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Relationship between Mindfulness and Competitive Anxiety among Athletic High-School Students: Mediating Role of Emotion Regulation

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Abstract

Introduction: The relationship between mindfulness and competitive anxiety in athletes, particularly regarding the function of emotion regulation, remains an under-researched area.
Objective: This study aims to explore the relationships among mindfulness, emotion regulation, and competitive anxiety in young athletes.
Methods: This research employed a descriptive-correlational approach, utilizing structural equation modeling for data analysis. A sample of 194 athletic adolescents was gathered through convenience sampling, and standardized measurement tools were used to assess the research variables. The data were analyzed using Smart PLS version 4.
Results: The findings revealed a significant relationship between competitive anxiety (P=0.000, t=-5.56, and b=0.42) and emotion regulation (P=0.000, t=3.25, and b=0.31) within the context of mindfulness. Furthermore, a substantial structural relationship was identified between emotion regulation and competitive anxiety, indicated by P=0.000, t=-4.41, and b=0.39. Importantly, the results suggest that emotion regulation acts as a significant mediator in the relationship between mindfulness and competitive anxiety, supported by a p-value of 0.000, a t-value of 4.12, and a b coefficient of 0.22, highlighting the statistical significance of this association.
Conclusion: The findings recommends that athletes incorporate mindfulness meditation into their training regimens to enhance their emotion-regulation capabilities. This practice can help athletes manage their emotional states during competitions, mitigate the effects of negative evaluations and external pressures, and foster a positive competitive mindset.

Keywords: Adolescent, Mental Health, Exercise, Self-Efficacy, Schools

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1. Introduction

Regular exercise among young individuals is associated with enhanced self-esteem, greater emotional resilience, improved problem-solving abilities, successful goal achievement, and stronger social skills when compared to their inactive counterparts (1). A significant factor influencing mental, physical, and performance outcomes is anxiety, which has become increasingly complex due to the proliferation of anxiety-inducing factors and a diminished capacity to manage them (2). This emotional state is particularly prevalent in sports settings, where initial research viewed anxiety as a unidimensional construct. However, as understanding has evolved, the multidimensionality of anxiety has been recognized, revealing connections between cognitive and physical anxiety (3). The latter can adversely affect athletic performance by inducing muscle tension, leading to a loss of coordination and involuntary muscle contractions, which may result in stumbling during movement. This physical aspect of anxiety encompasses physiological responses linked to anatomical arousal and is often accompanied by negative symptoms such as anger, elevated blood pressure, muscle stiffness, rapid heartbeat, sweaty palms, and gastrointestinal distress (4,5).

Cognitive and behavioral anxiety encompass distinct yet interconnected components that influence an individual's performance. The cognitive aspect involves psychological factors that hinder information processing due to a fear of failure, leading to diminished focus and impaired decision-making—both crucial for achieving optimal outcomes (2,6). This type of anxiety can provoke distractions, poor choices, and excessive worry about performance. Conversely, behavioral anxiety arises when an individual perceives external stimuli as threatening or uncomfortable, which skews their situational assessment (7,8). Following this evaluation, the individual may engage in both physical and mental adjustments to mitigate anxiety, ultimately impacting their behavior and performance. Anxiety manifests as feelings of unease, worry, or tension in response to perceived threats or stressors, prompting the body to react to both external and internal pressures (9).

Research indicates that mindfulness training enhances alpha wave activity in the cerebral cortex, leading to observable behavioral changes associated with mindfulness practices (10-12). Young athletes

often sacrifice their physical and mental well-being to manage various psychological pressures, including high training demands, fatigue, separation from loved ones, and challenges with time management. While there is ample data on anxiety and depression symptoms in the general population, specific information regarding young individuals, particularly young athletes, is scarce. Existing statistics primarily focus on adult athletes, revealing anxiety prevalence rates between 0.26% and 10.7%, and depressive symptoms ranging from 20.27% to 30.10% (13,14). Notably, research shows that girls experience higher levels of anxiety and depressive symptoms than boys, irrespective of their athletic involvement, and that athletes generally report more severe anxiety and depression compared to non-athletes (15,16). Consequently, mental health issues, particularly anxiety, represent a significant concern in contemporary society.

