

# The Relationship between Social Anxiety and Problematic Smartphone Use among Elite Student Athletes: the Mediating Role of Maladaptive Cognitive Emotion Regulation Strategies

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| Article Info                                                                                                                                                    | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| <b>Article type:</b><br>Research Article                                                                                                                        | <b>Objective:</b> This study investigated the association between social anxiety and problematic smartphone use among elite student athletes, emphasizing the mediating role of maladaptive cognitive emotion regulation strategies.                                                                                                                                                                                                                                                                                                                                                        |
| <b>Article history:</b><br>Received November 16, 2025<br>Received in revised January 01, 2026<br>Accepted January 05, 2026<br>Published online January 05, 2026 | <b>Method:</b> Employing a descriptive-correlational design based on structural equation modeling, participants were selected through convenience sampling from the population of elite university athletes across the country. The instruments included the Social Anxiety Questionnaire (Jarabek, 1996), the Cognitive Emotion Regulation Questionnaire (Garnefski & Kraaij, 2006) assessing maladaptive emotion regulation strategies, and the Problematic Smartphone Use Scale (Kwon et al., 2013). Data were analyzed using correlational techniques and structural equation modeling. |
| <b>Keywords:</b><br>Elite Athletes,<br>Maladaptive<br>Cognitive,<br>Emotion Regulation,<br>Social Anxiety,<br>Problematic<br>Smartphone Use                     | <b>Results:</b> The findings revealed a significant positive relationship between social anxiety and problematic smartphone use, which was mediated by maladaptive cognitive emotion regulation strategies. Furthermore, the proposed structural model demonstrated an acceptable goodness of fit.<br><br><b>Conclusions:</b> These results highlight the importance of developing group-based, educational, and psychological interventions to enhance adaptive emotion regulation strategies and reduce technology-related behavioral problems among elite athletes.                      |

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## Introduction

In today's competitive environment, physical fitness alone does not guarantee success; rather, a successful athlete must also possess strong mental readiness (Safaei et al., 2024). Elite athletes, as a distinct group within society who are continuously exposed to competitive pressure, social expectations, and persistent stress—especially during their student years—are more prone than others to the development of maladaptive behavioral patterns (Ong et al., 2023). In this regard, the use of smartphones has become one of the most prominent aspects of daily life in the past decade. Empirical evidence indicates that excessive and uncontrolled smartphone use can lead to the formation of maladaptive and addictive behavioral patterns, commonly referred to as problematic smartphone use (Chen et al., 2022). This phenomenon not only negatively affects academic performance and social relationships but also increases anxiety, depression, and poor sleep quality (Mei et al., 2024).

Social anxiety, as one of the most significant psychological challenges among athletes, may increase the use of communication technologies, as these tools provide opportunities to avoid face-to-face interactions (Yilmaz et al., 2023). Under such conditions, the smartphone acts as a maladaptive emotion regulation tool used by individuals to reduce social stress. Furthermore, theories related to emotion regulation suggest that individuals employ various cognitive strategies when facing stressful situations to manage their emotions. Some of these strategies are adaptive, while others are maladaptive (Gross, 2015). Maladaptive cognitive emotion regulation strategies—such as rumination, self-blame, and catastrophizing—are associated with the persistence of negative emotions and, rather than reducing anxiety, intensify maladaptive cycles (Lin et al., 2025). Consequently, these strategies may explain the relationship between social anxiety and problematic smartphone use (Luo et al., 2024). Akbari et al. (2021) found that social anxiety significantly predicts mobile phone addiction among university students, while Rahimi et al. (2024) reported a positive relationship between social anxiety and problematic smartphone use.

Compared with the general population, elite athletes are not only more prone to social anxiety but due to the nature of competitive sports, are also more likely to rely on maladaptive cognitive emotion regulation strategies (Song et al., 2024). When faced with failure or fear of negative evaluation by spectators and coaches, athletes may unconsciously engage in rumination or cognitive avoidance. Such situations may increase dependence on smartphones as a means to relieve tension (Wu & Guo, 2025). Evidence shows that social anxiety is associated with an intense fear of negative evaluation and avoidance of social situations (Yang et al., 2023). Among athletes, this condition becomes more pronounced due to constant exposure to competitive environments, formal and informal evaluations, and increased social pressure (Yilmaz et al., 2023). In these circumstances, smartphone use may serve as a temporary escape from anxiety-provoking interactions. However, excessive and repetitive use of this device creates a vicious cycle that ultimately leads to dependency and problematic usage (Zhou et al., 2023). Therefore, problematic

smartphone use is often regarded as a maladaptive coping behavior that, rather than addressing the root cause, only temporarily alleviates symptoms of anxiety or stress (Du & Feng, 2025).

