



Influences of mindset and lifestyle on sports performance: a systematic review

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Abstract

Introduction: In the scenario of the mindset and performance of athletes, the athlete's lifestyle becomes an integral part of this development. e need to focus on the mindset of athletes, exploring the perspectives of elite athletes through a qualitative approach, in order to understand the lifestyle and other factors to which they attribute their success. **Objective:** It was to carry out a systematic review to present the main studies on the influence of mindset (mindset) on the performance of athletes, as well as the entire lifestyle scenario for this development. **Methods:** The systematic review rules of the PRISMA Platform were followed. The research was carried out from January to March 2023 in Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results and Conclusion:** A total of 118 articles were found, and 32 articles were evaluated in full and 29 were included and developed in this systematic review study. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 52 studies with a high risk of bias and 14 studies that did not meet GRADE. It was concluded that mindsets such as believing in yourself after failure

(called the constructive mental code) are very beneficial for athletes' perseverance, motivation, and performance improvement. Still, a positive mindset can positively influence the performance of athletes, showing that mental skills training can lead to better performance in competition. Thus, champion athletes attribute their good mindset as the main predictor of competitive success. However, it is necessary to inform and encourage these practices in coaches and support staff in the area of the psychological skills of athletes. Mindfulness can benefit athletes' mindsets and performance. Cognitive variables, such as coping with stress, are significantly correlated with performance. Highperformance strategies include using honed mental rehearsal skills and practicing recovery.

Keywords: Sports performance. Mindset. Lifestyle. Mindfulness.

Introduction

In the mindset and performance scenario of athletes, the athlete's lifestyle becomes an integral part of this development [1-3]. One has to balance various factors such as the demands of competition, stressors, negative chance events, and interactions with family,

peers, coaching, and support staff [3]. In this sense, lifestyle practices and daily routines such as sleep, relaxation, diet, hydration, water immersion therapy, entertainment, and social networks are therefore essential to achieve and maintain elite performance [4-7]. Therefore, the quest to improve the performance of world-class athletes involves understanding the attributes, skills, strategies, support, environment, and lifestyles of elite performers [8-12].

In this context, international sports agencies such as the International Olympic Committee suggest that support for an athlete should be holistic, integrated, and evidencebased [13]. In this sense, it is necessary to focus on the mindset of athletes, exploring the perspectives of elite athletes through a qualitative approach, to understand the lifestyle and other factors to which they attribute their success [14].

Furthermore, training load monitoring has many potential applications and cannot simply be reduced to a metric and/or calculation. It is important to emphasize that it is also necessary to manage the training load with a performance and training progression mindset [15]. For example, feeling confident has been shown to improve cognition and performance, while a lack of confidence (eg, feeling helpless, or anxious) is stifling for cognition and performance [16,17]. Furthermore, it has been shown that certain mindsets, such as believing in yourself after failure, called the constructive mental code, are very beneficial for the perseverance, motivation, and performance improvement of athletes. In addition, feedback from teachers and coaches has been shown to have an internal impact on athletes, including influencing motivation, mindset, learning potential, and resilience to challenges [18-20].

Based on this context, the present study aimed to carry out a systematic review to present the main studies on the influence of mindset on the performance of athletes, as well as the entire lifestyle scenario for this development.

Methods

Study Design

The systematic review rules of the PRISMA Platform were followed. Available at: www.prisma-statement.org/. Accessed: 04/18/2023.

Data Sources and Research Strategy

The search strategies for this systematic review were based on the keywords (MeSH Terms): *Sports performance. Mindset. Lifestyle. Mindfulness*. The research was carried out from January to March 2023 in Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. In addition, a combination of

keywords with the Booleans "OR", "AND" and the operator "NOT" were used to target scientific articles of interest.

Quality of Studies and Risk of Bias

The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument.

Results and Discussion

Summary of Findings

A total of 118 articles were found. Initially, duplication of articles was excluded. After this process, the abstracts were evaluated and a new exclusion was performed, removing the articles that did not include the theme of this article, resulting in 84 articles. A total of 32 articles were evaluated in full and 29 were included and developed in this systematic review study (Figure 1). Considering the Cochrane tool for risk of bias, the overall assessment resulted in 52 studies with a high risk of bias and 14 studies that did not meet GRADE.

Figure 1. Guide to the article selection process.

