

Social Media Overuse and Anxiety among Chinese University Students: The Mediating Role of Perceived Stress

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Abstract. With the development of social media applications, the use of social media is increasing among college students. Previous research has demonstrated the negative impacts of social media overuse on students' mental health. While social media overuse has been regarded as a potential cause for anxiety, little is known about its underlying mechanisms. Therefore, this study aims to examine whether perceived stress mediated the relationship between social media overuse and anxiety. 358 Chinese college students completed anonymous questionnaires. These questionnaires measured social media usage, perceived stress, and anxiety. The results showed that (1) social media overuse positively predicts stress and anxiety; (2) no gender difference was found in the correlations between social media overuse, perceived stress and anxiety (3) perceived stress partially mediated the association between social media overuse and anxiety. This study can improve our understanding of how social media overuse relates with students' well-being.

Keywords: Social media overuse; perceived stress; anxiety.

1. Introduction

According to the Global Web Index, about 4.7 billion people are social media users and the average usage is more than 2 hours a day. For young people, social media has evolved into an indispensable medium for information sharing and interpersonal interaction [1].

Previous research has demonstrated that social media can be both advantageous and harmful [2]. On the one hand, people who use social media more frequently tend to report higher self-esteem and perceived social support levels [3]. Conversely, social media usage is also linked with social isolation, anxiety and depression. Although the complex mechanism behind the impact of social media is still being explored, social media overuse is reported to be negatively correlated with the psychological well-being of college students [4, 5].

Social media refers to the various online platforms which enable people to communicate with each other as well as share ideas, thoughts and information [6]. Several terms have been used by researchers to describe the maladaptive social media usage pattern, such as social media addiction, disordered social media use and social media overuse. In the current study, "social media overuse" was adopted to define the excessive usage of social media.

1.1 Social Media Overuse and Anxiety

Anxiety refers to feelings of fear, dread, and uneasiness that may occur in reaction to stress, and the symptoms of which include tension, worry and physiological alterations [7, 8]. Anxiety is proven to be closely linked with addictive behaviors such as gambling and substance abuse. [9, 10].

The influence of social media overuse on overall anxiety levels is mainly reflected in social anxiety and attachment anxiety. It is found that social anxiety is positively related to social media overuse [11]. Research also suggests attachment anxiety has a significant correlation with social media usage [12]. Specifically, attachment anxiety is related with psychological well-being which is also related with social media overuse. Another type of anxiety that influences social media usage is social appearance anxiety. People with greater social appearance anxiety have a higher tendency to use social media [13]. One explanation for this phenomenon is that interaction via social media can reduce people's anxiety levels, compared to face-to-face interaction. Therefore, people with social appearance anxiety tend to overuse social media.

In addition, recent research suggests that while social media predicts anxiety levels, this relationship is mediated by psychological capital [14]. Furthermore, social anxiety can be a partial mediator of the association between social media overuse and phubbing [15].

Social media usage has, on the one hand, a buffering effect on anxiety as it can promote a positive perception towards stressors and help people build and maintain interpersonal relationships [16]. On the other hand, similar to abstinence syndrome, people who overuse social media tend to experience anxiety when they cannot access the internet [17].

1.2 Social Media Overuse and Perceived Stress

Stress refers to a feeling of emotional or physical tension [18]. Previous research has demonstrated that perceived stress is connected with the overuse of social media [19]. This is because while social media usage can result in increased stress levels and negative emotions, it can also be a coping mechanism for managing distress, bringing social support and pleasant feelings to users [20]. Therefore, when people face negative emotions and stress, some of them will try to escape from these negative states by using social media [21,22]. As frequent and active use of social media can foster its overuse, a negative reinforcement cycle is created, which continually increases perceived stress level [23].

