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Problematic Social Media Use, Implicit Cognitive Biases, and Social Anxiety

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Abstract. This paper investigates the relationship among problematic social media use (PSMU), implicit cognitive biases, and social anxiety. Instead of only considering screen time as problematic use criteria, this research looks at other indicators like reduced control, repeated checking, emotional dependence and any adverse impact it might have on daily functioning. Studies reviewed suggest that implicit attitudes and attentional biases can make social-media related cues harder to ignore, leading to checking behaviors becoming increasingly automatic. Social anxiety may prompt individuals to turn to online communication as it provides greater control over self-presentation and reduces interpersonal pressure, but continued use may increase social comparison, uncertainty, avoidance and dependence on online reassurance. Fear of missing out and cognitive failures are examined as possible mechanisms that link emotional vulnerability with compulsive use. Overall, evidence supports a reciprocal model in which social anxiety, automatic reactions to platform cues, and decreased self-control may reinforce each other over time. Unfortunately, much of the existing research relies on cross-sectional measures; further longitudinal and experimental research must be conducted in order to establish definitive causality and clarify where these relationships lead.

Keywords: Problematic social media use, implicit cognitive biases, social anxiety, fear of missing out

1. Introduction

Social media now shapes everyday communication, entertainment, identity construction, and information seeking, which makes problematic patterns of use especially important to examine. As social media becomes more present in daily life, researchers have become increasingly concerned about patterns that are difficult to control and interfere with daily functioning. These patterns are commonly described as problematic social media use (PSMU) or problematic social network use. The term "social media addiction" is also widely used, but this paper uses PSMU because the term does not assume that excessive use always meets the threshold for a clinically recognized addiction. In other words, the main issue is not simply how many hours an individual spends online. What matters more is whether the use becomes compulsive and begins to harm schoolwork, sleep, relationships, or mental health.

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Research has linked problematic use of PSMU with depression, stress, general anxiety and social anxiety - yet these associations do not explain the psychological processes underlying its misuse. Peng and Liao found significant relationships between emotional distress and the six commonly discussed addiction components of PSMU, suggesting that problematic use is not one simple or uniform form [1]. A large meta-analysis revealed that problematic social networking use was positively related to anxiety symptoms across various studies, yet its exact cause is still not fully clear [2]. Much of existing research only allows participants to report symptoms at one time point, making establishing temporal order between psychological distress, PSMU and possible reciprocal reinforcement difficult.

Two factors may help explain this relationship, connecting automatic responses to platform cues with interpersonal fears that make those cues emotionally significant. Implicit cognition involves relatively automatic attitudes, associations, attentional tendencies, and response patterns that shape behavior without conscious analysis. Social anxiety refers to fear of negative evaluation and distress in real or anticipated social settings. Social media may initially appear attractive to socially anxious individuals as it provides greater control over timing, self-presentation, and responses - although over time this control could support avoidance and increased reassurance seeking behaviors. At the same time, repeated checking, comparison, fear of missing out (FoMO), and dependence on online reassurance may increase or prolong anxiety. Such processes could gradually make platform cues more salient and automatic; eventually reducing reflective control over use.

This review assesses research linking PSMU with implicit cognitive biases and social anxiety. It starts by outlining how PSMU is defined and measured before discussing studies focusing on implicit attitudes and attentional bias, summarizing evidence on social anxiety, as well as FoMO and cognitive failures as potential mechanisms. Overall, PSMU should be seen as a continuing cycle in which emotional vulnerability, automatic reactions to social media cues and difficulty with self-control can strengthen each other; yet its complete cycle has yet to be proven; most studies relying heavily on self-report; thus it would be more accurate to view this cycle as one possible explanation supported by several connected findings rather than treating it as fact.

2. Conceptualizing problematic social media use

PSMU describes a pattern in which social media becomes difficult to control and begins to create negative consequences. This definition is important because frequent use is not always problematic use. For example, a student may spend several hours online because classes, work, and friendships require it, but still be able to put the phone away when necessary. Another person may spend fewer hours online but repeatedly fail to reduce use, feel anxious when unable to check a platform, or ignore important responsibilities. Therefore, PSMU should be assessed through motivation, perceived control, symptoms, and functional impairment rather than through screen time alone.