In this context, another important aspect in understanding the relationship between social anxiety and problematic smartphone use is the mediating role of emotions and their regulation. Individuals with social anxiety often exhibit deficits in regulating negative emotions and tend to rely more heavily on maladaptive cognitive strategies (Lin et al., 2025). Liu et al. (2024) demonstrated that maladaptive strategies such as rumination and self-blame intensify the relationship between social anxiety and smartphone dependence. In other words, social anxiety alone does not directly lead to problematic smartphone use; rather, its effect is exacerbated through maladaptive emotion regulation patterns (Tingaz, 2025). These strategies not only sustain anxiety but also drive individuals toward avoidant behaviors such as excessive technology use (Liu et al., 2024). Similarly, Malek-Mohammadi et al. (2024) reported that smartphone addiction is associated with poorer mental health and higher anxiety levels among students.

Student athletes face complex pressures, as they must cope not only with academic challenges but also with the demands of athletic competition and expectations from coaches and spectators. These stressors can heighten social anxiety and predispose individuals to maladaptive coping patterns (Song et al., 2024). Moreover, the time constraints and busy lifestyles of athletes make smartphones the most accessible tool for managing negative emotions (Ong et al., 2023). Parallel to these findings, several studies emphasize the role of individual differences in moderating the impact of social anxiety on problematic smartphone use. For example, individuals with lower levels of social support or greater sensitivity to negative evaluation are at higher risk of developing digital dependency (Wu & Guo, 2025). Hosseini et al. (2020) found that maladaptive emotion regulation strategies are associated with increased mobile phone dependence, while Foroudifar et al. (2020) emphasized that deficiencies in cognitive emotion regulation contribute to heightened anxiety and maladaptive behaviors (Shao et al., 2022). This issue is particularly critical among athletes who are constantly under public scrutiny.

It is also important to note that problematic smartphone use is not merely an individual phenomenon but also has social and cultural roots. In athletic environments where online communication is an integral part of professional life, athletes often experience greater pressure to maintain an online presence, which further increases their dependence on smartphones (Fiedler et al., 2025). Considering these perspectives, examining the mediating role of maladaptive cognitive emotion regulation strategies in the relationship between social anxiety and problematic smartphone use is not only theoretically significant but also practically valuable for developing educational and therapeutic interventions in sport psychology. Identifying these pathways can help sport psychologists design interventions that enable elite athletes to replace maladaptive strategies with more adaptive ones, such as cognitive reappraisal or emotional acceptance.

From a sport psychology standpoint, this topic is particularly critical, as problematic smartphone use can have substantial consequences for athletic performance, training quality, sleep, and recovery (Mei et al., 2024). Studies indicate that insufficient sleep due to excessive smartphone use impairs concentration, increases injury risk, and diminishes athletic performance (Ji et al., 2024). Thus, understanding the psychological mechanisms underlying this phenomenon is essential for developing preventive and therapeutic measures in sports. Furthermore, the digital culture and social identity of the new generation of athletes add another layer of complexity. Many elite athletes use social media to build professional identities, attract sponsorship, or engage with fans—factors that intensify the pressure to remain constantly connected, increasing the risk of problematic smartphone use (Fiedler et al., 2025).

In summary, the present study highlights that social anxiety, maladaptive cognitive emotion regulation strategies, and problematic smartphone use interact to form a vicious cycle that may threaten the psychological well-being and athletic performance of elite student athletes. Despite the significance of this issue, limited research has explored these mechanisms. Therefore, the current study aimed to clarify the mediating role of maladaptive cognitive emotion regulation strategies in the relationship between social anxiety and problematic smartphone use among elite student athletes in Iran through structural equation modeling.

