



## The role of mindfulness in enhancing athletic performance: a critical review of empirical studies

*El papel del mindfulness en la mejora del rendimiento atlético: una revisión crítica de estudios empíricos*

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### Abstract

**Introduction:** Athletes face increasing psychological demands, making mental preparedness as vital as physical training in competitive performance.

**Objective:** This study aims to critically evaluate the role of mindfulness in enhancing athletic performance across cognitive, emotional, and recovery domains.

**Methodology:** Se realizó una revisión crítica utilizando bases de datos como Scopus, Web of Science y SAGE. Los criterios de inclusión se centraron en estudios empíricos revisados por pares, publicados entre 2019 y 2025, que abordaran el mindfulness y sus efectos en los resultados psicológicos de los atletas. Se utilizó una síntesis temática para analizar los hallazgos.

**Discussion:** Mindfulness improves attention, emotional regulation, and reduces anxiety. It enhances athletes' coping under stress and supports emotional clarity. Burnout prevention and recovery benefits were also evident, particularly with consistent and individualized interventions.

**Conclusion:** Mindfulness is a multidimensional intervention that enhances performance, supports recovery, and fosters psychological resilience in athletes. More sport-specific research is needed to refine effective intervention models.

### Keywords

Mindfulness, athletic performance, emotional regulation, burnout.

### Resumen

**Introducción:** Los atletas enfrentan crecientes demandas psicológicas, haciendo que la preparación mental sea tan crucial como el entrenamiento físico.

**Objetivo:** Este estudio busca evaluar críticamente el rol del mindfulness en la mejora del rendimiento deportivo en dominios cognitivos, emocionales y de recuperación.

**Metodología:** Se realizó una revisión sistemática y crítica de la literatura en bases de datos como Scopus, Web of Science y SAGE. Se incluyeron estudios empíricos revisados por pares publicados entre 2019 y 2025 que analizaran el impacto del mindfulness en atletas. Se aplicó síntesis temática.

**Discusión:** El mindfulness mejora la atención, regula las emociones y reduce la ansiedad. Fortalece el afrontamiento ante el estrés y aporta claridad emocional. También se evidenció su papel en la prevención del burnout y la recuperación, especialmente con intervenciones personalizadas.

**Conclusión:** El mindfulness es una intervención multidimensional que potencia el rendimiento, facilita la recuperación y fortalece la resiliencia psicológica de los atletas. Se necesita más investigación específica por deporte.

### Palabras clave

Mindfulness, rendimiento deportivo, regulación emocional, agotamiento.

## Introduction

The importance of motor performance is widely recognized in all sporting achievements whether it is in professional sports or at a lower-level amateur sports. The pressure on athletes to perform at their optimal physical and psychological level has increased over the years (Pranoto et al., 2024). Athletes are under increasing pressure from coaches, sponsors and fans and require the ability to maintain performance under pressure. This pressure may give rise to higher levels of stress and anxiety, which can negatively influence performance if not adequately addressed (L. Li et al., 2023; Q. Li et al., 2024). Therefore, improvement on sports depends not only on training the body but on being mentally and psychologically prepared.

Psychological aspects as the essential predictors in sport performance have been regarded in recent years (Aditya, Yusuf, et al., 2024). Aspects like focus, emotional regulation, as well as tolerance to stress are increasingly acknowledged as key components that contribute to optimal performance (Jones et al., 2020; Tang et al., 2023). Theoretical models and concepts like mental toughness and flow experience also highlight the importance of psychological factors in sport. Mental toughness has been associated with the extent to which performance is maintained in the face of adversity and the flow state is characterized by deep involvement in an activity leading to an optimal experience and performance (Ajilchi et al., 2022a; Walker, 2021). Cognitive-behavioral methods are also central in addressing the question of what role cognition has in relation to sporting performance (Josefsson et al., 2019; Lee et al., 2024).

Mindfulness, which is composed of attending on purpose to the present moment without judgment (mindfulness awareness), has become increasingly popular as a psychological intervention across different contexts, including sport (Dehghani et al., 2018; Zadkhosh et al., 2018). A growing interest in sport has also occurred along with mindfulness-based interventions (MBIs) being recognized as effective in health and educational contexts. Recently, training of mindfulness are becoming to be considered as effective methods to maintain good psychological health status and boost athletics performance (Dunning et al., 2019; Tang et al., 2022).

Mindfulness may enhance core aspects of athletes' attention regulation, emotional control, coping with stress, and recovery (Sparks & Ring, 2022; Sukur et al., 2023). Theoretical conceptualizations such as the mindfulness-acceptance-commitment (MAC) model and self-regulation theory account for the mechanisms by which mindfulness promotes these core components. Such models postulate that greater mindfulness should lead to better self-regulation and better emotion regulation, which in turn should lead to better performance (Vveinhardt & Kaspars, 2022). For example, by facilitating greater assimilation of emotions, athletes can control competitive anxiety and enhance their overall performance (Imtiaz et al., 2018a; Sukur et al., 2023).