One commonly used measure is the Bergen Social Media Addiction Scale (BSMAS), which is useful because it shifts attention from usage frequency to symptom patterns. It assesses six components adapted from behavioral-addiction research: salience, mood modification, tolerance, withdrawal, conflict, and relapse. Salience means that social media dominates thoughts or behavior. Mood modification refers to using it to escape, feel better, or reduce unpleasant emotion. Tolerance is the perceived need for increasing engagement to achieve the same effect, while withdrawal describes discomfort when access is restricted. Conflict occurs when use interferes with responsibilities or relationships, and relapse refers to returning to an excessive pattern after attempting to reduce it. A recent meta-analysis concluded that the BSMAS generally shows adequate reliability and validity across studies, while also emphasizing variation across languages, samples,

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and scoring practices [3]. Consequently, BSMAS scores should be interpreted as indicators of symptom severity and risk rather than as evidence that an individual necessarily has a clinical addiction.

The component approach also shows why PSMU is not homogeneous. Peng and Liao found different configurations of addiction symptoms and emotional distress rather than one continuum from "healthy" to "addicted." One person may use social media mainly for mood regulation, another may seek reassurance, and another may experience compulsive monitoring and conflict-related impairment [1]. A theory of PSMU must therefore explain how different pathways emerge from distinct combinations of vulnerability, emotional reinforcement, cue learning, and control failure.

The Interaction of Person–Affect–Cognition–Execution (I-PACE) model is useful for this paper because it explains problematic use as an interaction among personal vulnerability, emotional responses, learned cognitions, and executive control. According to the model, addictive behaviors develop through an interaction among personal vulnerability, emotional and cognitive reactions, and executive functions such as inhibition and decision-making [4]. Personal risk factors may include personality, mental-health symptoms, past social experiences, and motives for using a platform. When an individual experiences an internal trigger, such as loneliness, or an external cue, such as a notification, these factors shape what the person feels and expects social media to provide. If checking the platform produces pleasure or reduces distress, both positive and negative reinforcement can increase the likelihood of repeated checking. Over time, cravings and automatic habits may become stronger, while deliberate self-control has less influence in the moment.

Applied to social anxiety, the model suggests that a socially anxious person may expect online interaction to be safer or more controllable than face-to-face interaction. Checking social media can temporarily reduce uncertainty or provide reassurance, but this immediate relief may discourage offline coping and strengthen reliance on online feedback. The behavior is reinforced even when long-term consequences include comparison, interrupted sleep, or avoidance of offline situations. The I-PACE framework therefore avoids reducing PSMU to either a personal weakness or a property of technology alone. Instead, it locates problematic use in repeated interactions among personal vulnerabilities, the emotional function of use, learned cognitions, platform cues, and executive control [4]. This process perspective explains why implicit cognitive biases matter: repeated emotionally rewarding use may make platform cues increasingly salient before conscious self-regulation begins.

3. Problematic social media use and implicit cognitive biases

Implicit cognitions are automatic mental processes that affect attention, evaluation, memory, and behavior before a person has time to think carefully. In addiction research, substance-related cues can quickly attract attention, produce positive associations, or create approach impulses, and similar cue-reactivity processes may help explain some forms of PSMU. Social media logos, notification sounds, images of a feed, or words connected to approval and belonging may become meaningful cues. Kessling et al. discussed four forms of implicit cognition that may matter for problematic social network use: implicit attitudes, attentional biases, approach or avoidance tendencies, and associations stored in memory. These processes show possible parallels with other addictive behaviors [5]. However, the authors also make it clear that research specifically focused on social media is still limited.

Implicit attitudes refer to rapid positive or negative evaluations that do not always match up with an individual's explicit beliefs. A user may believe social media distracting while subliminally associating platform cues with pleasure, belonging, or emotional relief. Turel and Serenko designed

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the Facebook Implicit Associations Test (FIAT) to assess such associations among 220 Facebook users, and found evidence of them related to excessive usage [6]. Their work proved that implicit associations regarding Facebook can be measured and tied back to excessive usage. This result is not diagnostic but suggests that self-report can miss automatic associations that influence behavior even when users consciously intend to reduce usage. A participant could sincerely want to decrease Facebook use while still experiencing positive automatic associations that make platform cues hard to resist.

