Proceedings of ICSPHS 2027 Symposium: Psychology, Physical Activity, and Student Wellbeing
DOI: 10.54254/2753-7048/2027.KL39364

# *The Association Between Social Media Addiction and Anxiety Symptoms among Adolescents*

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***Abstract.*** This review explores the association between adolescent social media addiction (SMA) and anxiety symptoms, focusing on the underlying psychological mechanisms and moderating variables involved. Existing research generally indicates a positive correlation between problematic social media use and anxiety-related outcomes. "Fear of missing out" (FoMO) and social comparison may help explain this connection, as both involve attention to social feedback and others' evaluations. Gender and cultural background may also lead to differences in this association. However, the evidence regarding these factors is still limited, partly due to the fact that some studies examine problematic or general social media use rather than specifically targeting SMA. Additionally, differences in measurement methods and the dominance of cross-sectional research designs limit the comparability between studies and prevent the establishment of definite conclusions regarding causality and temporal sequence. Overall, the existing literature indicates an association between adolescent SMA and anxiety symptoms, although the underlying psychological mechanisms and situational factors are not yet fully clear.

***Keywords:*** Social media addiction, Anxiety symptoms, Adolescents

## 1. Introduction

Social media has increasingly become part of adolescents' daily lives, providing opportunities to communicate, be entertained, and socialize. However, the widespread use of social media among adolescents has also raised concerns about its potential impact on their mental health. Social media addiction (SMA) refers to an uncontrollable, excessive, and compulsive pattern of social media use, which may have negative effects on an individual's daily life and physical and mental health [1].

Anxiety is a psychological reaction related to the fear or worry of perceived threats, while anxiety disorders involve excessive and persistent anxiety or fear, which may impair daily functioning [2]. In this article, the term "anxiety symptoms" refers to the experience of anxiety, rather than clinical symptoms. As adolescents undergo significant social and psychological changes, they are also highly addicted to social media. Therefore, it is crucial to understand the relevant factors of adolescents' anxiety symptoms when discussing the possible psychological consequences of social media use.

Hence, this literature review synthesizes existing empirical research to explore the association between social media addiction and adolescents' anxiety symptoms. It also explores potential

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psychological mechanisms that may underlie this association, including moderating factors such as gender and cultural differences.

## 2. Evidence of the correlation between social media addiction (SMA) and anxiety symptoms

### 2.1. Correlational evidence

Evidence from research on problematic social networking use (PSNU) supports a correlation between problematic usage patterns and anxiety symptoms. PSNU encompasses various forms of problematic social network usage behaviors, including excessive, compulsive, dependent, and addictive social network usage behaviors. Du et al. [3] conducted a systematic review and meta-analysis of 209 independent effect sizes from 172 studies involving 252,337 participants from 28 countries. The meta-analysis revealed a moderate positive correlation between PSNU and generalized anxiety ($r = .388$), social anxiety ($r = .437$), attachment anxiety ($r = .345$), and separation anxiety disorder ($r = .496$).

Du et al. [3] noted that the studies included in their meta-analysis were only for adolescents and young adults, which is a group highly relevant to the research question of this review. However, when applying these research results specifically to adolescents and individuals with severe social media addiction (SMA), caution is needed. PSNU is a broad concept covering various forms of problematic social network usage, and it cannot be fully equated with the focus of this study on social media addiction (SMA).

Furthermore, the study found heterogeneity among the included studies. The levels of heterogeneity observed in generalized anxiety, social anxiety, and attachment anxiety were comparable, indicating that the strength of the association between PSNU and anxiety may be influenced by factors such as sample characteristics, geographical regions, gender, measurement tools, and assessment time. Given that the aggregated data are mainly cross-sectional studies, this meta-analysis supports the existence of a correlation between the two, but it cannot establish a causal relationship.

Kerr et al. conducted a systematic review of 32 English studies published before 2021, aiming to assess the direction of the association between adolescent social media use and anxiety, as well as the variable measurement methods, demographic characteristics, and research quality employed in these studies [4]. The results showed that over half (56.3%) of the studies found a positive association between social media use and anxiety. Among the measurement indicators used, "problematic social media use" was the most common (accounting for 31.4%). Notably, in the studies that adopted this indicator, 75.0% found a positive association between it and anxiety. Additionally, in studies using "screen time" as a social media use indicator, 72.7% found a positive association, while in studies using other indicators, this proportion was 40.9%.

The research results of Kerr et al. are largely consistent with the meta-analysis results of Du et al. Although these two studies employed different analytical methods, both observed a positive association between the results of social media use and anxiety-related outcomes. The consistency of these review results strengthens the evidence for this association. However, differences in research subjects, measurement methods, and research designs indicate that caution should be exercised when interpreting these results.

