

## The Impact of Social Anxiety and Loneliness on Problematic Social Media Use: The Mediating Role of Maladaptive Cognition

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### Abstract

Given the accelerated growth of social media, problematic social media use has emerged as a research hotspot in the field of psychology, especially among university students. The objective of this investigation is to explore the influence mechanism of social anxiety and loneliness on problematic social media use, and focuses on examining the mediating role of maladaptive cognition in this process. Based on the data analysis of 463 Chinese college students, this study uses structural equation modeling (SEM) for verification. The results show that both social anxiety and loneliness significantly and positively predict problematic social media use, while maladaptive cognition plays a partial mediating role in this process. This finding not only reveals the potential psychological mechanism of problematic social media use but also highlights the key role of maladaptive cognition, providing new theoretical basis and practical implications for the innovative education and management intervention of problematic social media use

**Keywords:** Social Anxiety, Loneliness, Problematic Social Media Use, Maladaptive Cognition

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## Introduction

With the rapid development of new media and mobile communication technology, social media has gradually evolved into an indispensable communication platform in modern society, which has profoundly shaped people's psychological perception, cognitive mode and daily behavior. The current generation of college students had grown up alongside the swift advancement of the Internet and social media. For them, social media and networks served not just as a communication tool, but also an important part of their lifestyle. And because of that, they were at a higher risk of becoming the "vulnerable group" due to excessive use and over-reliance on problematic social media use. Research indicated that this risk existed among university students in China (Dai et al., 2022), and approximately 6% of college students in China experience issues associated with problematic Internet usage (Gong and Liang, 2019).

Problematic social media use involved a pattern of behavior characterized by prolonged and intense engagement with social media platforms, which adversely affected a person's physical, psychological, and behavioral health, however, this impact did not meet the diagnostic criteria for mental disorders as outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (Jiang et al., 2016). A large number of empirical studies showed that social anxiety and loneliness were the two main predictors of problematic social media use (e.g. Ma, 2022; Pi and Li, 2023). Social anxiety and loneliness showed a strong positive association with problematic social media use and acts as a significant predictor for it. (e.g., Peng, et al., 2020; Zhao et al., 2022; Wang, 2021; Wu, Huang and Yang, 2024; Harlendea and Kartasasmita, 2021; Smith, 2022; Huang, 2022; Wu, Feng and Zhang, 2024).

From the perspective of psychological mechanism, maladaptive cognition involves how people assess their social requirements in both real-life and online contexts (Davis, 2001). Studies have indicated that maladaptive cognitions play a mediating role between social anxiety and smartphone addiction (Zhou et al., 2021). Similarly, FOMO (fear of missing out), as a specific manifestation of maladaptive cognitions, also exhibits partial mediating effects in the path where loneliness influences problematic social media use (Tang, 2022; Przybylski et al., 2013).

Although existing studies have initially revealed the mediating role of maladaptive cognition between relevant psychological variables and problematic media use, however, existing research on maladaptive cognition had mainly focused on its relationship with internet addiction, online game addiction, mobile phone addiction, and social network usage, etc. Empirical research examining the association between maladaptive cognition and problematic social media use remains relatively limited. Especially in the Chinese context, relevant research is scarce. Therefore, it was particularly important to deeply explore how social anxiety and loneliness affect problematic social media use through maladaptive cognition.

Building on the above foundation, this study primarily explores how social anxiety and loneliness interact to influence individuals' problematic social media use, with a specific emphasis on the mediating function of maladaptive cognition in this process, and provides a valuable reference for the construction of educational intervention and management strategies for problem social media use.

## Research Objective

1. To explore the influence mechanism of social anxiety and loneliness on problematic social media use.
2. To examine the mediating role of maladaptive cognition in this process.

## Literature Review

### **The relationship between social anxiety and problematic social media use**

Research had indicated a connection between social anxiety and problematic social media use. People who experience social anxiety tend to favor online interactions over in-person ones and often engage with social media in a more problematic manner. Compared to their peers, Individuals with elevated social anxiety levels appear to utilize social media more frequently (Dempsey et al., 2019). Social anxiety had been recognized as a considerable risk factor that may contribute to problematic use of social media (Ruggieri et al., 2020; Chu et al., 2021).