Attentive bias offers another form of evidence. It occurs when certain stimuli receive faster, longer or harder-to-disengage attention than neutral stimuli. Nikolaidou et al. conducted research comparing responses between social networking users with differing levels of problematic use and neutral stimuli users. Individuals engaging in more problematic social-networking usage demonstrated evidence of biased attention toward cues related to social-media use [7]. Such findings support the possibility that repeated reinforcement may increase motivational salience of platform cues; when notifications or images from social-media capture attention without prompting from within an ongoing task, this can disrupt goal-directed control mechanisms and lead to checks before an informed decision has taken place.

Attentional-bias tasks must be carefully interpreted; faster or slower attention could indicate initial orientation, delayed disengagement, cognitive conflict, familiarity or any combination of these processes. Associations between PSMU severity and attention bias cannot indicate directionality: heavy use may train attention toward platform cues while preexisting sensitivities to social rewards could spur use. Kessling et al. cautioned that relatively few studies had directly tested these processes [5].

A balanced interpretation is that learning may occur in both directions. Social media gives users small and unpredictable rewards: a message may arrive, a post may receive likes, or new information may reduce uncertainty. Because a reward does not appear every time, users may keep checking to see what happens next. Platform cues then become more meaningful, and automatic attention to those cues makes another check more likely. Stress and anxiety can make this pattern stronger because the user is focused on emotional relief. In I-PACE terms, learned reactions to cues begin to interact with emotion and self-control [4]. Therefore, implicit bias is probably not the only cause of PSMU, but it is also not simply an unimportant result of heavy use. It may be one part of a cycle that makes checking feel increasingly automatic.

4. Problematic social media use and social anxiety

Social anxiety involves fear of being judged, humiliated or rejected in social situations; online reassurance, controlled self-presentation and avoidance strategies can provide much-needed reinforcement. Plus, unlike face-to-face conversations, online interaction gives users more control. People expecting negative evaluation may find these features more reassuring. Edit a message before responding; wait before showing pictures; select which pictures to show or simply observe other conversations without joining; edit a message prior to responding or wait before responding; choose pictures to show or observe without joining; watch people without joining; these features could provide more safety for people expecting negative evaluation. Social media offers real connection while at the same time helping the person avoid uncomfortable offline experiences. Unfortunately, though, controlled online communication becomes more problematic when it replaces opportunities to acknowledge uncertainty and build confidence through direct interactions.

Overall, evidence points towards a reliable positive association between social anxiety and PSMU. Wu et al. conducted an in-depth systematic review and meta-analysis on these two concepts

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specifically, finding strong positive associations [8]. Du et al. also reported significant positive correlations between problematic social networking use and anxiety symptoms and an in-depth meta-analysis conducted across multiple measures of data [2]. Meta-analyses combine many studies, providing stronger support than single samples alone. Yet differences across studies suggest that strength of relationship may vary according to user characteristics, measurement instruments used, platform usage contexts etc.

Research on PSMU complicates any simple explanation. Peng and Liao found that anxiety, depression and stress were all connected in different ways to different addiction components; PSMU may therefore include both "feels better" pathways - in which use is positively or negatively reinforcing because it alters mood - and must do pathways - where use becomes compulsive even though not particularly enjoyable; for socially anxious users early engagement may provide immediate interpersonal rewards while later checks may become driven more by fear, obligation or avoidance: the user feels obliged to monitor messages, reactions or activities by other people or monitor conversations by others in real time [1].

PSMU may intensify social anxiety through upward comparison, visible popularity metrics, ambiguous feedback, and the displacement of sleep or in-person contact. For a socially anxious user, a delayed reply may be interpreted not as neutral timing but as evidence of rejection, exclusion, or reduced social value. These pathways fit the meta-analytic association, although the present evidence does not establish each mechanism directly.

The reverse direction is equally plausible. Social anxiety can increase the motivation to seek controllable communication, reassurance, or distraction. When online interaction reduces distress, immediate relief reinforces the behavior. The same behavior can therefore reduce distress in the moment while maintaining anxiety over time by limiting corrective offline experiences.