The predominant approach to treating anxiety as a psychological issue has traditionally involved medication (17). However, this method often falls short of fully addressing the needs of individuals, as it can lead to undesirable side effects and may not always yield effective results. Athletes across various levels and sports frequently encounter the pressures associated with competition, and numerous studies have highlighted the detrimental effects of stress and anxiety on athletic performance. There has been an increasing acknowledgment in recent years of the necessity to incorporate various psychological factors alongside pharmacological treatments in addressing conditions such as anxiety. One such factor that has garnered less attention is mindfulness, which may offer valuable insights and strategies for managing psychological distress in athletes (18).

Mindfulness is characterized by the intentional focus on the present moment, approached with a non-judgmental and open mindset (19). Individuals who exhibit higher levels of mindfulness tend to have a greater awareness of their everyday experiences and a deeper understanding of their mental habits, such as the inclination to dwell on the past or worry about the future, as well as a critical perspective towards both internal thoughts and external circumstances (20). This practice fosters a continuous awareness of each moment, enhancing one's ability to engage fully with life as it unfolds (21). Mindfulness practice enhances awareness of physical sensations and their relationship to emotional states, thereby improving self-awareness and concentration. This approach is particularly beneficial for athletes, as it sharpens focus and aids in emotional regulation. Research has shown that mindfulness can effectively reduce stress and anxiety, ultimately promoting overall well-being (22). Mindfulness fosters a deeper connection between the mind and body, thereby enhancing interoceptive awareness. This heightened awareness allows individuals to better identify and interpret internal bodily signals, including sensations of hunger, thirst, temperature fluctuations, heart rate variations, breathing patterns, muscle tension, fatigue, and overall physical discomfort (19,21).

Mindfulness is a significant factor in how individuals engage with society, particularly in addressing behavioral issues. It enhances emotion regulation by fostering attention control and cognitive awareness of both internal feelings and external circumstances (23,24). Recent research has increasingly focused on the interplay between mindfulness and emotional disorders, highlighting the importance of emotion regulation (25,26). This concept encompasses the various ways individuals manage and express their emotions, involving biological, psychological, cognitive, behavioral, and social elements (24). Cognitive emotion regulation specifically refers to the ability to navigate emotional responses in the face of negative experiences, serving as a strategy to handle distressing information. By influencing the type, intensity, duration, and expression of emotions, mindfulness practices can effectively mitigate competitive anxiety through improved emotional regulation (25).

The relationship between mindfulness and competitive anxiety in athletes, particularly the role of emotion regulation, has been insufficiently explored. This oversight underscores the need for further research, especially among adolescents who encounter various stressors that can lead to significant psychological difficulties. Consequently, this study seeks to investigate the connections between mindfulness, emotion regulation, and competitive anxiety in young athletes.

2. Methods

2.1. Design and Participants

This study utilized a descriptive-correlational design with structural equation modeling. The study's statistical population comprised 1,513 male students aged 15 to 18 who participated in the 2023 Student Sports Olympiad. Following established guidelines for determining the minimum sample size in the partial least squares method, the maximum sample size was calculated to be 122 participants, based on a formula that multiplies the number of indicators by 10. To improve the reliability and accuracy of the results, the final sample size was increased to 194 individuals to accommodate potential non-responses. This research is categorized as descriptive-correlation and was conducted in a field setting, utilizing structural equation modeling to analyze the conceptual framework. Prior to the research's practical implementation, both participants and their parents received comprehensive information regarding the study's aims and methods. Inclusion criteria included being a high school student, active participation as an athlete in the 2023 Sports Olympiad, no physical or mental health issues, and not being on any special medication. Participants who did not meet these criteria or who failed to complete the questionnaire were excluded from the study.

2.2. Measurements

2.2.1. Mindfulness

The Sports Mindfulness Questionnaire (27) was employed to assess levels of mindfulness, consisting of 15 items rated on a six-point Likert scale, where responses range from almost never (one) to almost always (six). This instrument includes three subscales: awareness, non-judgment, and defocusing. The overall mindfulness score is derived from the mean of the responses, with higher scores indicating increased mindfulness. In this study, the validity of this instrument has been confirmed by eight experts,

yielding a Content Validity Index (CVI) of 0.91 and a Content Validity Ratio (CVR) of 0.90. Moreover, the scale demonstrated a high reliability, with a Cronbach's alpha of 0.96.

