00150-1](https://doi.org/10.1016/S0022-3999(00)00150-1)
- Luo, X., & Hu, C. N. (2021). The mediating role of loneliness in the relationship between college students' sleep problems and dependence on mobile social media [In Chinese]. *Chinese Journal of Health Psychology, 5*, 776–781.
<https://doi.org/10.13342/j.cnki.cjhp.2021.05.028>
- Milošević-Đorđević, J. S., & Žeželj, I. L. (2014). Psychological predictors of addictive social networking sites use: The case of Serbia. *Computers in Human Behavior, 32*, 229–234.
<https://doi.org/10.1016/j.chb.2013.12.018>
- Owens, J., Adolescent Sleep Working Group, Committee on Adolescence, Au, R., Carskadon, M., Millman, R., ... O'Brien, R. F. (2014). Insufficient sleep in adolescents and young adults: An update on causes and consequences. *Pediatrics, 134*(3), e921–e932.
<https://doi.org/10.1542/peds.2014-1696>

- Sami, H., Danielle, L., Lihi, D., & Elena, S. (2018). The effect of sleep disturbances and internet addiction on suicidal ideation among adolescents in the presence of depressive symptoms. *Psychiatry Research*, *267*, 327–332. <https://doi.org/10.1016/j.psychres.2018.03.067>
- Scott, H., Biello, S. M., & Woods, H. C. (2019). Identifying drivers for bedtime social media use despite sleep costs: The adolescent perspective. *Sleep Health*, *5*(6), 539–545. <https://doi.org/10.1016/j.sleh.2019.07.006>
- Scott, H., & Woods, H. C. (2018). Fear of missing out and sleep: Cognitive behavioural factors in adolescents' nocturnal social media use. *Journal of Adolescence*, *68*(1), 61–65. <https://doi.org/10.1016/j.adolescence.2018.07.009>
- Shang, X., Zhang, Y., & Yang, X. Y. (2016). Investigation and analysis of the sleep situation of college students in medical colleges—Taking Xinjiang Medical University as an example. *Journal of Xinjiang Medical University*, *39*, 243–246.
- Wang, X. D., Wang, X. L., & Ma, H. (1999). *Manual of Mental Health Rating Scale*. China Mental Health Journal Press.
- Woods, H. C., & Scott, H. (2016). #Sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *Journal of Adolescence*, *51*(1), 41–49. <https://doi.org/10.1016/j.adolescence.2016.05.008>
- Xu, M. M., Zheng, C. H., & Chen, Y. P. (2022). Effects of cyclic resistance training on sleep quality and psychological status of college students with primary sleep disorders. *Applied Preventive Medicine*, *2*, 226–229.
- Zhang, C. L., & Zhou, Z. K. (2018). The relationships between passive social networking site use, social anxiety, rumination thinking, and adolescent depression: A moderated mediation analysis [In Chinese]. *Chinese Journal of Clinical Psychology*, *26*, 490–493 + 497. <https://doi.org/10.16128/j.cnki.1005-3611.2018.03.016>
- Zhang, X., Wu, Y., & Liu, S. (2019). Exploring short-form video application addiction: Socio-technical and attachment perspectives. *Telematics and Informatics*, *42*, Article 101243. <https://doi.org/10.1016/j.tele.2019.101243>
- Zhang, Y. L., Chen, Y. M., Jin, J. J., & Yu, G. L. (2021). The relationship between fear of missing out and social media addiction: A cross-lagged analysis [In Chinese]. *Chinese Journal of Clinical Psychology*, *29*, 1082–1085. <https://doi.org/10.16128/j.cnki.1005-3611.2021.05.039>
- Zhang, Y. L., Li, S., & Yu, G. L. (2020). The relationship between fear of missing out and cognitive failure in college students: The mediating role of mobile social media dependence [In Chinese]. *Chinese Journal of Clinical Psychology*, *1*, 67–70 + 81. <https://doi.org/10.16128/j.cnki.1005-3611.2020.01.016>
- Zhao, Y. Y., & Wang, B. (2022). Effects of nocturnal intermittent hypoxia on the sleep quality of college students [In Chinese]. *Journal of Shanxi University (Natural Science Edition)*, *45*, 480–486. <https://doi.org/10.13451/j.sxu.ns.2021097>