In recent years, empirical research into mindfulness in sports has developed rapidly. In particular, several studies have examined the effects of different mindfulness-based training programs, including Mindfulness-Based Stress Reduction and MAC, on different groups of athletes (C. Li et al., 2019; Petrovska et al., 2023). Moreover, numerous findings suggested the benefits of mindfulness training in reducing stress and anxiety and improving attention and psychological well-being (Jones et al., 2020). Notwithstanding, it is crucial to keep in mind that some studies show mixed results regarding the effectiveness of mindfulness interventions in performance improvement (Johles et al., 2025). In addition, other studies reported that mindfulness training could significantly reduce anxiety and promote emotional and affective resilience among athletes, especially injured athletes (Chen et al., 2019). For example, several studies found a positive relationship between mindfulness practices and reduced competitive state anxiety and emotional self-efficacy among athletes (Rozaidi et al., 2023; Zadkhosh et al., 2018). Also, the cultivation of attention and ability to maintain focus and cool down in stressful situations is associated with reduced anxiety levels among athletes who complied with mindfulness training (L. Li et al., 2023; Tang et al., 2022).

An increasingly dynamic picture of the field of mindfulness research within sport continues to emerge, with more recent research targeting particular sports and demographic groups (Aditya, Rahmatika, et al., 2024a; Orhan et al., 2024). Indeed, studies on mindfulness interventions in various athletes, including young athletes, and in athletes in high-stress sports environments, are on the rise (Lee et al., 2024; Ruiz et al., 2021). Of particular interest, mindfulness training has been found effective in preventing



burnout and supporting recovery by enhancing emotional regulation and reducing alexithymia. The implications of these findings extend beyond performance outcomes alone, indicating broader psychological and well-being benefits for athletes (Dunning et al., 2019; Johles et al., 2025).

To summarise, momentum is building that empirically supports that mindfulness might be an important factor in optimising athleticism. The integration of mindfulness into training regimes can help foster important psychological skills for improved performance results (Carraça & Magalhães, 2025; Villa Ricapa et al., 2025). While the nuances of mindfulness in the context of sports continue to be elucidated, additional research will be essential for understanding the circumstances in which beneficial outcomes are derived from engaging in mindfulness practices with athletes from different domains (Imtiaz et al., 2018b; Josefsson et al., 2019; Sparks & Ring, 2022).

A critical literature review on the role of mindfulness in sports performance the contemporary discussion about the role of mindfulness practice in sport performance has clearly gaped lacking of critically comprehensive reviews which systematically evaluate the strength of the evidence, source of heterogeneity, and the subreddit of inconsistency found among the empirical studies in this field. Even though an extensive studies examined the effectiveness of mindfulness interventions, results in this area are sometimes not consistent and are across studies different. For example, although a few studies have focused on improvements of athletes' performance due to mindfulness training, some have observed insignificant effects or the necessity to take particular contextual factors into account in the interpretation of outcomes (Amemiya & Sakairi, 2019; Shaabani et al., 2020a; Si et al., 2024). Furthermore, different methodological approaches have been used across studies, which also complex the possibility of making general inferences about the actual effects and utility of mindfulness-based interventions in athletes (Reinebo et al., 2024). The lack of an integrative review of such findings limits our deeper insights into the role that mindfulness may play within sports, as it leaves multiple theoretical and practical implications under-researched.

The purpose of this review was thus to address this lack and critically evaluate the evidence on mindfulness and sport performance. By critically examining the theoretical structure, methods, results and caveats of the available literature, this review aims to elucidate how Mindfulness could improve athletic performance. In doing so, it will educate both practitioners on what might be the best things to do when it comes to offer mindfulness training and what areas need more investigation in future research. Also, it will be important for the future research to tackle the discrepancies and methodological issues found in the preceding literature, in order to foster the scientific progress on how mindfulness is developed in the sport context and to push for stronger and more standardized methodologies in the field going forward.

Therefore, this review aims to critically evaluate empirical evidence on the effectiveness of mindfulness-based interventions in sport performance, specifically focusing on cognitive, emotional, and recovery-related outcomes. It also seeks to identify research gaps, highlight methodological inconsistencies, and offer recommendations for future studies and practical applications in sport psychology. This review adopts a critical systematic approach to synthesizing empirical studies from 2019 to 2025, without adhering to formal protocols such as PRISMA or AMSTAR-2. The methodology focuses on thematic synthesis, guided by established psychological frameworks, to assess mindfulness interventions in athletic contexts.

## Method

Using a critical review approach, this study systematically evaluated the contribution of mindfulness to athletic performance by examining the strength, consistency, and limitations of empirical evidence published between 2019 and 2025. Given the diversity of theoretical frameworks and research methodologies in the current literature, a critical lens was applied to assess methodological rigor, theoretical coherence, and practical relevance in sport settings. The focus was not only on mapping existing studies but also on evaluating their validity and drawing insights into areas of agreement, divergence, and research gaps.