It has been demonstrated that social media overuse predicts perceived stress and that stress could be induced by social media overuse. To begin with, the overuse of social media may lead to perceived information overload, which is associated with perceived stress [24]. Then, social media overuse also means a higher likelihood of excessive exposure to negative information which may trigger negative emotions and stress. Furthermore, when people want to withdraw from the overuse of social media, the process of withdrawal itself can result in increased stress levels, which is similar to abstinence reactions. [25].

1.3 Perceived Stress and Anxiety

Research has revealed that perceived stress and anxiety have neurobiological links [26]. While perceived stress is typically caused by external triggers, such as assignment deadlines and unemployment, anxiety is the internal reaction to stress. And anxiety is the psychophysiological manifestation of stress. Stress is a common trigger for anxiety. However, perceived stress does not necessarily trigger anxiety, and this depends on various factors such as cognition and coping strategies [27]. Past studies indicate that, among college students, perceived stress is significantly correlated with anxiety. In addition, this correlation is influenced by students' coping strategies [28].

1.4 The Current Study

It has been found that anxiety and stress levels are higher among college students than in the general population [29]. Based on the aforementioned information, perceived stress and anxiety are associated with social media overuse. Students try to relieve stress and anxiety through social media, yet social media is also a source of stress and anxiety. Therefore, exploring the relationship among social media overuse, perceived stress and anxiety can contribute to the research field of psychological well-being of college students.

While many studies have explored correlations among social media overuse, perceived stress and anxiety, there has been little research exploring the mediating role of perceived stress. The purpose of the present study is to fill the research gap by examining the mediating role of perceived stress in the relationship between social media overuse and anxiety among Chinese college students. It is hypothesized that (1) social media overuse positively predicts perceived stress and anxiety; (2) perceived stress plays a mediating role in the relationship between social media overuse and anxiety.

2. Method

2.1 Participants

A total of 358 Chinese college students (mean = 21.54 years, SD = 6.28; 43% males, 56.7% females, 0.3% prefer not to say) were recruited in this study. Among them, 81.6% were undergraduates and 18.4% were postgraduates. These participants are recruited via opportunity sampling. The survey was conducted on the Wenjuanxing, an online questionnaire platform, between September 3rd and September 7th. Participation was voluntary and anonymous. Student consent for participation was obtained. Meanwhile, participants could withdraw from the study whenever they wished. After finishing the questionnaire, the contact information was provided in case there were some contact needs.

2.2 Measures

An online-based self-report questionnaire was used for data collection, including the Bergen Social Media Addiction Scale (BSMAS), the Perceived Stress Scale (PSS-10), and the Beck Anxiety Inventory (BAI). All questions were translated into simplified Chinese. The questionnaire also requested basic personal details such as age, level of education.

Social media overuse. The BSMAS was used to assess social media overuse [30]. The situation of BSMAS was revised from Facebook to social media. Participants answered 6 items on a 5-point Likert scale ranging from 1 (very rarely) to 5 (very often). The total score of BSMAS ranges from 6-30, with higher scores indicating a higher level of social media usage. Cronbach's α of the current study was 0.75.

Perceived stress. Perceived stress was measured by the PSS-10 [31], which assessed participants' perceived stress levels. Participants answered 10 items on a 5-point scale ranging from 0 (never) to 4 (very often). Scores for each item were added up to get total scores, with higher total scores indicating higher perceived stress. Cronbach's α of PSS-10 in the current study was 0.60.

Anxiety. Anxiety was measured by the BAI [32]. The BAI was translated into Mandarin and this Chinese version BAI was proved to have good internal consistency and reliability [33]. The BAI consisted of 21 items (e.g., "feeling of choking" and "unable to rest") that participants answered in a 4-point scale ranging from 0 (not at all) to 3 (severely). The total score was calculated by adding all responses and higher BAI total scores indicated higher severity of anxiety [34]. Cronbach's α of the current study was 0.93.

2.3 Data analysis

Descriptive statistics, independent t-test, Pearson correlations and mediating effect analysis were conducted using SPSS 22.0, with the PROCESS Macro version 4.1, also, model four (Bootstrap = 5000) was used to analyze the data. Meanwhile, in the mediating effect analysis, Baron and Kenny's [35] approach was conducted.