## Materials and Methods

### Design

The present study employed a descriptive-correlational design using the structural equation modeling (SEM) approach. This design was chosen to examine the relationships among social anxiety, maladaptive cognitive emotion regulation strategies, and problematic smartphone use among elite student athletes.

### Statistical Population and Sample

The statistical population consisted of all elite student athletes participating in the 15th National Student Cultural and Sports Olympiad, held in the summer of 2022 at the University of Tabriz, with the participation of 112 universities and approximately 2,000 competitors from across the country. According to Guilford, the minimum sample size for structural equation modeling should be at least 200 participants. Similarly, Comrey stated that a sample of 100 is poor, 200 is fair, 300 is good, 500 is very good, and 1,000 is excellent (Homan, 2010). Accordingly, considering possible attrition or incomplete responses, an initial sample of 500 participants was determined. After listing all provinces represented at the competition, five provinces were randomly selected from five geographical regions of Iran—north, south, east, west, and center (South Khorasan, Mazandaran, Markazi, Kerman, and Hamedan)—using cluster random sampling. During data collection, convenience sampling was employed. The electronic questionnaire link was distributed in person

at the competition venue. Out of 500 distributed questionnaires, 384 completed responses (260 female and 124 male athletes) were returned and qualified for statistical analysis after excluding incomplete or invalid submissions.

### ***Instruments***

To collect data, three standardized instruments were used to measure the study's variables:

#### **Social Anxiety Questionnaire (Jerabek, 1996)**

This instrument was designed to measure the level of social anxiety and fear of social exposure across five components: fear of strangers, fear of evaluation by others, fear of public speaking, fear of social isolation, and fear of showing anxiety symptoms. In the present study, the subscales used included fear of negative evaluation by others, fear of social isolation, and social anxiety fear. The questionnaire contains 25 items, rated on a five-point Likert scale ranging from strongly disagree to strongly agree ("almost always," "often," "sometimes," "rarely," "almost never"), where higher scores indicate greater levels of social anxiety. Jerabek (1996) confirmed the construct validity of this scale through factor analysis, reporting a Cronbach's alpha of .90, indicating excellent reliability. In a later study, Moghtader et al. (2020) reported acceptable reliability ( $\alpha = .76$ ). In the present research, the Cronbach's alpha coefficient was .87, confirming high internal consistency in this sample.

#### **Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski & Kraaij, 2006)**

This questionnaire includes 36 items and nine subscales (each containing four items). Responses are rated on a five-point Likert scale from never to always. In this study, only the maladaptive subscales—self-blame, rumination, catastrophizing, and other-blame—were used. In the original version, construct validity was supported via factor analysis, with Cronbach's alpha coefficients ranging from .68 to .86. In the Persian adaptation, Hassani (2017) reported Cronbach's alpha coefficients between .76 and .92, indicating good to excellent internal consistency. In this study, Cronbach's alphas for maladaptive subscales were .80, .83, .81, and .77, and .86 for the combined maladaptive subscale total, demonstrating good reliability.

#### **Smartphone Addiction Scale (SAS; Kwon et al., 2013)**

Developed to assess the degree of smartphone dependency, this scale contains 33 items across six subscales. Each item is rated on a six-point Likert scale. In the current study, the subscales used included disturbance of daily life, excessive use, and tolerance reduction. Kwon et al. (2013) confirmed construct validity through factor analysis and reported an overall Cronbach's alpha of .97, with subscale reliabilities ranging from .83 to .91. The Persian version validated by Fathi et al. (2022) demonstrated a Cronbach's alpha of .93. In the current research, Cronbach's alpha reliability was assessed using a pilot study with 30 participants: Social Anxiety ( $\alpha = .92$ ), Maladaptive

Cognitive Emotion Regulation ( $\alpha = .80$ ), Problematic Smartphone Use ( $\alpha = .81$ ). These results confirmed the reliability of the instruments for the present sample. To ensure content validity, feedback was obtained from experts in sports management and psychology.

### Data Analysis

Data analysis was conducted using both descriptive and inferential statistics. Since the Kolmogorov–Smirnov test indicated non-normal distributions for the study variables (significance level  $< .05$  and Z values outside the  $\pm 1.96$  range), the assumption of normality was rejected. Therefore, due to the two-level model structure and non-normal data, the Partial Least Squares (PLS) method was applied to test the hypotheses and confirm the structural model using SmartPLS version 3 and SPSS version 22.