2.2.2. Competitive Anxiety

The Competitive Sports Trait Anxiety Scale (28) was used for measuring competitive anxiety. It comprises 25 items, ranging from 1 (rarely) to 3 (most of the time). Total scores can range from 25 to 75, with higher scores indicating higher competitive trait anxiety. In this study, the validity of this instrument has been confirmed by eight experts, yielding a CVI of 0.89 and a CVR of 0.91. Moreover, the scale demonstrated a high reliability, with a Cronbach's alpha of 0.91.

2.2.3. Emotion Regulation

The Cognitive Emotion Regulation Questionnaire (29) was used for measuring emotion regulation. It comprises 36 items, each rated on a five-point Likert scale ranging from 1 (almost never) to 5 (almost always). This instrument assesses nine distinct factors related to emotional regulation, including self-blame, blaming others, catastrophizing, rumination, refocusing on planning, acceptance, positive focus, and positive appraisal. Each of the 36 questions is designed to evaluate one specific factor, providing a comprehensive overview of an individual's cognitive emotion regulation strategies. In this study, the validity of this instrument has been confirmed by eight experts, yielding a CVI of 0.92 and a CVR of 0.94. Moreover, the Cronbach's alpha coefficient of the scale was 0.93.

2.3. Procedure

In the implementation phase, collaboration with the Education Department was initiated to secure the necessary permissions. Following this, a visit to the school was conducted to present the research objectives, highlighting the importance of the findings to ensure informed consent from both parents and students. A convenience sampling method was then employed to select a sample of 194 athletic adolescents, who were asked to complete questionnaires. The completed questionnaires were subsequently collected for analysis.

2.4. Statistical Analysis

For the data analysis, descriptive statistics were employed, focusing on measures of central tendency and variability such as mean, standard deviation, skewness, and kurtosis. Following this, inferential statistics were applied through structural equation modeling, contingent upon the validation of necessary assumptions. The analysis was performed using Smart PLS statistical software version 4, with a significance level set at 0.05.

3. Results

Table 1 outlines the characteristics of mindfulness, competitive anxiety, and emotion regulation in adolescent athletes. The skewness and kurtosis values for all variables are within the acceptable range of -2 to +2, indicating that the data adheres to the normal distribution criteria.

Table 1. Description of Research Variables.

	Skewness	Kurtosis	Mean	SD	Maximum	Minimum
Mindfulness	0.263	0.521	2.58	0.29	4.75	1.33
Competitive Anxiety	0.373	0.417	55.26	3.14	63.84	37.46
Emotion Regulation	1.08	0.146	85.69	6.45	155.96	45.37

Table 2 indicates that the Cronbach's alpha coefficients for mindfulness, competitive anxiety, and emotion regulation were 0.93, 0.90, and 0.88, respectively. Furthermore, the composite reliability scores were 0.91 for mindfulness, 0.89 for competitive anxiety, and 0.84 for emotion regulation. The average variance extracted (AVE) values were 0.652 for mindfulness, 0.577 for competitive anxiety, and 0.569 for emotion regulation. These metrics surpass the established acceptable thresholds, suggesting that the questionnaires employed exhibit strong reliability and validity.

Table 2. Validity and Reliability.

	Cronbach's Alpha	Composite Reliability	AVE
Mindfulness	0.931	0.911	0.652
Competitive Anxiety	0.902	0.892	0.577
Emotion Regulation	0.883	0.841	0.569

The analysis utilizing Pearson's correlation coefficient revealed a significant relationship between mindfulness and competitive anxiety ($P < 0.001$, $r = -0.58$), as well as between emotion regulation and competitive anxiety ($P < 0.001$, $r = -0.47$). Additionally, a significant correlation was found between mindfulness and emotion regulation ($P < 0.001$, $r = 0.39$). These findings support the hypothesis of a linear relationship among the variables studied. Moreover, the variance inflation factor (VIF) values for all variables remained below the critical limit of 10, indicating that multicollinearity does not pose a problem in this research.