3. Results

3.1 Descriptive Statistics

The mean of social media overuse is 18.63 (SD = 4.67). The mean of perceived stress is 20.68 (SD = 4.59). And the mean of anxiety is 15.46 (SD = 11.35). The independent-samples t test showed that there were no significant gender differences in social media overuse, perceived stress and anxiety ($p > .05$).

Table 1. Gender difference of social media overuse, perceived stress and anxiety.

	Male (n = 154)		Female (n = 203)		<i>t</i>	<i>p</i>
	M	SD	M	SD		
SMO	18.75	4.94	18.55	4.47	.40	.687
Perceived Stress	20.77	4.78	20.63	4.47	.30	.765
Anxiety	16.01	11.42	14.96	11.26	.87	.385

3.2 Correlation Analysis

The results of correlation analysis were shown in Table 2. It can be found that social media overuse was positively correlated with perceived stress and anxiety significantly. In addition, perceived stress is positively correlated with anxiety significantly.

Table 2. The Pearson correlation of main variables

	1	2	3	4	5
1 Age	-				
2 Gender	0.12*	-			
3 Social media overuse	-0.13*	-.29	-		
4 Perceived stress	-0.12*	-.02	0.49***	-	
5 Anxiety	.02	-.03	.34***	.35***	-

Notes: * $p < .05$, *** $p < .001$.

3.3 The Mediation Effect of Perceived Stress

Then, the mediation analysis was performed. Based on Baron and Kenny's [35] causal steps method, the regression of social media overuse on perceived stress was significant ($\beta = .49, p < .001$), and the regression of social media overuse ($\beta = .22, p < .001$) and perceived stress ($\beta = .25, p < .001$) on anxiety were also significant (see Figure 1). The indirect effect (.08) of perceived stress accounted for 33% of the total effect (.24) of social media overuse on anxiety with a bootstrap 95% confidence interval without 0, which indicated that the relationship between social media overuse and anxiety is partially mediated by perceived stress (see Table 3).

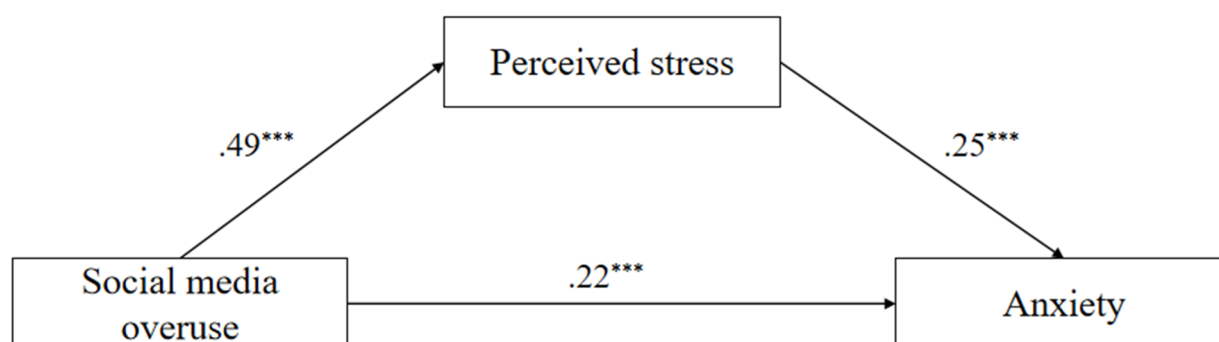


Figure 1. The mediating effect of perceived stress (** $p < .001$)

Table 3. Total, direct, and indirect effects of social media overuse on anxiety

	effect size	se	<i>t</i>	<i>p</i>	Lower (Bootstrap) 95% CI	Upper (Bootstrap) 95% CI
Total effect	.24	.03	6.79	< .001	.167	.303
Direct effect	.15	.04	3.89	< .001	.074	.227
Indirect effect of perceived stress	.08	.02			.044	.130

4. Discussion

The present study found that males and females reported social media overuse, anxiety and perceived stress at similar levels. However, Müller et al. [36] suggested that males tended to report a higher internet addiction rate than females. A possible explanation was that while males exhibit higher internet addiction than females, this addiction was largely explained by video game addiction. In other words, males had a higher tendency for online games addiction than females, but they were also less prone to social media addiction [37].