Numerous studies had confirmed that social anxiety shows a strong positive association with problematic use of social media and acts as a significant predictor for it. (e.g., Jiang, 2020; Peng, et al., 2020; Tong, 2019; Zhao et al., 2022; Wang, 2021; Wu, Huang and Yang, 2024). Given this robust relationship, Social anxiety ought to be taken into account when treating problematic social media use (Wu et al., 2024)

In view of the above literature on social anxiety and problematic social media use, the following hypotheses are proposed to study and test the relationship between the two:

Hypothesis 1: Social anxiety is positive predictor of problematic social media use.

### **The relationship between loneliness and problematic social media use**

Loneliness is referred to be the disparity between an individual's expectations of intimacy and the actual experiences encountered during social interactions (Russell, 1996). Individuals who experience a heightened sense of loneliness exhibit a higher susceptibility to participate in problematic social media use (Błachnio et al., 2016). Jiao (2016) found that the more loneliness, the more likely they are to broaden their interpersonal circle through WeChat, and the greater their

tendency to frequently utilize the Internet for alleviating loneliness. In 2016, Jiang et al. mentioned that specific negative emotions are the direct cause of teenagers' problematic social media use.

Obviously, loneliness, as a negative emotion, has a connection to problematic social media use. As loneliness levels in individuals rose, their problematic social media use also increased. so they tend to increase their frequency of social interactions via social media platforms (O 'Day and Heimberg, 2021). And were more inclined to pursue social satisfaction through online platforms (Smith, 2022). High levels of loneliness are a risk element for problematic social network use (Morahan-Martin and Schumacher, 2000).

Through quantitative analysis, research had shown that loneliness was a strong positive indicator of problematic social media use within the university student population. Studies by Ceyhan et al. (2008) and Özdemir et al. (2014) demonstrated a positive association between loneliness and problematic social media usage. This finding that was subsequently corroborated by the research of Tang (2022). In addition, Chen et al. (2022) and Wu, Feng and Zhang (2024) also highlighted a significant positive predictive association between loneliness and problematic social media use. A thorough investigation carried out by Song et al. (2014) using a meta-analysis approach reached similar conclusions, confirming a positive association between loneliness and problematic social media use. Huang (2022) also demonstrated that the stronger the feeling of loneliness, the more intense the negative behaviors exhibited on the problematic behavior on social media.

These views were consistent with the need-satisfaction theory, and loneliness, which arises from an unfulfilled psychological need, frequently drives people seek social media as a form of compensation. Within this offsetting mechanism, individuals could elevate both how often and how intensely they engage with social media, which can result in problematic usage (Chen et al., 2015).

Based on the above-mentioned literature on loneliness and the problematic social media use, the following hypothes is proposed to study and test the relationship between the two:

Hypothesis 2: Loneliness is a positive predictor of problematic social media use.

### **The mediation of maladaptive cognition**

Maladaptive cognition involves how people assess their social requirements in both real-life and online contexts. They tend to perceive the online environment as more beneficial than reality, believing that their virtual identity is an improvement over their offline persona, so forming an overly positive evaluation and expectation of the Internet (Davis, 2001). Maladaptive cognition was linked to issues related to problematic Internet usage (Zhou et al., 2019). Nwufo et al. (2022) proposed that maladaptive cognition exerts a direct influence on problematic Internet use of teenage students, and the two are positively correlated. Zhang et al. (2020) also found comparable findings, suggesting that maladaptive cognition serves as a significant predictor of problematic Internet use.