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### 2.2. Methodological limitations

One of the main methodological limitations of the existing literature lies in the lack of standardized criteria for measuring social media addiction (SMA). Various studies have employed diverse standards and scales to define problematic or addictive social media usage behaviors. Some studies focus on frequency and duration of use, while others assess addiction-related symptoms such as loss of control, withdrawal reactions, or interference with daily life. The differences in measurement methods hinder direct comparisons between different studies and may lead to inconsistent research results regarding the strength of the association between SMA and anxiety symptoms. Moreover, cross-sectional studies and observational studies dominate, limiting the ability to determine the temporal sequence of this association. Therefore, it is unclear whether SMA occurs before anxiety symptoms, whether anxious adolescents are more likely to exhibit problematic social media usage behaviors, or whether there is a bidirectional relationship between the two. In summary, the heterogeneity in the definition and measurement of SMA, combined with limited evidence regarding the temporal sequence, weakens the consistency and interpretability of the existing research results.

## 3. Research on psychological mechanisms of intermediaries

### 3.1. Social comparison

Chan et al. conducted a three-month, two-phase longitudinal study involving 330 Hong Kong youth to examine the relationship between social anxiety and social media addiction (SMA), further investigating the mediating role of social comparison on social media [5]. The study found that social anxiety was associated with higher levels of subsequent SMA, and social comparison on social media significantly mediated this relationship—particularly more so among female participants. This suggests that individuals with higher levels of social anxiety may be more prone to engage in social comparison on social media, thereby linking them to greater SMA.

Du et al. further noted that social comparison is a common phenomenon on online social platforms [3]. Users tend to compare their own lives with others' idealized portrayals, which may reinforce perceptions of missing social opportunities and increase attention toward others and social feedback on social media. Consequently, persistent social comparison may be linked to more frequent social media use and heightened needs for social validation, offering a potential psychological mechanism for understanding how social comparison contributes to the association between SMA and anxiety symptoms.

### 3.2. Fear of missing out (FoMO)

Du et al. revealed a moderate positive correlation ($r = 0.496$) between problematic social network use (PSNU) and "fear of missing out" (FoMO) through meta-analysis, suggesting that FoMO might be a key psychological factor in understanding PSNU [3]. Social networks have the characteristics of immediacy and continuous updates, which may trigger individuals' concerns about missing important social information or activities, thereby prompting them to check and use these platforms more frequently, and leading to problematic usage behaviors. Moreover, the social comparison and real-time feedback mechanisms on these platforms may intensify individuals' focus on social connections, further enhancing FoMO.

This mechanism may also be related to anxiety symptoms. FoMO reflects a persistent worry about being socially excluded, missing social opportunities, or losing contact with others, thus

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potentially exacerbating anxiety experiences. Therefore, higher levels of FoMO may be associated with more severe PSNU and anxiety symptoms simultaneously, providing a potential psychological mechanism for explaining the correlation between adolescent social media addiction and anxiety. However, given that the existing studies mainly provide correlational evidence, further research is needed to determine whether "social anxiety" (FoMO) truly lies between social media addiction and anxiety symptoms.

## 4. Moderating variables

### 4.1. Gender differences

Gender may be an important moderating variable between social media addiction (SMA) and anxiety symptoms. Chan et al. found a positive correlation between social anxiety and SMA, and the mediating role of social comparison on social media was more significant among female participants [5]. This indicates that gender may affect the psychological mechanism connecting anxiety-related factors and SMA. Additionally, a systematic review and meta-analysis conducted by Wu et al. also pointed out that gender is an important moderating variable between social anxiety and problematic social media use [6]. In summary, these studies suggest that the association between SMA and anxiety symptoms may vary by gender. Therefore, when exploring the relationship between SMA and anxiety symptoms in the adolescent population, gender differences must be taken into account.

However, the research conducted by Chan et al. revealed a significant gender imbalance, with 75.2% of the participants being female and only 24.8% being male. This may limit the comparability and generalizability of the research results across different gender groups. Therefore, the specific regulatory role of gender in the association between SMA and anxiety symptoms still requires further verification.

### 4.2. Cultural differences

Geographical and cultural background may be important factors influencing the correlation between adolescent social media addiction and anxiety symptoms. Gordesli et al. used 299 middle school students (with an average age of 15.21 years) from Turkey (n = 176), Ireland (n = 70), and the United Kingdom (n = 53) as a sample to explore the moderating role of cultural value orientation in the relationship between social media usage and adolescent mental health [7]. The study examined the horizontal and vertical dimensions of individualism and collectivism, and found that longer periods of social media use were associated with anxiety and depression symptoms, regardless of whether it was during weekdays or weekends, although the specific results varied depending on the duration of use. This indicates that the connection between social media use and adolescent anxiety is not solely determined by the duration of use, but may also be influenced by an individual's cultural value orientation. For example, in collectivist cultures, the emphasis on group belonging and community identity may make individuals more sensitive to social exclusion or missed group activities. While the continuous interaction and social comparison on social media may further exacerbate these concerns, thereby linking to anxiety symptoms. However, since this study measured the duration of social media use rather than social media addiction (SMA), it is not possible to directly determine whether cultural values have moderated the relationship between SMA and anxiety symptoms. This highlights a limitation of the current research: although cross-cultural studies have begun to explore the relationship between social media use and mental health,

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more direct evidence is still needed to understand whether cultural factors affect the association between adolescent SMA and anxiety symptoms.