The path analysis results obtained through Smart PLS software, detailed in Table 3, indicate a robust structural relationship between competitive anxiety and emotion regulation within a mindfulness framework. The analysis yielded significant values for competitive anxiety, with P=0.000, t=-5.56, and b=0.42, while emotion regulation showed P=0.000, t=3.25, and b=0.31. Additionally, a significant structural relationship exists between emotion regulation and competitive anxiety, as evidenced by P=0.000, t=-4.41, and b=0.39.

Table 3. Structural Model Coefficients and Values for the Direct Path.

Path	b	SE	t-Value	P-Value
Mindfulness => Competitive Anxiety	- 0.422	0.039	-5.56	0.000
Mindfulness => Emotion Regulation	0.312	0.028	3.25	0.000
Emotion Regulation => Competitive Anxiety	- 0.394	0.035	-4.41	0.000

The results presented in Table 4 indicate that emotion regulation serves as a significant mediator in the relationship between mindfulness and competitive anxiety. This is supported by a p-value of 0.000, a t-value of 4.12, and a b coefficient of 0.22, underscoring the statistical relevance of this connection.

Table 4. Structural Model Coefficients and Values for the Indirect Path.

Indirect Path	b	SE	t-Value	P-Value
Mindfulness => Emotion Regulation => Competitive Anxiety	0.22	0.046	4.12	0.000

The Stone-Geisler Q^2 index values presented in Table 5 are all positive, suggesting a high-quality structural model. This model exhibits strong predictive power for the endogenous latent variables, with an R^2 value of 0.56 for mindfulness, indicating that it accounts for 56 percent of the variance in this construct. Additionally, the SRMR value of 0.072 falls below the acceptable threshold of 0.08, while the goodness of fit index (GOF) for the overall model is 0.38, surpassing the minimum requirement of 0.36. Together, these results confirm that the model demonstrates a good fit.

Table 5. Model fit Indices.

	Q^2	R^2	SRMR	GOF
Mindfulness	0.293	0.563	0.072	0.38
Competitive Anxiety	0.311	0.710		
Emotion Regulation	-			
Acceptable Value	Be positive		<0.8	>0.36

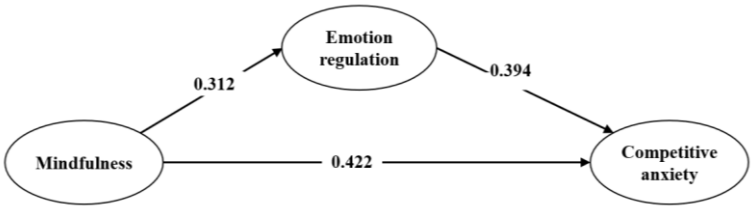

Figure 1. Standardized Coefficients of Paths

4. Discussion

This investigation aims to explore the relationships among mindfulness, emotion regulation, and competitive anxiety in young athletes. Findings from the study reveal a significant structural relationship between competitive anxiety and emotion regulation within the context of mindfulness. Furthermore, a significant relationship is identified between emotion regulation and competitive anxiety, with emotion regulation acting as a significant mediator in the relationship between mindfulness and competitive anxiety. To interpret these findings, it can be stated that mindfulness enables individuals to detach from persistent thought patterns and manage sports-related anxiety effectively (23). By concentrating on the present moment, mindful practitioners can disrupt the cycle of negative automatic thoughts (30). This cognitive-behavioral approach fosters a connection among physical, cognitive, and emotional processes, emphasizing awareness, particularly of one's own body (31). Consequently, those who engage in mindfulness develop a flexible mindset that acknowledges and accepts their feelings as they arise, allowing them to regain equilibrium after experiencing adverse emotions.