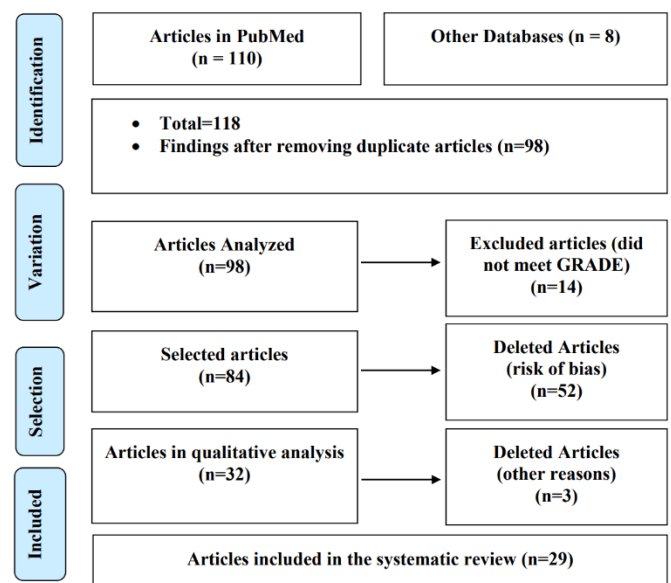
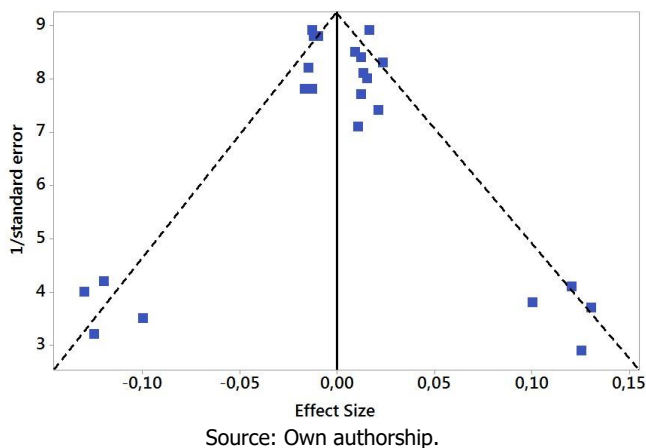


Figure 2 presents the results of the risk of bias of the studies through the Funnel Plot, showing the calculation of the magnitude of the difference using the Cohen Test (d). The sample size was indirectly determined by the inverse of the standard error. This graph showed symmetrical behavior, not suggesting a significant risk of bias, both between studies with small sample sizes that are shown at the bottom of the graph and studies with large sample sizes that are displayed in the upper region.

Figure 2. The symmetrical funnel plot does not suggest a risk of bias among the small sample size studies that are shown at the bottom of the plot. High confidence and high recommendation studies are shown above the chart (NTotal= 29 studies evaluated in full in the systematic review).



Major Clinical Findings – Mindset, Lifestyle, and Sports Performance

Based on the main findings, elite athletes form an important social group, and it is notorious to analyze their lifestyles. In this scenario, a study developed knowledge about the lifestyle of elite athletes. Participants in the first phase included 19 sports experts, such as sports sociologists, sports psychologists, and sports coaches, who were selected by purposeful sampling and snowball methods to conduct unstructured in-depth interviews. According to the results, the lifestyle of elite Iranian athletes includes indicators such as professional mindset, skills, outlook on life, financial education, responsibility, consumption, leisure, personal issues, and religious behavior. The subjects of the second phase were 44 national-level athletes who voluntarily participated in the study. Five dominant lifestyles were identified among elite athletes: consumerist, relaxed, socially useful, profit-oriented, and professional [21].

In this context, mindfulness can benefit athletes' mindset and performance. These benefits can be enhanced by sport-specific mindfulness interventions. One study aimed to develop a specific mindfulness intervention for rowing and, second, to investigate its effects on mindfulness, flow, reinvestment, and rowing performance. Rowers were randomly assigned to a 6-week rowing-specific mindfulness intervention (n=23), which included generic and rowing-specific practices, or a control group (n=21). Rowers completed pretest and posttest measures of performance, mindfulness, flow, and rowingspecific reinvestment. The results showed

that the intervention group increased flow, mindfulness, and improved performance, in addition, conscious motor processing decreased from the pre-test to the post-test. However, the intervention did not preferentially change mindfulness or reinvestment compared to the control. Participants provided favorable feedback and evaluated the intervention positively. The 6-week rowing-specific mindfulness intervention promoted flow, encouraged mindfulness, and aided performance. Therefore, a sport-specific mindfulness intervention may benefit athletes [22].

In addition, a study examined how stress coping skills, such as a stress mindset, affect performance and awareness in the context of a soccer match. A total of twenty elite women's soccer players participated in the study. The final sample size consisted of 15 players for the Stress Mindset Measure (SMM) analysis and 8 players for the multilevel model analyses. Two types of intervention were used to manipulate stress mindset and control heart rate variability (HRV); a serious game called "Stressjam" and a reflection tool called "Brainjam". The "Stressjam" intervention resulted in significant differences in stress mindset across the intervention ($p=0.008$). The multilevel analysis showed a positive, strong, and significant correlation between the stress mindset, manipulated through "Stressjam" and SA ($p=0.014$). A correlation of practical interest, given confidence intervals, was found between stress mindset, manipulated through "Stressjam", and performance. Therefore, cognitive variables, such as coping with stress, are significantly correlated with awareness in soccer. A correlation of practical interest was found between coping with stress and performance [23].