### Results

Out of the total 384 collected questionnaires, 67.70% of respondents were male ( $n = 260$ ) and 32.29% were female ( $n = 124$ ). Participants' ages ranged from 18 to 28 years. Regarding education level, 69.01% were undergraduate students, 26.25% were master's students, and 5.72% were doctoral students. The age distribution was as follows: 55 participants (14.32%) aged 18–20 years, 62 participants (16.14%) aged 20–22 years, 44 participants (11.45%) aged 22–24 years, 140 participants (36.45%) aged 24–26 years, and 83 participants (21.61%) aged 26–28 years. Regarding athletic experience, 12% had up to 2 years, 18% had between 2–4 years, 31% between 4–6 years, 23% between 6–8 years, and 16% had over 8 years of continuous athletic activity.

Table 1. Correlation matrix among study variables

| Variable / Subscale        | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1. Social Anxiety (Total)  | 1     | .58** | .55** | .46** | .49** | .51** | .39** | .47** | .44** | .42** |
| 2. Regulation (Total)      | .58** | 1     | .66** | .78** | .80** | .82** | .75** | .55** | .52** | .50** |
| 3. Problematic Use (Total) | .55** | .66** | 1     | .52** | .50** | .53** | .44** | .81** | .84** | .76** |
| 4. Self-Blame              | .46** | .78** | .52** | 1     | .63** | .65** | .60** | .41** | .39** | .36** |
| 5. Rumination              | .49** | .80** | .50** | .63** | 1     | .69** | .55** | .43** | .41** | .39** |
| 6. Catastrophizing         | .51** | .82** | .53** | .65** | .69** | 1     | .61** | .45** | .42** | .40** |
| 7. Other-Blame             | .39** | .75** | .44** | .60** | .55** | .61** | 1     | .38** | .36** | .34** |
| 8. Disturbance             | .47** | .55** | .81** | .41** | .43** | .45** | .38** | 1     | .72** | .69** |
| 9. Overuse                 | .44** | .52** | .84** | .39** | .41** | .42** | .36** | .72** | 1     | .74** |
| 10. Tolerance              | .42** | .50** | .76** | .36** | .39** | .40** | .34** | .69** | .74** | 1     |

$p < .01$ ; \*\* = significant correlation at 1% level

Before conducting inferential analyses, the assumptions of normality were assessed. Skewness values ranged from 1.12 to 2.45, and kurtosis values ranged from 1.35 to 3.10, indicating deviations from normal distribution. The Kolmogorov–Smirnov test results were significant for all variables ( $p < .05$ ), confirming the non-normality of the data. Given the violation of normality and the conceptual complexity of the model, the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach was used, which is suitable for non-normal data and medium-sized samples. Table (1) presents the means, standard deviations, and correlations among the main variables and their subscales.

The correlation matrix indicates significant positive relationships among all key variables and subscales, supporting the theoretical associations proposed in the study.

**Table 2. Kolmogorov–Smirnov test for normality**

| Variable                                 | Mean | K–S (Z) | Sig. (p) |
|------------------------------------------|------|---------|----------|
| Maladaptive Cognitive Emotion Regulation | 3.39 | .87     | .029     |
| Social Anxiety                           | 2.99 | .167    | .005     |
| Problematic Smartphone Use               | 3.06 | .049    | .002     |

As shown in Table 2, since all significance levels were below .05, the null hypothesis of normality was rejected. Therefore, due to the non-normal distribution and the hierarchical nature of the model, PLS-SEM was applied to confirm the model and test the hypotheses.

**Table 3. Path coefficients and significance levels**

| Path                                                                  | Standardized Coefficient ( $\beta$ ) | t-value | Sig. (p) |
|-----------------------------------------------------------------------|--------------------------------------|---------|----------|
| Social Anxiety → Maladaptive Cognitive Emotion Regulation             | .55                                  | 7.85    | .001     |
| Social Anxiety → Problematic Smartphone Use                           | .47                                  | 5.86    | .0001    |
| Maladaptive Cognitive Emotion Regulation → Problematic Smartphone Use | .22                                  | 2.57    | .001     |
| Social Anxiety → Maladaptive Regulation → Problematic Use (Indirect)  | —                                    | 2.14    | .003     |

As shown in Table 3, all hypothesized paths were statistically significant. Figures 1 and 2 illustrate the standardized coefficient model and the t-value model, respectively, both confirming the adequacy of model fit and the hypothesized relationships among variables.