## 5. Research gap

Although existing studies generally indicate that there is a connection between adolescent social media addiction (SMA) and anxiety symptoms, the nature of this relationship and its influencing factors require further investigation. Firstly, current studies have adopted different definitions and measurement tools for problematic social media use (PSNU) and SMA, as in the meta-analysis by Du et al. The research results focusing on problematic social network use may not fully represent the strict sense of SMA. Secondly, although existing meta-analyses provide evidence for the association between SMA-related behaviors and anxiety, the prevalence of cross-sectional studies limits our understanding of the temporal sequence and potential bidirectional relationships. Regarding the psychological mechanism, Du et al. found a moderate positive correlation (r = .496) between PSNU and fear of missing out (FoMO), while Chan et al.'s longitudinal study explored the mediating role of social comparison in the relationship between social anxiety and SMA. Nonetheless, these findings are not sufficient to clearly determine the specific roles of FoMO and social comparison in the connection between adolescent SMA and anxiety symptoms. In terms of moderating variables, Wu et al.'s meta-analysis suggested that gender is a moderating factor between social anxiety and problematic social media use, while Gordesli et al. studied the role of cultural value orientations in the relationship between social media use and adolescent mental health. Nevertheless, the variables examined in these studies are not entirely synonymous with SMA and anxiety symptoms, and the conclusions need to be verified through more direct evidence. Therefore, future research should further explore the roles of FoMO and social comparison, and investigate whether gender and cultural background affect the association between SMA and anxiety symptoms in adolescents.

## 6. Discussion

Overall, the existing literature generally supports a positive correlation between adolescent social media addiction (SMA) and anxiety symptoms, but the exact nature of this relationship remains unclear. "Fear of missing out" (FoMO) and social comparison are likely to be key psychological factors in understanding this relationship. For instance, a meta-analysis by Du et al. found a close connection between FoMO and problematic use of social networking sites. Nevertheless, since problematic use of social networking sites is not equivalent to SMA, these findings cannot directly prove that FoMO mediates the relationship between SMA and anxiety symptoms. Similarly, Chan et al. explored the role of social comparison in the connection between social anxiety and SMA, providing clues about the potential psychological mechanisms, although it is necessary to carefully distinguish between social anxiety and broader anxiety symptoms. Therefore, although existing research provides some support for the potential psychological mechanisms, the extent to which these mechanisms explain the association between adolescent SMA and anxiety symptoms still requires further verification.

In addition to psychological mechanisms, gender and cultural background may also affect this association. Meta-analysis by Wu et al. found that gender moderated the relationship between social anxiety and problematic use of social networking sites, indicating that this relationship may vary by gender group. However, this finding does not directly prove that gender also moderates the relationship between SMA and general anxiety symptoms. Similarly, a cross-cultural study by Gordesli et al. examined social media usage and mental health among adolescents in different

DOI: 10.54254/2753-7048/2027.KL39364

countries, but its focus was on usage duration rather than SMA. Therefore, although these studies emphasize the importance of gender and cultural background, they are not sufficient to determine whether these factors have changed the association between SMA and anxiety symptoms. This evidence gap indicates that future research must directly examine the moderating role of these factors in specific relationships, rather than relying solely on inferences based on different variables.

These limitations also affect the comparability and explanatory scope of the existing evidence. Firstly, although some studies measure SMA, others focus on problematic use of social media, social networking sites, or usage duration. Although these indicators overlap, they are not exactly the same. Therefore, the strength of the associations observed in different studies may not be directly comparable. Secondly, cross-sectional studies make it difficult to establish a temporal sequence. Hence, it is unclear whether SMA precedes anxiety symptoms, anxiety symptoms are related to subsequent problematic use, or there is a bidirectional relationship between the two. In summary, although the existing literature supports the association between adolescent SMA and anxiety symptoms, our understanding of the potential psychological mechanisms, moderating factors, and causal direction of this association is still very limited. Future research should use well-defined and validated SMA measurement tools and combine longitudinal research designs to directly examine the specific roles of FoMO, social comparison, gender, and cultural background in this association.

## 7. Conclusion

In conclusion, existing studies generally support a positive correlation between adolescent social media addiction and anxiety symptoms. Fear of missing out (FoMO) and social comparison may be potential explanations for this association, while gender and cultural background may lead to differences at the individual and group levels. However, the differences in measurement methods and the dominance of cross-sectional studies have limited the comparability of research results and hindered the determination of the causal temporal sequence. Therefore, although there is a correlation between social media addiction and adolescent anxiety symptoms, the nature of this relationship, as well as the role of potential psychological mechanisms and moderating variables, is not yet fully clear. In the future, standardized measurement tools for social media addiction and longitudinal research designs are needed to further clarify these relationships.

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