A comprehensive search was conducted across leading academic databases including Scopus, Web of Science, Taylor & Francis Online, SAGE Journals, and Google Scholar. The search targeted English-language, peer-reviewed empirical studies that explored the relationship between mindfulness-based interventions and psychological or performance-related outcomes in athletes. The keywords used in combination with Boolean operators included: “mindfulness AND athletic performance,” “mindfulness-based interventions AND sports,” “mindfulness AND emotional regulation in athletes,” “MAC approach AND sport psychology,” and “mindfulness training AND physical performance.”

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Published between 2019 and 2025	Purely theoretical or conceptual papers without empirical data
Empirical studies (quantitative, qualitative, or mixed-method)	Studies focused solely on spiritual or meditative practices outside the sports context
Focused on mindfulness and its influence on cognitive, emotional, or psychological performance in athletes	Studies addressing only physiological or biomechanical outcomes without psychological components
Written in English and published in peer-reviewed journals	Non-peer-reviewed sources (e.g., opinion pieces, blogs, editorials)

The selected studies were systematically coded and analyzed based on key elements including the author and year of publication, study focus, methodology, and principal findings. Each study employed a distinct methodological approach—ranging from randomized controlled trials and quasi-experimental designs to daily diary methods and meta-analyses—reflecting the diversity of research strategies used to assess mindfulness in athletic contexts.

The data analysis was guided by thematic synthesis, allowing the findings to be categorized into three overarching domains:

1. Cognitive Enhancement – including improvements in attention, focus, and flow state.
2. Emotional Regulation – covering stress and anxiety reduction, and emotional control under pressure.
3. Burnout Prevention and Recovery – addressing mental recovery, resilience, and injury coping mechanisms.

Each article was reviewed for its contribution to these domains and assessed for alignment with key psychological models, especially the Mindfulness-Acceptance-Commitment (MAC) approach and self-regulation theory. These theoretical lenses supported a deeper understanding of how mindfulness affects performance through improved psychological functioning.

Data triangulation was employed across diverse methodologies (e.g., randomized controlled trials, quasi-experiments, daily diary methods, meta-analyses) to compare findings and increase analytical trustworthiness. As this study is based entirely on published literature, no ethical approval was required. Nonetheless, high standards of academic integrity were upheld throughout, including accurate referencing and critical engagement with all sources.

## Results

### *Summary of Selected Literature*

Following the identification and selection of relevant studies, a systematic thematic synthesis was conducted to extract and organize key findings across the reviewed literature. The coding process aimed to identify recurring psychological outcomes associated with mindfulness-based interventions in athletic contexts.

One researcher conducted the initial coding of each article by examining the abstract, methodology, and results sections. The key data extracted included psychological outcomes such as focus, attention, stress, anxiety, emotional awareness, and recovery indicators. To ensure the reliability and transparency of the interpretation, themes were developed through an iterative reading process and were compared across studies to confirm consistency.

Three overarching themes emerged from this synthesis:



1. Cognitive Enhancement: Derived from repeated findings related to improved focus, attentional control, and concentration (e.g., Josefsson et al., 2021; Si et al., 2024).
2. Emotional Regulation: Formed through recurring references to reduced anxiety, enhanced emotional awareness, and stress coping (e.g., Zhang et al., 2024; Kelemen et al., 2025).
3. Burnout Prevention and Recovery: Inferred from results discussing post-training recovery, reduced emotional fatigue, and performance resilience (e.g., Jones et al., 2020; Shaabani et al., 2020).
4. Although the thematic synthesis was conducted by a single reviewer, efforts were made to maintain objectivity by cross-referencing findings with theoretical models (e.g., the MAC approach, self-regulation theory). This single-coder process is recognized as a methodological limitation, and future reviews may benefit from independent coding by multiple researchers to enhance analytic validity.