Previous research also indicated that females tended to suffer more stress and anxiety than males, which was inconsistent with the results of the current research [38, 39]. Several factors may explain this inconsistency. Firstly, all participants in the current study were college students whose age and social identity were different to the overall population. Secondly, all participants were from Chinese cultural backgrounds. The cultural differences may influence people's cognition and further influence levels of perceived stress and anxiety.

The results showed that social media overuse significantly positively predicted perceived stress and anxiety, which was in line with the hypotheses and the aforementioned studies [14, 24]. Also, perceived stress positively predicts anxiety, which was consistent with the hypothesis.

The results indicated that college students who overused social media tended to show higher anxiety levels, which may have implications for how to improve students' well-being.

In the research conducted by Malaeb et al. [40], anxiety and perceived stress was predicted by social media overuse. Together with findings in the current study, it is possible that there is a reciprocal relationship between social media overuse and anxiety.

Another finding was that perceived stress partially mediated the relationship between social media overuse and anxiety. Specifically, while social media overuse had direct impacts on anxiety, social media overuse also indirectly impacted anxiety through perceived stress. A possible explanation for this phenomenon was that when students realized they had overused social media, their perceived stress levels might increase as they may feel guilty about wasting too much time on social media. Following this, increased levels of perceived stress may result in increased levels of anxiety. This suggests that cognition is likely to play a role in this relationship.

There are some limitations in this study. Firstly, the results of PSS-10 showed a relatively poor internal reliability, which may be caused by improper translation. Secondly, this study used the cross-sectional study design, which means inability to establish a causal relationship. Future longitudinal research is needed to further explore the underlying mechanism.

Previous studies have explored the relationship among social media overuse, perceived stress and anxiety, but there is a lack of knowledge regarding its underlying mechanism. The current study first examined if the correlations were the same in the sampling population of Chinese college students. Then, the current study performed a mediation analysis to examine the possible mediating role of perceived stress in the relationship between social media overuse and anxiety to better understand the mechanism.

This study has also emphasized that it may be meaningful to investigate the impacts of social media overuse on university students' life satisfaction. Further research is need to explore how cognition, culture and biological factors influence the mediation model.

5. Conclusion

The current study used a web-based survey to explore the relationships among social media overuse, perceived stress and anxiety. The results indicated that perceived stress has a mediating effect on the relationship between social media overuse and anxiety. Further research could investigate the possible reciprocal relationships between anxiety and social media overuse.