Research has shown that maladaptive cognition as a mediating factor between social anxiety, loneliness and problematic social media use. Davis (2001) proposed that distal psychological factors such as social anxiety, loneliness and so on influenced individuals' internet use behaviors through the mediation of maladaptive cognitive factors, ultimately leading to internet addiction. But this research conclusion was drawn from the study of non-Chinese samples. Some researchers took Chinese college students as the research object and used maladaptive cognition as mediating variable to examine the connection between social anxiety and mobile phone addiction, and reached the same conclusion. That was to say, the research results indicated that maladaptive cognition acted as a mediator within the connection between social anxiety and mobile phone addiction (Zhou et al., 2021). Another study used fear of missing out (FOMO) as mediating variable to investigate how loneliness correlates with problematic social network use within Chinese undergraduate and master's students. The findings indicated that FOMO could play a partial mediating role in the effect of loneliness on problematic social network use (Tang, 2022). As a maladaptive psychological phenomenon caused by social comparison and cognitive bias, FOMO was considered as a manifestation or form of maladaptive cognition, which was supported by psychological research (Przybylski et al., 2013).

Based on the literature of the above research, therefore, we propose the following hypotheses:

Hypothesis 3: Maladaptive Cognitions is the mediator between social anxiety and problematic social media use.

Hypothesis 4: Maladaptive Cognitions is the mediator between loneliness and problematic social media use.

## Research Framework

Based on the above literature and the hypothesis proposed according to the literature analysis, this study puts forward a theoretical framework, as shown in Figure 1.

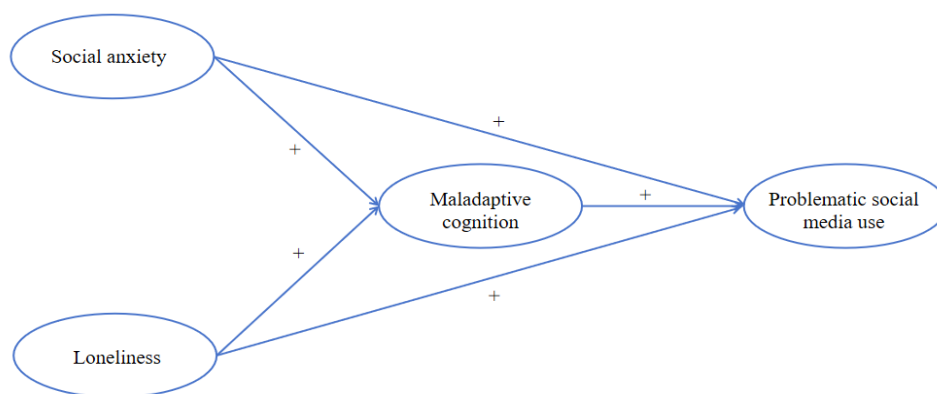


Figure 1 Research Framework

## Research Methodology

### Research Design

This study employed a quantitative research design, utilizing a questionnaire to gather data from undergraduate students at various universities in Guangxi Province, China.

### Sample

The study involved undergraduate students from various universities in Guangxi Province, China, recruited through convenience sampling. Participation was voluntary and unpaid.

### Research Instrument

#### 1. Problematic social media use questionnaire

The problematic social media use questionnaire was developed by Van Rooij et al. in 2017. The questionnaire utilized a 5-point Likert scale for scoring based on how often, 1 indicates “never,” and 5 corresponds to “very often.” Higher scores reflect more serious problematic social media use. The initial version of the questionnaire was developed in English, so the study translated the problematic social media use questionnaire into Chinese to ensure the cross-cultural adaptation. Confirmatory factor analysis revealed that the translated subscales all maintained the unidimensional structure of the original scale. In the current study, the internal consistency reliability of the scale was found to be 0.805.

#### 2. Interaction Anxiousness Scale

This study will employ the Interaction Anxiousness Scale created by Leary in 1983 to assess social anxiety levels. It consists of a unidimensional framework comprising 15 items in total. Likert 5 points is adopted (1 means “not consistent at all” and 5 means “extremely consistent”). Elevated scores reflect increased degrees of social anxiety. In the current research, the internal consistency reliability coefficient for the scale was determined to be 0.837.

#### 3. The Revised UCLA Loneliness Scale

The Revised UCLA Loneliness Scale (3rd edition) compiled by Russell in 1996. It consists of 20 items and is scored on 4 points. Use the scale of 1 (never) to 4 (often) to specify the frequency with which you have experienced those feelings. The total scores for all 20 items are calculated, resulting in a potential range of 20 to 80. A greater score on the scale reflects a higher degree of loneliness. In the current study, the internal consistency reliability coefficient for the scale was determined to be 0.874.