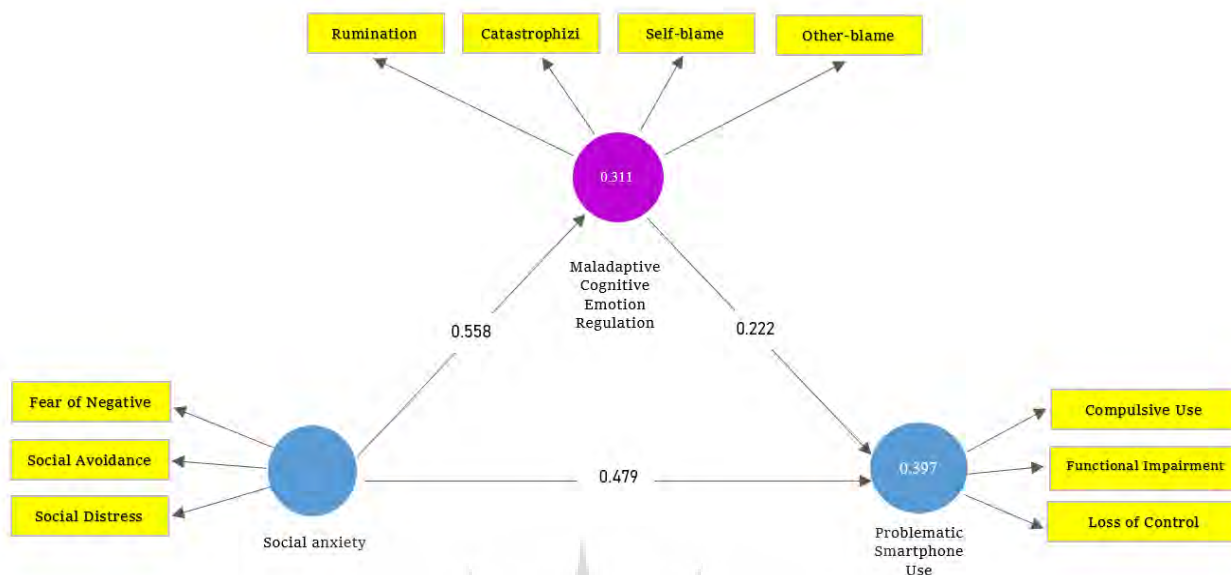


Figure 1. Research model in standard mode

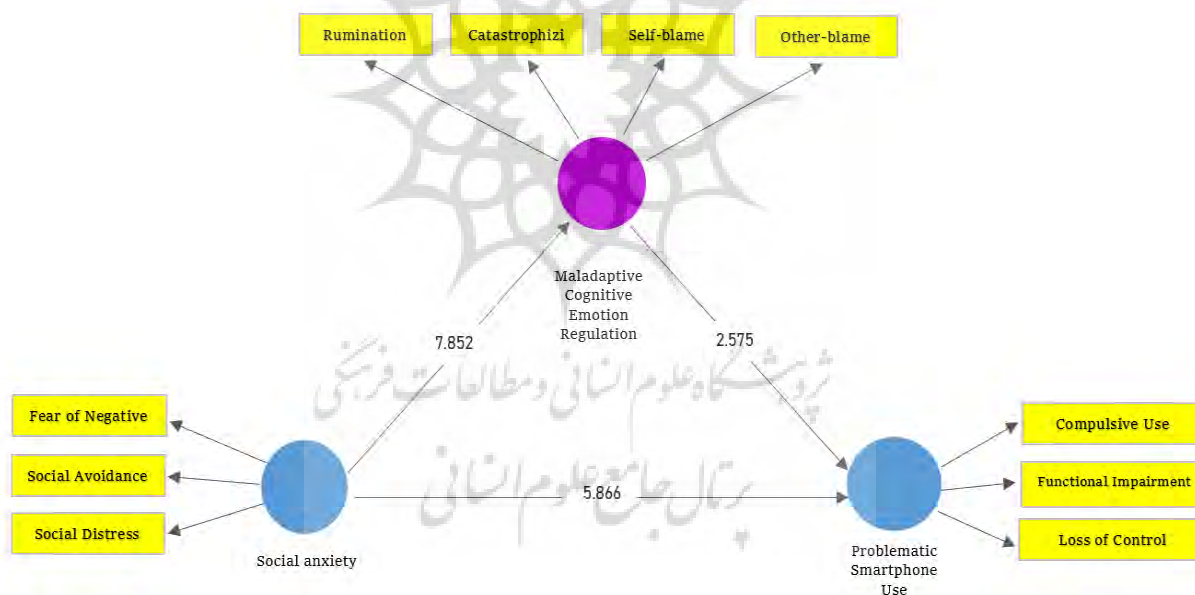


Figure 2. Research model in meaningful mode

The quality of the measurement model was assessed using communality, cross-validated redundancy, and the Goodness-of-Fit (GOF) index. All variables demonstrated positive cross-validated redundancy values. The GOF index was .41, exceeding the acceptable threshold of .40, indicating a good model fit. In simple terms, the empirical data fit the theoretical structure and underlying constructs well, confirming the alignment of observed variables with the conceptual framework. Therefore, the hypothesis proposing the mediating role of maladaptive cognitive

emotion regulation in the relationship between social anxiety and problematic smartphone use among elite student athletes was confirmed ( $t = 2.14, p < .05$ ). The findings demonstrate a statistically significant indirect effect at the 95% confidence level ( $t > 1.96$ ), validating the researcher's assumption.

$$GOF = \sqrt{Communalities * R^2} = \sqrt{0.50 * 0.34} = 0.41$$

## Discussion

The findings of the present study revealed that social anxiety has a significant and positive relationship with both maladaptive cognitive emotion regulation strategies and problematic smartphone use, and that maladaptive cognitive emotion regulation plays a mediating role in this relationship. These results are consistent with the findings of Giansanti (2025), Liu et al. (2025), Zhang and Li (2025), Wang and Zhang (2025), Rahimi et al. (2024), and Malek-Mohammadi et al. (2024), which indicate that social anxiety not only directly affects maladaptive digital behaviors but also operates through dysfunctional emotion regulation mechanism. This suggests that social anxiety functions as a triggering factor for digital avoidance behaviors, especially under competitive and socially demanding conditions. Individuals with high levels of social anxiety often experience an intense fear of negative evaluation