References

- [1] Vromen, A., Xenos, M. A., & Loader, B. Young people, social media and connective action: From organisational maintenance to everyday political talk. *Journal of Youth Studies*, 2015, 18(1): 80-100.
- [2] Best, P., Manktelow, R., & Taylor, B. Online communication, social media and adolescent well-being: A systematic narrative review. *Children and Youth Services Review*, 2014, 41: 27-36.
- [3] Gonzales, A. L., Hancock, J. T. Mirror, mirror on my Facebook wall: Effects of exposure to Facebook on self-esteem. *Cyberpsychology, Behavior, and Social Networking*, 2011, 14(1-2): 79-83.
- [4] Boer, M., Van Den Eijnden, R. J., Boniel-Nissim, M., Wong, S.-L., Inchley, J. C., Badura, P., Craig, W. M., Gobina, I., Kleszczewska, D., & Klanšček, H. J. Adolescents' intense and problematic social media use and their well-being in 29 countries. *Journal of Adolescent Health*, 2020, 66(6): S89-S99.
- [5] Mohammed, Q. Q. Association between Social Media Addiction and Life Satisfaction among University Student. *Indian Journal of Public Health Research & Development*, 2020, 11(2).
- [6] Carr, C. T., & Hayes, R. A. Social media: Defining, developing, and divining. *Atlantic journal of communication*, 2015, 23(1): 46-65.
- [7] Akiskal, H. S. Anxiety: Definition, relationship to depression, and proposal for an integrative model. In *Anxiety and the anxiety disorders*, 2019, (pp. 787-798). Routledge.
- [8] Barlow, D. H. *Anxiety and its disorders: The nature and treatment of anxiety and panic*. Guilford press, 2004.
- [9] Kranzler, H. R., & Liebowitz, N. R. Anxiety and Depression in Substance Abuse: Clinical Implications. *Medical Clinics of North America*, 1988, 72(4): 867-885.
- [10] Blaszczynski, A., & McConaghy, N. Anxiety and/or depression in the pathogenesis of addictive gambling. *International Journal of the Addictions*, 1989, 24(4), 337-350.
- [11] Chen, Y., Li, R., Zhang, P., & Liu, X. The moderating role of state attachment anxiety and avoidance between social anxiety and social networking sites addiction. *Psychological reports*, 2020, 123(3): 633-647.
- [12] Worsley, J. D., Mansfield, R., & Corcoran, R. Attachment anxiety and problematic social media use: The mediating role of well-being. *Cyberpsychology, Behavior, and Social Networking*, 2018, 21(9): 563-568.
- [13] Ayar, D., Gerçeker, G. Ö., Özdemir, E. Z., & Bektas, M. The effect of problematic internet use, social appearance anxiety, and social media use on nursing students' nomophobia levels. *CIN: Computers, Informatics, Nursing*, 2018, 36(12): 589-595.
- [14] Jiang, Y. Problematic social media usage and anxiety among university students during the COVID-19 pandemic: The mediating role of psychological capital and the moderating role of academic burnout. *Frontiers in psychology*, 2021, 12, 612007.
- [15] Chu, X., Ji, S., Wang, X., Yu, J., Chen, Y., & Lei, L. Peer phubbing and social networking site addiction: the mediating role of social anxiety and the moderating role of family financial difficulty. *Frontiers in psychology*, 2021, 12.
- [16] Marzouki, Y., Aldossari, F. S., & Veltri, G. A. Understanding the buffering effect of social media use on anxiety during the COVID-19 pandemic lockdown. *Humanities and Social Sciences Communications*, 2021, 8(1): 1-10
- [17] Lozano Blasco, R., Latorre Cosculluela, C., & Quílez Robres, A. Social network addiction and its impact on anxiety level among university students. *Sustainability*, 2020, 12(13): 5397.
- [18] Fink, G. Stress: definition and history. *Stress science: neuroendocrinology*, 2010, 3(9): 319-328.