Table 2. Summary of Selected Literature

Author and Year	Sample Size	Sport Discipline	Methodology	Intervention Duration	Measured Outcomes	Key Findings
(Su et al., 2024)	Total of 40 athletes (20 experimental, 20 control), with an average age of approximately 15.7 years	Elite athletes from the Hong Kong Sports Institute (specific sport disciplines not specified)	Mixed-methods approach (qualitative interviews and quantitative performance assessments)	Not explicitly mentioned in the abstract, but consists of a training program plus follow-up	Mindfulness, acceptance, satisfaction with performance, and sport training performance	MAIC improved mindfulness, acceptance, and training performance, though effects decreased during follow-up; interviews supported the quantitative findings
(Si et al., 2024)	Total of 582 participants across included studies	Mixed (various sports disciplines; not detailed in the abstract)	Meta-analysis of 11 studies with 23 effect sizes	Not specified in the abstract	Mindfulness level, flow/fluency state, athletic performance, psychological anxiety	Mindfulness training had a significant large effect in improving mindfulness (SMD = 1.08), flow (SMD = 1.47), performance (SMD = 0.92), and reducing anxiety (SMD = -0.87)
(Josefsson et al., 2021)	25 elite biathlon athletes	Biathlon	Quantitative study using correlational design	Not applicable (observational study; no intervention mentioned)	Dispositional mindfulness facets (Awareness, Refocusing, Nonjudgemental attitude); shooting performance in actual competitions	All three mindfulness facets were positively associated with better shooting performance; biathlon experience was also a credible predictor, but competitive level was not
(Zhang et al., 2024)	78 elite athletes, 27 observations per athlete over 9 weeks (total data points = 2,106)	Not specified (elite athletes from various sports)	Diary study design; data collected over 9 weeks; analyzed using multilevel structural equation modeling	9 weeks (observational, not interventional)	State mindfulness, mood (positive and negative dimensions), salivary cortisol (stress), and self-rated athletic performance	State mindfulness was positively related to performance ratings and negatively related to performance anxiety.
(Kelemen et al., 2025)	20 elite Hungarian distance runners (10 experimental, 10 control)	Distance running (national and international level athletes)	Quasi-experimental design with pre- and post-intervention assessments	6 weeks of group-based MSPE training	Flow experience, competitive anxiety, mindfulness, and emotion regulation	Experimental group showed significant improvements in flow and reduction in cognitive anxiety; control group showed no change
(Shaabani et al., 2020)	72 basketball players (Mean age = 28.6 ± 4.0 years)	Basketball	Experimental study with four randomized groups (depletion/mindfulness, no depletion/mindfulness, depletion/no mindfulness, control)	15-minute breath and body mindfulness audio session (vs. audiobook for control)	Free throw performance under pressure after ego depletion and mindfulness intervention	Mindfulness intervention mitigated performance decline caused by ego depletion; free throw accuracy was preserved in mindfulness group despite pressure and depletion



(Wu et al., 2021)	101 college athletes	Not specified; referred to broadly as "college athletes" from various sports	Cross-sectional study using Pearson correlation analysis	Not applicable (non-interventional study)	Scores of dispositional mindfulness (MAAS), psychological skills (APSI), and mental toughness (TMTIS)	Dispositional mindfulness was positively correlated with psychological skills ( $r = 0.21-0.36$ ) and mental toughness ( $r = 0.27-0.30$ ), all statistically significant.
(Nien et al., 2020)	46 university athletes	Not specifically mentioned; referred to generally as "university athletes"	Quasi-experimental design with intervention and control group	Five-week mindfulness training program	Mindfulness level, endurance performance (via graded exercise test), executive function (via Stroop task), and N2 component of ERPs	Post-intervention improvements in mindfulness, endurance, Stroop accuracy, and reduced N2 amplitude in the mindfulness group compared to control
(Jones et al., 2020)	Not explicitly stated in the abstract; participants were members of a Division I NCAA Women's Rowing Team	Collegiate women's rowing	Controlled experimental design (Intervention vs. Control group)	8 weeks	Psychological well-being, subjective and objective sleep quality, athletic coping skills, and rowing performance (6,000-m ergometer test)	Intervention group improved in all measured outcomes compared to the control group; increases in mindfulness were correlated with better well-being, coping skills, and sleep.

The nine included studies provide an overall picture of how the role of mindfulness in improving different facets of athletic performance is developing. These studies use a variety of methodological paradigms—that is, quantitative, qualitative, mixed-methods, quasi-experimental, and randomized clinical designs—attesting to the emerging research interest in this area. Collectively, mindfulness continues to be a core psychological resource for athletes to promote physical and psychological health.

No start full text Many studies highlight the beneficial impact of mindfulness on cognitive and attentional functions. For example, (Josefsson et al., 2021) and (Nien et al., 2020) note that mindfulness can indirectly enhance focus and executive functioning, which are essential for detail sports such as biathlon, and endurance categories. These conclusions are consistent with the meta-analysis of (Si et al., 2024) which aggregates across studies to assert that mindfulness can improve attention and emotional regulation, which are known key predictors of steady athletic performance.

The theme of emotional regulation was also prominent. Zhang et al. and Su et al. illustrate how mindfulness reduces stress and emotional instability, which leads to enhanced self-rated performance and satisfaction in elite athletes (Su et al., 2024; Zhang et al., 2024). For instance, state mindfulness inversely linked to performance pressure, thus, reflecting that it offers an anxiety-buffering effect. This aligns with the findings of (Shaabani et al., 2020b), experimental research that proved how one of these short interventions kept at risk athletes on an expected level of athletic output in basketball players considering cognitive fatigue after ego depletion.

In addition, mindfulness-based interventions may reinforce the psychological resilience and coping capabilities of athletes. Wu et al. and Kelemen et al. found that incorporating mindfulness with psychological preparation can lead to mental toughness and self-confidence, as well as facilitate athletes' skill in managing competitive pressure. These findings infer mindfulness practice as a supplement to traditional sports psychology programs to help develop the whole athlete (Kelemen et al., 2025; Wu et al., 2021).

Finally, research, including (Jones et al., 2020) broaden the context of mindfulness beyond sports performance measures, demonstrating its advantages in terms of improving quality of sleep and the overall psychological profile of student rowers. This wider application serves to reflect the importance of mindfulness not only as a performance enhancer, but as a protective factor for mental health, maintenance, and recovery for athletes.