This two-way explanation is also why correlation should not be treated as proof that social media directly "causes" social anxiety. Many studies are cross-sectional, use self-report, and focus on students or young adults. Other factors, including loneliness, stress, depression, or poor sleep, may increase both PSMU and social anxiety. Measurement also matters. A scale focused on conflict and withdrawal may identify more serious impairment than a scale focused mainly on frequency. Bottaro et al. found that the BSMAS generally has good reliability and validity, but differences in measurement still affect comparisons across studies [3]. Therefore, the clearest conclusion is that social anxiety and PSMU are consistently related and may reinforce one another, but the exact direction is not the same in every situation.

5. Psychological mechanisms connecting PSMU and social anxiety

FoMO is one of the clearest possible mechanisms. It refers to concern that others are having meaningful or enjoyable experiences without the individual, accompanied by a desire to remain socially connected. FoMO includes both thoughts and emotions: the person imagines missing important social information and then feels discomfort that encourages more checking. Social media fits this cycle especially well because it presents selective events, conversations, and reactions without full context, leaving users to infer whether they have been excluded or overlooked. Checking may reduce uncertainty for a short time, but the next post can immediately create a new reason to feel excluded or uninformed.

Elhai et al. examined worry, FoMO, problematic smartphone use, and PSMU in 456 American college students [9]. Both worry and FoMO were significantly associated with greater severity of problematic smartphone and social media use, but the relationships were stronger for FoMO. FoMO also statistically mediated the associations between worry and both forms of problematic use. These

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findings fit the I-PACE model because worry can be treated as a vulnerability that shapes affective and cognitive responses, while FoMO functions as a more use-specific expectation and emotional trigger [4]. Broad worry may become focused on possible social exclusion, and checking social media may then function as an accessible strategy for temporarily reducing that concern.

FoMO may also play a part in connecting social anxiety with implicit attention. Socially anxious individuals may be particularly sensitive to signals of inclusion, rejection, or evaluation. FoMO (fear of missing out) makes notifications and platform cues even more valuable, since they could indicate socially relevant information. Attention may then be drawn not only by entertainment value but also by the possibility that notifications contain information about acceptance or rejection or social standing. Repeated checking can strengthen associations among social-media cues, relief and connection; Nikolaidou et al's attentional bias report as well as Turel and Serenko implicit associations measurement both are consistent with this account, although neither study alone provides evidence for FoMO having caused these biases [6, 7].

Cognitive failures provide another component of this cycle. Cognitive failures include everyday lapses in attention, memory and action taken; for instance losing track of tasks or intentions and making unintended mistakes due to failing attention or forgetting intentions or becoming distracted during tasks or actions taken. PSMU may increase such instances through interruptions, information overload, divided attention, or disrupted sleep patterns. Conversely, those struggling to focus or regulate behavior may find immediately rewarding social-media content especially appealing, since it requires minimal effort and offers instantaneous stimulation. Kasturiratna and Hartanto provide important longitudinal evidence: 252 young adults completed weekly measures over 13 weeks and random-intercept cross-lagged analyses demonstrated positive effects in both directions, with higher PSMU predict greater cognitive failures while increased cognitive failures predicted an increase in PSMU for the next week [10].

This two-way result substantiates the concept of a feedback loop. Cognitive failures do not equal implicit bias: cognitive failures refer to visible lapses in daily functioning while implicit bias refers to automatic cue-related tendencies; yet these two may still interact. Social media cues may inadvertently capture attention, leading to disconnection with one's current goals. Repeated distraction can result in errors and frustration; feeling less in control makes an easy and emotionally fulfilling activity even more attractive; for socially anxious persons social media provides both comfort and avoidance; thus emotional vulnerability, automatic attention and reduced self-control may interact together to form one system even though they represent different psychological processes.

An integrated cycle can be summarized as follows. Social anxiety and worry increase the need for reassurance; FoMO translates that vulnerability into platform-specific concern; and checking temporarily reduces uncertainty. Repetition increases the salience of platform cues, while interruptions and cognitive failures weaken goal-directed control. Increased use then creates more comparison and ambiguous feedback, potentially renewing social anxiety. This cycle fits the I-PACE model, but remains partly inferential because no single reviewed study tests the complete sequence.

6. Discussion

Studies reviewed in this paper demonstrate why PSMU cannot be explained solely by screen time alone. Its symptoms can include salience, mood modification, tolerance withdrawal conflict relapse. Each person may exhibit different combinations of these symptoms [1-3]. The I-PACE model ties these ideas together by showing how personal vulnerability interacts with emotion learned

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expectations self control [4, 5]. In this process implicit associations and attentional biases make social media cues increasingly difficult to ignore [5-7].