- [19] Cannito, L., Annunzi, E., Viganò, C., Dell'Osso, B., Vismara, M., Sacco, P. L., Palumbo, R., & D'Addario, C. The Role of Stress and Cognitive Absorption in Predicting Social Network Addiction. *Brain Sciences*, 2002, 12(5): 643.
- [20] Brailovskaia, J., Rohmann, E., Bierhoff, H.-W., Schillack, H., & Margraf, J. The relationship between daily stress, social support and Facebook Addiction Disorder. *Psychiatry research*, 2019, 276: 167-174.
- [21] McNicol, M. L., & Thorsteinsson, E. B. Internet addiction, psychological distress, and coping responses among adolescents and adults. *Cyberpsychology, Behavior, and Social Networking*, 2017, 20(5): 296-304.
- [22] Brailovskaia, J., Schillack, H., & Margraf, J. Tell me why are you using social media (SM)! Relationship between reasons for use of SM, SM flow, daily stress, depression, anxiety, and addictive SM use—An exploratory investigation of young adults in Germany. *Computers in Human Behavior*, 2020, 113, 106511.
- [23] Zhao, N., & Zhou, G. COVID-19 stress and addictive social media use (SMU): Mediating role of active use and social media flow. *Frontiers in Psychiatry*, 2021, 12, 635546.
- [24] Misra, S., Roberts, P., & Rhodes, M. Information overload, stress, and emergency managerial thinking. *International Journal of Disaster Risk Reduction*, 2020, 51, 101762.
- [25] Tams, S., Legoux, R., & Léger, P.-M. Smartphone withdrawal creates stress: A moderated mediation model of nomophobia, social threat, and phone withdrawal context. *Computers in Human Behavior*, 2018, 81: 1-9.
- [26] Daviu, N., Bruchas, M. R., Moghaddam, B., Sandi, C., & Beyeler, A. Neurobiological links between stress and anxiety. *Neurobiology of stress*, 2019, 11, 100191.
- [27] Spielberger, C. D., Sarason, I. G., Strelau, J., & Brebner, J. M. *Stress and anxiety*. Taylor & Francis, 2014.
- [28] Balaji, N. K., Murthy, P., Kumar, D. N., & Chaudhury, S. Perceived stress, anxiety, and coping states in medical and engineering students during examinations. *Industrial Psychiatry Journal*, 2019, 28(1): 86.
- [29] Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal of affective disorders*, 2013, 148(1): 1-11.
- [30] Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. Development of a Facebook addiction scale. *Psychological reports*, 2012, 110(2): 501-517.
- [31] Cohen, S., Kamarck, T., & Mermelstein, R. A global measure of perceived stress. *Journal of health and social behavior*, 1983: 385-396.
- [32] Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. An inventory for measuring clinical anxiety: Psychometric properties. *Journal of consulting and clinical psychology*, 1988, 56(6): 893-897.
- [33] Cheng, S. K.-W., Wong, C.-W., Wong, K.-C., Chong, G. S.-C., Wong, M. T.-P., Chang, S. S.-Y., Wong, S.-Y., Chan, C. K.-Y., & Wu, K.-O. A study of psychometric properties, normative scores, and factor structure of the Beck Anxiety Inventory--the Chinese version. *Chinese Journal of Clinical Psychology*, 2002, 10(1): 4-6.
- [34] Halfaker, D. A., Akeson, S. T., Hathcock, D. R., Mattson, C., & Wunderlich, T. L. 3 - Psychological Aspects of Pain. In T. A. Lennard, S. Walkowski, A. K. Singla, & D. G. Vivian (Eds.), *Pain Procedures in Clinical Practice (Third Edition)*, 2011, (pp. 13-22). Hanley & Belfus.
- [35] Baron, R. M., & Kenny, D. A. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 1986, 51(6): 1173.
- [36] Müller, K. W., Glaesmer, H., Brähler, E., Woelfling, K., & Beutel, M. E. Prevalence of internet addiction in the general population: results from a German population-based survey. *Behaviour & Information Technology*, 2014, 33(7): 757-766.

- [37] Su, W., Han, X., Yu, H., Wu, Y., & Potenza, M. N. Do men become addicted to internet gaming and women to social media? A meta-analysis examining gender-related differences in specific internet addiction. *Computers in Human Behavior*, 2020, 113, 106480.
- [38] Matud, M. P. Gender differences in stress and coping styles. *Personality and individual differences*, 2004, 37(7): 1401-1415.
- [39] Christiansen, D. M. Examining sex and gender differences in anxiety disorders. A fresh look at anxiety disorders, 2015: 17-49.
- [40] Malaeb, D., Salameh, P., Barbar, S., Awad, E., Haddad, C., Hallit, R., Sacre, H., Akel, M., Obeid, S., & Hallit, S. Problematic social media use and mental health (depression, anxiety, and insomnia) among Lebanese adults: Any mediating effect of stress? *Perspectives in psychiatric care*, 2021, 57(2): 539-549.