Together, these studies are part of an emerging body of evidence supporting mindfulness as a flexible, effective approach in sport environments. Although results are comparable between studies, the variety

of sport, the age of the athletes, and the design of the interventions demonstrate that more individualized mindfulness programs for the different requirements of different sports may be beneficial.

### ***Mindfulness and Cognitive Performance***

In order to build on the evidence base related to mindfulness and cognitive performance, we can also integrate the results from the ten studies considered in the previous section to realise a more comprehensive review on how mindfulness might play a role in athletes' mental and performance attributes. Taken together, these prior studies are in agreement with the strong association of mindfulness with emotional regulation, attention, and resilience, correlating well with the general psychological benefits reported in the studies of (Gan et al., 2024; Gevorgyan, 2022).

For example, the research conducted by (Zhang et al., 2024), that similarly relied on a daily diary approach to examine within-person relationships between mindfulness, mood, and stress, is in line with the findings of (L. Li et al., 2023) concerning increased emotional clarity. Zhang found that athletes reported that a state of mindfulness was associated with higher self-rated performance and lower performance-related worries, developing a direct pathway effect of mindfulness on emotional self-regulation for the athletes. This lends support to the suggestion that mindfulness reduces anxiety, a common theme in the alexithymia studies and competitive anxiety (Zhang et al., 2024).

Moreover, (Su et al., 2024) on athletes revealed that those engaging in mindfulness and acceptance-based training, enjoyed greater satisfaction with performance and showed greater adaptive behavioral results. This is in corroboration with the study by (Aditya, Rahmatika, et al., 2024b) mental toughness and resilience focus, it may be that mindfulness could assist athletes in dealing with emotional stressors and remaining perf within high-pressure situations.

Si et al. also provides valuable context for the cognitive performance aspect by concluding that mindfulness significantly enhances attention and emotion regulation across multiple randomized controlled trials (Si et al., 2024). These results are consistent with the findings of (Tang et al., 2022) that high mindfulness is associated with lower state trait anxiety, which is important for those athletes who tend to choke under pressure. Taken together, these studies indicate that mindfulness provides cognitive benefits as a prophylactic, as well as a performance-enhancing technique.

This is also confirmed by the study published by (Josefsson et al., 2021) who discovered that increased mindfulness skills in biathletes resulted in a better focus and a higher accuracy of shooting. Thus, our findings provide clear evidence of the connection between attentional control, achieved through various degrees of emotional control, and performance in a context of competition, mirroring the neurocognitive advantages reported by (Dinter et al., 2021) on mindfulness and biological stress responses. Likewise, the randomized controlled trial of (Nien et al., 2020) reported significant enhancing effects of both executive function and endurance performance following the mindfulness programme, in line with Lee et al. of reduced perceived stress secondary effects on their perceived stress.

The buffering role of mindfulness in the emotional and psychological dimensions was also observed in the study conducted by (Jones et al., 2020) among female university rowers, in whom better quality of sleep, improved well-being and lower stress levels were reported. Such positive effects go beyond the competitive environment and imply that the culture of mindfulness is part of the ecosystem of mental health, which is conducive to an athletes' peak performance—echoing holistic outcomes stressed by (Gevorgyan, 2022; L. Li et al., 2023).

Finally, (Kelemen et al., 2025) and (Wu et al., 2021) extend this work by demonstrating the benefits of group mindfulness training and psychological skill development on self-confidence and coping. These results support the idea that mindfulness not only works on the individual level in terms of stress reduction, but also as an intervention with positive effects on team building and mental readiness—essential factors for emotionally taxing sport environments.

In integrating these findings, it becomes evident that mindfulness is not a unidimensional exercise, but a multi-dimensional intervention affecting emotion, cognition, and performance together. Considered in conjunction with the extant literature, these ten studies support mindfulness as a fundamental piece of the psychological tool kit among athletes, contributing to emotional regulation, reduced stress and anxiety, and ultimately performance in both the short and long term.



## ***Mindfulness and Emotional Regulation***

Mindfulness seems to be a crucial skill for improving emotional control, and for this reason it has gained increased attention for athletes' performance in front of audiences. Its function in decreasing stress and anxiety is highly documented in literature. Furthermore, a study conducted by O'Connor et al. demonstrated that highly dispositionally mindful athletes were more resilient to psychological distress during the COVID-19 pandemic (O'Connor et al., 2022). It implies that mindfulness can serve as a protective factor for stress, which helps athletes to control their emotions better in situations of adversity. This kind of affect regulation is essential for good performance and is possibly even more important within high-pressure competitive contexts.

As well, the association between mindfulness and emotional awareness is interesting. Emotional awareness is important for athletes because the recognition and regulation of emotions affect how they react to competitive stress. Ajilchi et al. reported that a mindfulness training intervention induces both mental toughness and psychological well-being among athletes through an improved regulation of their emotional reactions (Ajilchi et al., 2022). Improved emotional awareness helps athletes to know when anxiety has an impact on the focus and their performance. As a result, through the practice of mindfulness, this enables athletes to sustain emotional clarity, enabling them to perform their best under pressure.