Social anxiety has been shown to be positively associated with problematic use, as indicated by numerous systematic reviews and meta-analyses [2, 8]. However, its relationship likely runs both ways and could be affected by other variables. Socially anxious individuals may prefer the comforting controllability of online communication to ease distress; conversely, problematic patterns could increase comparison, evaluation concerns and reliance on reassurance. FoMO provides an ideal medium for connecting worry and social concern into platform-specific monitoring, thus creating a link between emotional vulnerability and routine checks. FoMO is closely associated with PSMU severity and serves as a mediator in terms of worrying and problematic use [9, 10]. Furthermore, longitudinal findings on cognitive failures reveal how problematic use and cognitive difficulties may interact to reinforce each other over time [10].

Methodological and conceptual limitations inhibit stronger conclusions, including cross-sectional designs' dominance, self-report methodology's dependence, variation in PSMU measurement accuracy and limited sample diversity. One problem with mediation models is their tendency to describe statistical patterns rather than causal chains. Furthermore, self-report measures may be subject to recall errors and shared method bias that compromise their reliability and validity. Thirdly, PSMU meaning can vary across scales and platforms; evidence collected via Facebook may not apply fully to short video platforms like Vine or Vine video or image-based messaging platforms like Snapchat or Telegram. Fourthly, student and young-adult samples tend to dominate samples taken from younger adolescents, older adults or culturally diverse populations.

Finally, implicit measures themselves can have reliability and interpretation problems. A faster response to social-media stimuli may reflect familiarity, salience, emotional value, or several processes at once.

Future studies should combine longitudinal tracking, experimental cue manipulation, and consent-based behavioral data to test whether changes in platform cues, attention, and anxiety unfold in the predicted sequence. Repeated measures could distinguish stable differences between people from short-term changes within the same person, while behavioral indicators could reduce reliance on recall. Experiments should test whether reducing cues changes attentional bias, actual use, or anxiety. Research should also examine age, gender, culture, platform design, and active versus passive use because meta-analytic findings already suggest meaningful heterogeneity [8].

Interventions should focus on why a person uses social media and how automatic that use has become instead of simply recommending less screen time. Some people may benefit from turning off notifications and removing obvious cues. Others may need support for social anxiety, worry, FoMO, avoidance, or difficulty with inhibition. Since the research does not support one universal cause, an assessment should identify which part of the cycle matters most for each person. Overall, the evidence supports a reciprocal model: social anxiety and related emotional vulnerabilities can encourage problematic use, while repeated cue-driven use can strengthen automatic cognitive patterns and expose users to more experiences that maintain anxiety. This reciprocal explanation is more realistic than treating social media as either a harmless habit or the single cause of mental-health problems.

7. Conclusion

This paper examined the relationship among problematic social media use, implicit cognitive biases, and social anxiety. Across the reviewed research, PSMU emerges as more than frequent screen use. It is a pattern involving reduced control, emotional dependence, repeated checking, and functional

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impairment. The evidence also suggests that social anxiety and PSMU may reinforce each other. Socially anxious individuals may be drawn to the control and reassurance offered by online communication, while repeated use may increase comparison, uncertainty, and sensitivity to social feedback. Implicit attitudes, attentional bias, FoMO, and cognitive failures help explain how this relationship may become increasingly automatic over time.

PSMU should not be understood solely from one cause or solution perspective. Reducing screen time may help, but may not address emotional and cognitive factors behind its maintenance. For effective prevention and intervention strategies to be successful, they must consider user motivations, sensitivity to platform cues, need for reassurance from others, avoidance of offline situations, ability to regulate attention regulation skills and future research should use longitudinal designs to establish how this process develops over time.

Overall, this review integrates different areas of research into one comprehensive explanation for why PSMU may contribute to social anxiety. It highlights how its relationship is maintained by an interaction among emotional vulnerability, automatic attention and weak self-control - three mechanisms which interact to maintain this link between PSMU and social anxiety. Identifying such systems provides an effective means of distinguishing when ordinary use becomes problematic and which psychological processes must be addressed accordingly.

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