Mindfulness significantly enhances interoceptive awareness, making its integration with physical training crucial (32). By intentionally focusing on the present moment, individuals can observe their breath and recognize internal sensations and their connections to emotional states without judgment (33). This practice cultivates a broader sense of awareness and offers numerous benefits, including reduced stress, improved emotional regulation, and greater enjoyment in physical activities. Furthermore, mindfulness fosters increased self-awareness, concentration, and performance, all of which are vital for injury prevention, resilience, recovery, and overall well-being (32,34).

Mindfulness is closely linked to various dimensions of well-being and health, particularly in fostering positive emotions (18). Individuals who practice mindfulness tend to confront and accept negative emotions rather than evade them, employing cognitive strategies that enhance their emotional awareness and regulation (19). This ability to manage emotions effectively is a hallmark of mindfulness, as these individuals approach challenges with a non-judgmental attitude, patience, and a fresh perspective, akin to experiencing situations for the first time. Consequently, cultivating mindfulness can significantly enhance emotional regulation, leading to more effective emotional control in individuals (20). Individuals who possess the skill to manage their emotions are more likely to cultivate positive thinking and effectively address challenges. This emotional regulation not only enhances their capacity for optimistic thought but also equips them with better tools for problem-solving (18,19). Thus, the ability to control one's emotions plays a crucial role in fostering a mindset that promotes positivity and resilience.

Athletes appear to cultivate a psychologically receptive state by focusing on recent negative experiences and accepting them without judgment, while also acknowledging positive and desirable events (35,36). This approach fosters a mental environment that reduces anxiety across cognitive, behavioral, and motor domains. Furthermore, these athletes engage in a conscious immersion in the present moment, deriving enjoyment from their current experiences without the burden of past regrets or future anxieties (37,38). This mindful practice significantly alleviates their anxiety levels compared to those who do not employ cognitive interventions.

Mindfulness has been shown to foster the emergence of positive thoughts, mitigate emotional responses during stressful situations, and promote self-compassion (31). By enhancing psychological flexibility, positive mindfulness contributes to improved mental health and greater life satisfaction. This practice not only equips individuals to better navigate their environments but also plays a crucial role in overall well-being. Positive thinking significantly influences individuals' perceptions and their capacity to handle threatening situations (33,34). The process of cognitive emotion regulation enhances emotional awareness, allowing for better modulation and expression of feelings. Furthermore, compassion fosters a deliberate focus on suffering, promoting an understanding of its effects and facilitating both cognitive and emotional insights into challenges, ultimately aimed at fostering healing (32).

This study encountered several limitations that should be acknowledged. Primarily, its concentration on adolescents may restrict the applicability of the findings to other age demographics, such as children, indicating a need for future investigations to encompass younger cohorts. Additionally, the use of questionnaires to evaluate research variables raises concerns about potential self-reporting bias. Moreover, the study does not account for potential confounding variables such as age, type of sport, years of athletic experience, or socioeconomic background, all of which may influence anxiety or mindfulness levels. Finally, while structural equation modelling was used, the cross-sectional correlational design limits the ability to infer causality. On a more positive note, this research underscored notable strengths, especially in its examination of mindfulness among student athletes, a topic that has not been extensively explored in previous studies.

4.1. Conclusion

The findings of this research align with its objectives, emphasizes the roles of mindfulness, and emotion-regulation in reducing athletes' competitive anxiety. Specifically, mindfulness influences athletes' competitive anxiety through its effects on so emotion-regulation. Consequently, the research recommends that athletes incorporate mindfulness meditation into their training regimens to enhance their emotion-regulation capabilities. This practice can help athletes manage their emotional states during competitions, mitigate the effects of negative evaluations and external pressures, and foster a positive competitive mindset. Moreover, it is crucial for athletes to recognize their psychological challenges and seek timely adjustments or professional assistance when necessary. By addressing these issues proactively, athletes can maintain a constructive outlook and better showcase their inherent athletic talents, ultimately reinforcing the importance of mental health in sports performance.

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Footnotes

Authors' Contribution: This study was carried out solely by the corresponding author.

Conflicts of Interest

Non to declare.

Data Availability: The data that support the findings of this study are openly available upon request from the corresponding author.

Ethical Approval: The author confirms that all steps and requirements of this study comply with ethical guidelines. Participants were informed about the characteristics of the study and gave written informed consent.

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