Additionally, having a sense of mindfulness can decrease alexithymia—a term that refers to when individuals have difficulty recognizing and sharing their feelings. Rogowska and Tataruch findings highlight the relationship between mindfulness, emotional self-regulation, and mental skills in athletes, and more importantly suggest that higher levels of mindfulness are related to lower alexithymic tendency (Rogowska & Tataruch, 2024). There by improving emotion clarity and consequently emotional expression and emotion regulation, athletes are better able to mitigate the negative effects of emotions on performance, decreased reactivity and enhanced coping. Through mindfulness training, athletes experience greater emotional clarity, which supports full engagement in sport and the development of effective coping mechanisms and performance-promoting strategies.

Research by Wu et al. supports the link of mindfulness and coping-effectiveness, especially when encountering sports' stress situations (Wu et al., 2021). Their results indicate that athletes who engage in mindfulness are more likely to perceive stress not as a threat but a challenge that could be controlled. This change of focus can go a long way toward cutting down on the negative feelings that often come with competitive pressure. Athletes develop into more robust individuals who see adversities as chances to show off their talents and not as scary monsters.

Also, mindful training enhances one's attentional functioning which is an imperative factor for performing in a sport context. Shaabani et al. noted that through selective attention, athletes can block out distractions, that is fans and pressure of performances, to solely concentrate on task at hand (Shaabani et al., 2020). Mindfulness helps develop a mind-state that allows athletes to focus their minds on key aspects of their performance — such as technique and strategy — reducing/eliminating distractions and improving overall performance in their sporting experiences. This heightened awareness has particularly high implications in paced sports, in which performance is determined by small margins, a high level of sustained attention.

Mindfulness: beyond emotion regulation to self-regulation. Kelemen et al. performed a pre-test/post-test quasi-experimental investigation and reported the significant increases in anxiety and self-confidence in athletes who participated in mindfulness interventions (Kelemen et al., 2025). The beneficial psychological effects of mindfulness not only facilitate emotional control; they also create a world in which it is more natural to achieve peak performance. Practicing mindfulness allows and athlete to confront these high pressure scenarios with confidence, and mitigate the debilitating effects of anxiety.

Moreover, mindfulness interventions are reported to have positive effects on athletes' mental states when analyzed within meta-analyses. Si et al. demonstrated that implementation of mindfulness training in sports positively influences emotional regulation and there by the enhanced performance outcomes can be predicted (Si et al., 2024). These results are important because they point to the emotional benefits of mindfulness and confirm its downstream effects on performance.





In conclusion, adding mindfulness training to athletes' training programs is a strong intervention to support emotion regulation, decrease anxiety, and to enhance adaptation to performance pressure. Through development of emotional awareness and clarity, mindfulness provides athletes with tools to control their emotions, and therefore enhance performance. With the expanding body of research on mindfulness, this practice may have great potential to promote both performance and mental health in athletes.

### ***Burnout Prevention and Recovery Support***

Burnout—with its emotional exhaustion, depersonalization, and low personal accomplishment—is an area of concern for athletes, coaches, and high-stress individuals. Mindfulness has shown to be a protective factor against burnout and has offered some solution to the individuals in coping with stress and improving the emotional resilience. Recent studies have shown that mindfulness-based interventions can prevent and decrease symptoms of burnout by enhancing self-perception and improving coping mechanisms. For example, a recently published systematic review by Li et al. It was reported that mindfulness had a significant effect on burnout in athletes, and in particular, it enabled emotion regulation and reduced negative affect, which is closely related to burnout symptoms (C. Li et al., 2019). This study highlights the significance of mindfulness as a potential lead in terms of pro-actively preventing burnout across several professional and sports settings.

It is important too to consider the role of mindfulness in mental and physical healing. And research has found that mindfulness-based interventions increase recovery through producing more of a sense of physical calm and emotional equilibrium. As an example, Ratri et al.'s meta-analysis indicated that mindfulness training can lead to significant improvements in recovery experiences in health care professionals, suggesting that mindfulness may foster not only mental relaxation, but also physical restoration (Ratri et al., 2022). These two features are of particularly relevance in the field of sport, where recovery processes seem to have two new best friends in improving performance and health. Thus, the implementation of mindfulness practices into recovery routines can help athletes to develop a mindset that is conducive to relaxation and recovery, ultimately reducing risk of burnout.

For achieving the maximum benefit from mindfulness intervention, the length and quantity of exercises are an essential factor. It has been found that short and frequent mindfulness interventions produce more promising results than long and infrequent ones (Urbanowicz et al., 2023). This indicates that engaging in mindfulness practice in daily activities may improve athletes' response to stress and recovery. The recent work of Pawsey et al. stems this belief by suggesting, even short offline mindfulness practice may support significant recovery benefits amongst coaches, supporting effects for frequent practice over duration of practice (Pawsey et al., 2021). It is important to consider which are the ideal mind ness training parameters in order to develop effective preventive burnout programs.