#### 4. Maladaptive Cognitions Scale for Pathological Internet Use among Chinese Adolescents

The Maladaptive Cognitions Scale for Pathological Internet Use among Chinese Adolescents was constructed by Mai et al. (2012) and includes 12 items. The questionnaire consisted of three

factors, namely social comfort (Items 1-4), distraction (Items 5-8), and self-realization (Items 9-12). It utilized a 5-point Likert scale, with ratings spanning from 1 to 5, with 1 indicating total disagreement and 5 indicating full agreement. A high score reflects more pronounced maladaptive cognitions. In this research, the internal consistency reliability coefficient for the scale was determined to be 0.898.

### Data Collection

With ethical approval from Assumption University and permission from the dean, data was collected using China's "Questionnaire Star" platform. After eliminating invalid questionnaires with overly short response times or regular patterns of answering, a total of 463 valid questionnaires were ultimately obtained. Most college students were aged between 18 and 23, accounting for 95.04%. And 52.70% of the participants were male and 47.30% were females.

### Data Analysis

This study employed path analysis based on correlation-covariance techniques using Structural Equation Modeling (SEM). Data were analyzed using SPSS version 27.0 and AMOS version 26.0.

## Findings

To elucidate the relationships among the variables, AMOS was used to test the model, with results presented below:

The overall model fit was satisfactory ( $\chi^2/df = 2.72$ ,  $AGFI = 0.92$ ,  $GFI = 0.95$ ,  $CFI = 0.97$ ,  $TLI = 0.96$ ,  $NFI = 0.95$ ,  $RMSEA = 0.06$ ), indicating that the model effectively explained the associations among the variables.

To further analyze the results, the researcher repeated sampling 5000 times according to the Bootstrap method to calculate the direct effect of social anxiety (SA) and loneliness (LL) on problematic social media use (PSMU) and Indirect effects through the mediation variable (maladaptive cognition (MC)). The main results are as follows (See Table 1):

Findings from the mediational analysis demonstrated that the total effect of social anxiety on problematic social media use was 0.390. Among them, the direct effect was 0.288, the indirect effect was 0.102. It was indicated that maladaptive cognition is partially mediated between social anxiety and problematic social media use. Similarly, the total effect of loneliness on problematic social media use was 0.262. Specifically, the direct effect was 0.162, the indirect effect was 0.100, and it was indicated that maladaptive cognition partially mediated between loneliness and problematic social media use.

To summarize, the results not only support the direct impacts of social anxiety and loneliness on problematic social media use, but also support the partial mediation effect of maladaptive cognition between social anxiety and problematic social media use, and also between loneliness and problematic social media use.

**Table 1** The direct effect of social anxiety (SA) and loneliness (LL) on problematic social media use (PSMU) and Indirect effects through the mediation variable (maladaptive cognition (MC))

Mediation Effects

Mediation path	B	SE	p	95% CI	
				LB	UB
Independent variable: SA					
SA - MC- PSMU (Indirect effect)	0.102	0.028	0.000	0.055	0.166
SA -PSMU (Direct effect)	0.288	0.060	0.000	0.172	0.407
SA - PSMU (Total effect)	0.390	0.058	0.000	0.276	0.502
Independent variable: LL					
LL- MC- PSMU (Indirect effect)	0.100	0.032	0.000	0.048	0.178
LL- PSMU (Direct effect)	0.162	0.068	0.023	0.024	0.292
LL- PSMU (Total effect)	0.262	0.071	0.001	0.115	0.389

## Discussion

### The relationship between social anxiety and problematic social media use

This study found that social anxiety and loneliness exhibited a significant positive predictive influence on problematic social media use, indicating that a rise in social anxiety would lead individuals to be more inclined to problematic social media use, and these relationship was highly significant. This finding supports Hypothesis 1 of this study.