and difficulties in face-to-face interactions (Yang et al., 2025). Such fears often stem from distorted self-perceptions, including feelings of inadequacy and unrealistic social expectations, which are further intensified in competitive environments like sports, where performance pressure and social comparison are frequent (Kim & Park, 2025).

Importantly, individuals with social anxiety tend to employ maladaptive cognitive strategies—such as rumination, catastrophizing, and self-blame—to cope with psychological pressure (Chen & Wang, 2025). Rather than alleviating distress, these strategies amplify negative emotions, creating a self-reinforcing cycle of anxiety that promotes avoidant behaviors, including excessive smartphone use (Tang et al., 2025). Smartphones, as convenient avoidance tools, allow individuals to escape anxiety-provoking real-life interactions and replace them with controlled virtual engagement, where they feel safer (Wu & Zhao, 2025).

Among elite student athletes, this pattern becomes even more pronounced due to the dual pressures of academic and athletic demands, requiring constant stress management and social adaptation (Liu et al., 2025). Smartphones serve as mechanisms to maintain social identity, communication, and stress regulation, often intensifying dependency due to frequent contact with coaches, teammates, and family members through messaging and social media platforms (Zhou & Chen, 2025). Moreover, smartphones offer a temporary psychological refuge from performance-related stress and public scrutiny, inadvertently increasing the risk of digital addiction (Tang et al., 2025). According to Gross's (2015) emotion regulation framework, maladaptive strategies such as

catastrophizing and self-blame heighten negative affect, perpetuating stress and unhealthy coping behaviors. This cycle may activate the hypothalamic–pituitary–adrenal (HPA) axis, resulting in chronic stress and greater reliance on avoidance behaviors such as excessive smartphone use (Huang & Li, 2025).