Mindfulness has also been found to enhance emotional clarity which is essential to avoid burnout. This is particularly relevant in high-demanding professions where emotional dysregulation tends to generate feelings of hopelessness and fatigue. Recent scientific findings underscore the role of emotional regulation in protective factors against burnout, showing that mindfulness training programs can facilitate individuals' ability to better identify and manage their emotions (Almén, 2021). As a result, greater emotional clarity is associated with more effective decision making and coping, less experience of overwhelm, and lower susceptibility to burnout.

Additionally, the relationship between mindfulness and the workplace should not be disregarded. Araújo-Filho et al. witnessed that if the support of the organization is supplemented with mindfulness interventions, it could be a solid base to diminish burnout amongst health care workers (Araújo-Filho et al., 2023). This reinforcing dynamic highlights that mindfulness as a practice is most efficacious when grounded in institutional policies that value mental health and well-being. It is known that a workplace culture must be one of support for the effective delivery and sustainment of mindfulness in the workplace. This is especially relevant for burnout prevention interventions and recovery programs.

Furthermore, recent research underscores the importance of customized mindfulness programs designed to respond to unique requirements. The results of Afonso et al. propose interventions that target specific dimensions of burnout among anesthesiologists, their workload and emotional demands, for higher efficacy (Afonso et al., 2021). Customizing mindfulness interventions enables individuals to

address the specific in-formative challenges they encounter, based on improved intervention-individual fit, thus accelerating recovery and diminishing burnout.

The large body of evidence so far suggests the critical importance of mindfulness in burnout prevention and recovery across different domains such as sport and health care. Promoting emotional regulation, setting the stage for recovery mechanisms, and identifying optimal conditions to practice mindfulness are ways to help people to cope greatly with burning out. As we learn more about the nuanced nature of burnout, mindfulness practices with organizational endorsement may be a key practice in a strategy to cultivate wellness and high performance in high-stress work environments.

## Discussion

The corpus of empirical research reviewed in this investigation underscores the growing importance of mindfulness in the optimization of athletic performance, especially via its influence on cognitive functioning, emotional self-regulation, and burnout avoidance. The ten studies included also adopted different methodologies, encompassing randomized controlled trials, quasi-experimental designs, and mixed methodologies, highlighting the flexibility and extent of current study in this area. The general results indicate that mindfulness acts as a multidimensional psychological resource which, not only enhance performance, but also seem to maintain the optimal mental health of athletes in competitive contexts.

**Mindfulness** One of the strongest points of consensus among studies is that mindfulness confers cognitive benefits, especially for attention, concentration, and executive function. Research by (Josefsson et al., 2021) and (Nien et al., 2020) offers strong support for the proposition that mindfulness enhances attentional control, which is a key component of precision- and endurance-oriented sports. These results are supported by a meta-analysis of data from studies by (Si et al., 2024) that mindfulness has favorable effects on attention and emotional regulation, which are among the main skills for athletic success. Furthermore, athletes trained in mindfulness have frequently expressed – that compared to other periods of their athletic careers – greater ease maintaining focus during actual competition, an important factor in achieving personal and team success.

The increase in cognitive performance by mindfulness is associated with an enhanced emotional regulation. For example, research by (Zhang et al., 2024) and (Su et al., 2024) were that mindfulness enables athletes to process stress and anxiety and to increase self-appraisal and performance satisfaction. Mindfulness of state, specifically, has been found to protect athletes from performance-based concerns and to construct emotional clarity. These results are in accordance with previous work of (Tang et al., 2023) and (L. Li et al., 2023), who found that dispositional mindfulness is associated with lower trait anxiety and higher emotional resilience under pressure.

In addition, the decreased alexithymia (difficulty identifying and expressing emotions) induced by mindfulness<sup>45</sup> may also be beneficial for stress-induced reductions in performance. The relationship between mindfulness and life adversity has been highlighted by (Rogowska & Tataruch, 2024) who show that higher mindful level athletes experience lower emotional reaction and increased emotional awareness to deal with adversity. The ability to understand emotions helps athletes to identify their emotions and what they feel and to be in control of them, resulting in more clearness in high pressure moments and ultimately facilitating high performance.

Besides cognitive and emotional advantages, mindfulness has a key function in preventing and overcoming burnout. Burnout is a common phenomenon among elite athletes characterized by emotional exhaustion and reduced sense of accomplishment. Mindfulness-based interventions are effective in reducing experiences of burnout, as evidenced by the studies of (C. Li et al., 2019) and (Almén, 2021). These structured interventions support innate coping skills while enhancing emotional regulation, increasing self-awareness, and fostering psychological well-being—all strong counterweights to burnout.

“Beyond prevention, it’s about being more mindful,” he added, which helps with recovery, both mental and physical. There is also some evidence to suggest that the calming, harmonizing effect of mindfulness practices supports recovery following exertion. As an example, studies conducted by (Ratri et al., 2022) and (Pawsey et al., 2021) found that even very short and regular moments of mindfulness can contribute to significant positive experiences of recovery. This is of particular value to athletes with

heavy training schedules or competition schedules, in which timely recovery from a match can help ensure continued performance.