This outcome was in line with the conclusions of numerous studies both at home and abroad. For instance, Gignac and Szodorai (2016) discovered that social anxiety was strongly positively correlated with problematic social media use, indicating that people experiencing social anxiety were more likely to engage in problematic social media use. Jiang et al.(2020) discovered that Social anxiety demonstrated a statistically significant positive correlation with problematic social media engagement. Additionally, other studies, such as those by Peng et al. (2020), Wang (2021), Zhao et al. (2022), and Wu, Huang and Yang (2024), had all confirmed a significant positive association



between social anxiety and problematic social media use, along with the tendency for individuals among social anxiety to be more prone to exhibit problematic behaviors.

Some studies suggested that social anxiety was significantly linked to an elevated risk of (Chu et al., 2021; Ruggieri et al., 2020). Individuals exhibiting higher social anxiety levels showed a preference for online communication compared to in-person exchanges. and their behavior patterns on social media were often more problematic. Compared to their peers, Individuals with social anxiety used social media more frequently and were at a higher risk of developing dependence, which in turn increased the likelihood of problematic social media use (Dempsey et al., 2019); Individuals experiencing high levels of social anxiety might be more inclined to participate in problematic social media use (Cheng et al., 2019; Chu et al., 2021).

#### **The relationship between loneliness and problematic social media use**

This research found that loneliness has a significant positive predictive influence on problematic social media use, suggesting that an increase in loneliness would lead individuals to demonstrate a heightened predisposition toward problematic social media use, and this relationship was highly significant. This finding supports Hypothesis 2 of this study.

And about the link between loneliness and problematic social media use, this result aligned with the conclusions of related studies both domestically and internationally. For example, the research by Ceyhan et al. (2008) and Özdemir et al. (2014) revealed a positive connection between loneliness and problematic social media use. Furthermore, Meshi et al. (2021) pointed out that the more intense the feeling of loneliness, the more pronounced the problematic social media use. Additionally, studies conducted by Tang (2022), Chen et al. (2022), Huang (2022), Smith (2022), and Wu, Feng, and Zhang (2024) all upported the predictive significance of loneliness in problematic social media use. Loneliness was widely recognized as a critical determinant of problematic social media use (Morahan-Martin and Schumacher, 2000; O'Day and Heimberg, 2021). So It could be seen from this that the higher the degree of loneliness among Chinese college students, the more serious their problematic social media use.

#### **Maladaptive cognition as a mediating factor between social anxiety, loneliness and problematic social media use**

This research identified that maladaptive cognition partially mediates the impact of social anxiety and loneliness on problematic social media use. This finding supported hypothesis 3 and hypothesis 4 of this study.

This conclusion aligns with previous related studies. For instance, Davis (2001) and Mai et al. (2012) proposed that distal psychological factors like social anxiety and loneliness influence individuals' internet use behaviors through the mediation of maladaptive cognitive factors, ultimately leading to

internet addiction. Zhou et al. (2021) further pointed out that maladaptive cognition plays a crucial mediating role between social anxiety and smartphone addiction, indicating that maladaptive cognition acts as a key link between social anxiety and problematic online behaviors. Tang (2022) further identified "Fear of Missing Out" (FOMO) as a manifestation of maladaptive cognition and explored the impact of FOMO within the connection between loneliness and problematic social media use among university students. The research findings further verified the key role of maladaptive cognition in this process.

In conclusion, the research results indicate that both social anxiety and loneliness show a significant positive correlation with problematic social media use. Maladaptive cognition partially mediates the association between social anxiety, loneliness and problematic social media use.

## Recommendation

Although this study provides a valuable reference framework for the innovative management of problematic social media use, it is important to recognize certain limitations. First, the utilization of a cross-sectional design restricts the capacity to establish causal connections between social anxiety, loneliness, maladaptive cognition, and problematic social media use. Researchers are encouraged to adopt longitudinal approaches in future studies. Second, the reliance on self-reported questionnaires for data collection might lead to biases related to social desirability. So future investigations could integrate supplementary techniques, such as conducting interviews, or utilizing physiological measures. Lastly, the sample was confined to college students from a particular area in China. Broadening the scope of participants to encompass individuals from varied regions, age brackets, and cultural contexts would facilitate broader applicability of the findings.

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