From a neuroscientific perspective, excessive smartphone use can disrupt prefrontal cortex functioning, which governs emotion regulation and decision-making (Park, 2025). Neuroimaging studies demonstrate that problematic smartphone use weakens the connectivity between the prefrontal cortex and the brain's reward system, thereby reducing self-control (Nguyen & Tran, 2025). This behavior also affects the dopaminergic pathways, increasing the need for continuous stimulation, a pattern especially risky for athletes seeking instant reward and feedback (Han & Choi, 2025).

From a social–psychological standpoint, social anxiety among elite athletes results from the interaction between personality traits (e.g., perfectionism, social sensitivity) and environmental pressures. Athletes with higher social anxiety are more exposed to negative social comparison and peer pressure, especially on social media platforms such as Instagram, which amplifies feelings of inadequacy and encourages unhealthy smartphone use (Sun & Liu, 2025). In contrast, athletes with greater social support experience fewer maladaptive behaviors, even if they suffer from anxiety (Yang et al., 2023).

Cultural context also plays a moderating role: in societies where digital visibility and athletic success are highly valued, athletes face stronger pressure to maintain an online presence, reinforcing dependency patterns (Fiedler et al., 2024). Such dynamics may lead to addictive smartphone use, particularly when combined with social anxiety and maladaptive regulation strategies. Younger athletes appear especially vulnerable, as they are still forming their identity, and excessive online comparison can reduce self-esteem and increase dependency (Li & Kim, 2025; Zhao & Wang, 2025). From a social learning perspective, individuals tend to repeat behaviors that temporarily reduce psychological tension. The smartphone functions as an external negative reinforcer, offering short-term relief from anxiety through avoidance of stressful social interactions (Du & Feng, 2025). However, this maladaptive coping loop may have long-term consequences for both mental health and athletic performance.

### **Practical Implications**

Given the study findings, managing smartphone use is essential not only for maintaining psychological well-being but also for optimizing athletic performance. Group-based interventions focused on interpersonal communication skills can strengthen face-to-face interaction and reduce reliance on virtual engagement, especially among younger athletes at risk of social isolation (Zhou et al., 2025). Excessive smartphone use has been shown to impair sleep quality, increase fatigue, and elevate the risk of injury (Suyim et al., 2025). The blue light emitted from smartphone screens can disrupt the circadian rhythm and reduce melatonin production, negatively affecting recovery,

focus, and reaction time (Wang & Zhang, 2025; Xu et al., 2025). Thus, the results highlight the need for targeted psychological and educational interventions. Training in adaptive emotion regulation strategies—such as cognitive reappraisal, acceptance, and mindfulness—can effectively replace maladaptive patterns and reduce both social anxiety and problematic smartphone use (Huang & Li, 2025; Park, 2025).

Mindfulness practices, through their impact on amygdala activity and cognitive flexibility, help athletes manage social and competitive stress more effectively (Zhou et al., 2025). Digital literacy workshops in sports settings can also play a crucial role by educating athletes about the effects of blue light on sleep, managing notifications, and setting time limits for smartphone use (Suyim et al., 2025). Complementary activities such as reading, mental training, and light exercise can further mitigate digital dependency (Wang & Zhang, 2025).

## **Conclusion**

on the whole, the present study emphasizes that social anxiety, maladaptive cognitive emotion regulation, and problematic smartphone use form a self-reinforcing triad that threatens both the mental health and athletic performance of elite student athletes. Training in mindfulness and cognitive reappraisal, as well as digital literacy education, are essential preventive strategies. It is recommended that sports federations and university athletic departments organize psychological counseling sessions, mindfulness-based programs, and digital well-being workshops to mitigate social pressure and prevent digital dependency. From an applied perspective, understanding these psychological pathways enables sports psychologists to design more targeted interventions. Teaching adaptive emotional regulation skills—anchored in cognitive reappraisal, mindfulness, and acceptance—can reduce social anxiety and, in turn, prevent problematic smartphone use.

Like all other studies, this study faced certain limitations, including the sensitive nature of the topic and partial cooperation of participants, as well as limited access to participants' personal data related to digital behavior. Future research is recommended to use longitudinal designs and objective digital usage measures to validate these findings across diverse athletic contexts.

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## **Conflicts of interest**

There are no conflicts of interest.

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