The timing of, and the delivery method of, mindfulness interventions also matter. There is evidence short and frequent practice is often more effective than long, infrequent practice. Urbanowicz et al. report that active meditation of mindfulness on a daily basis assists the athletes in developing psychological resilience and to better adapt to stress, while aiding in long term recovery and handling emotions (Urbanowicz et al., 2023). If the level and format of mindfulness training is more tailored to athletes according to their needs, it might optimize the efficacy.

Organizational support is also an important contingency for the effective delivery of mindfulness interventions. As demonstrated in the experiments of (Araújo-Filho et al., 2023) and (Afonso et al., 2021), mindfulness interventions which are nested within support of the institution are more likely to be effective. And this is just as true in sports as it is in healthcare: when a coaching staff and team culture endorse positive mental health, mindfulness can become a more feasible way of coping and growing.

Overall, the results of these studies lend considerable support to the proposition that mindfulness is not just another skillset for the mind but a critical component of mental preparedness and emotional regulation in sport. It improves cognitive function and reduces stress/anxiety, protects athletes from burning out and facilitates recovery – all of which can contribute to immediate performance results as well as long-term athlete development. Because mindfulness has received a strong momentum in sport psychology, future research should examine how to tailor intervention strategies according to the sport requirements, athlete's characteristics, and level of competition.

Despite the encouraging results reported in this review, there were several methodological limitations in the existing literature that need to be scrutinised. First, it is the heterogeneity of interventions—studies varied greatly in the length, frequency, and mode of the mindfulness interventions applied, as well as focused more on mechanisms or forms of mindfulness practices, such as MAC, MBSR, and MSPE. The mode of delivery differed and it influenced the comparability between studies. Moreover, participants had substantially different features, including age, gender, country of sport, competitive level, and cultural background; thus, the findings may not be generalizable. Another important limitation concerns the lack of long-term (in)destuced follow-up of severe gymnasts responses, precluding conclusions about the persistence of the positive psychological and performance-related outcomes. Further is reporting transparency was often poor as many studies did not sufficiently describe key elements such as fidelity of the intervention, qualifications of the trainers, or adherence of the participants. This means that the findings are difficult to interpret and their reproducibility is compromised. Limiting the sources considered to English-language, peer-reviewed documents may also have introduced publication bias, leading to the exclusion of relevant studies published in other languages or in the grey literature.

Going forward, using validated and standardized mindfulness intervention protocols is crucial in order to increase consistency and facilitate more meaningful comparisons between studies. Longitudinal research designs will also be key to gain a clearer understanding of long-term effects of mindfulness-based approaches in sport settings. Indeed, there is an urgent call to action for research to expand to under-represented populations such as youth athletes, para-athletes, and team-based sport individuals. Comparative work across cultures may offer insight into the mechanisms of mindfulness interventions in different sociocultural contexts. Finally, investigating the relationship between trait mindfulness and influences of structured trainings could contribute to illuminate the mechanisms that differentiate outcomes among individuals. Lastly, research on the cost-effectiveness and scalability of mindfulness will be equally important in informing its applied use within high-performance sport settings.

In conclusion, mindfulness transcends a mere performance-enhancing strategy, it is an integrated psychological resource that may help athletes to cope with cognitive challenges/symptoms, to regulate emotions and enhance recovery. When applied wisely in athletic practice, mindfulness may in fact promote short-term performance improvement and long-term psychological durability. Further research is needed on these interventions to improve, contextualize, and establish standard applications; this will be important in maintaining their effectiveness and widespread adoption in high performance sports settings.



## Conclusions

This critical review has analyzed 9 empirical investigations of the relationship between mindfulness and athletes' performance in sport, in the context of cognitive processes, emotion regulation and burn-out. The results suggest an evidence base for the power of mindfulness as a psychological intervention that brings multifold dividends in athletes. It enhances attentional control and executive function, enabling athletes to remain focused under pressure. These cognitive boosts are important for single player as well as team sports; in those situations players need to maintain acute focus and decision-making accuracy over an extended period of time.

Mindfulness not only leads to cognitive gains but it also reduces anxiety, improves emotional clarity, and supports emotional resilience. Mindful athletes have more control over their emotions, competitive anxiety, and responses to competitive stress. Mindfulness also has importance for athlete protection for burnout by enhancing emotional balance and recovery. There is evidence to suggest that repeated practise of mindfulness meditation facilitates physical recovery and mental balance, especially when treatments are individually adapted and repeated.

The review also underscores the weight of organizational and contextual factors, or "requisite ingredients" such as supportive coaching environments and personal intervention formats, so as to maximize the effectiveness of mindfulness programmes. concluded that preliminary evidence exists regarding the utility of combining the practice of mindfulness with sport-specific, mental skills training. Although the current body of work shows support for mindfulness in sport training, future long-term, sport-specific research would help to optimize the best practices for athletes.

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