In this regard, a person's beliefs about the nature of stress (stress mindset) play an important role in the extent to which someone experiences the harmful or beneficial results of stress. Stress mindset has been explored in college students, but there is limited research on stress mindsets in student-athletes. Sports can serve as a buffer to the negative impacts of stress for some student-athletes; however, the pressures associated with sport participation increase stress in other student-athletes. In this regard, a study analyzed potential differences in stress mindset and perceived stress between non-athletes and collegiate athletes. A total of 272 students (n = 87 student-athletes; n = 185 non-athletes) completed a demographic questionnaire, the Perceived Stress Scale, and the Stress Mindset Measure via an online survey. No significant differences were observed between the stress mindset scores of student-athletes and non-athletes; however, significant differences were observed between perceived stress by

student-athletes and non-athletes. Thus, student-athletes and non-athletes shared a similar view of stress, but studentathletes reported a lower level of perceived stress than non-athletes [24].

In light of this, the popularity of sport psychology and mindset, both as an academic discipline and as an applied practice, has grown substantially over the past two decades. Few in the field of competitive athletics would argue the importance of being mentally prepared before an athletic competition, as well as the need to maintain that particular mindset during competitive competition. There is still a lack of understanding about the process and mechanisms by which these mental abilities affect performance. Thus, a study described how mental skills training resulted in better performance in competition [25].

In this context, champion athletes attribute their good mindset (psychological) as the main predictor of competitive success [1,2]. Still, championship performance requires a particular way of life that integrates mindset, performance factors, lifestyle, and relationships. High-performance strategies include the use of honed mental rehearsal skills and practice recovery [5].

Still, the best championship performance occurs at the intersection of a strong psychological profile, interpersonal support, and performance and lifestyle strategies. In that regard, it's up to the athlete's ability to shift focus within these domains through a slope that can lean in many directions. This ability is adaptive through self-regulation. Thus, specific guidelines for athlete education ensure that performance and lifestyle strategies are used effectively. Furthermore, it is necessary to facilitate greater education for coaches and support staff in the area of the psychological skills of athletes [6].

Still in this scenario, the COVID-19 pandemic stands out, which directly impacts the training course of athletes, affecting mindset and psychology. The organizational consequences of isolation are the absence of organized training and competition, lack of communication between athletes and coaches, inability to move freely, lack of adequate sun exposure, and inadequate training conditions. In this way, athletes need to redefine their mindset to understand isolation as an opportunity for development, organizing appropriate guidelines, educating and encouraging athletes to apply appropriate preventive behavior and hygiene measures to promote immunity and ensure good isolation conditions for life. Mental fatigue must be anticipated and controlled mentally. Daily monitoring should be established [26].

Added to this, the change in lifestyle for an athlete is comprehensive and includes a change in mindset, training, work, entertainment, and includes identity, self-image, and values. While elite athletic performance emphasizes the importance of social development, physical abilities, sport-specific skills, and psychological factors, championship performance also requires a particular way of life that integrates mindset, performance, relationships, and lifestyle factors. The findings confirm the critical importance of an athlete's psychological profile, in particular their strong self-regulatory skills, in coordinating and maximizing their learning and performance. Also, authors have shown that a multidimensional psychological profile together with a social perception allows elite athletes to negotiate and manage stressors in high-performance sports [3,4,7].

In this sense, social support is seen as a stress buffer and an integral part of building resilience. It is critical to facilitate and value the relationships they form among peers, teammates, coaches, family, and support staff throughout the elite athlete's journey. Thus, personalized education forms part of recognized performance and lifestyle strategies to ensure they are used effectively. At a high-performance level, athlete voice and empowered decision-making can be effective for athletic preparation and performance [27].

In this sense, international sports bodies advocate a holistic approach to athletic profile and environmental factors for world-class sporting performance. Thus, one study explored the contribution, impact of lifestyle, and psychological factors among a sample of world-class champion athletes. Four dominant and overlapping themes emerged psychological attributes, interpersonal relationships, performance strategies, and lifestyle practices. All athletes attributed their success to psychological rather than physical factors, and the vast majority relied on mental rehearsal skills and recovery practices. Therefore, the athletic profile and support needed to achieve and maintain podium-level performance are multidimensional, integrated, and individualized, and psychological factors are key. In this regard, there is ample evidence that mindset and emotion affect performance in athletes. Military and sports organizations have focused on optimizing the internal states of their military personnel and athletes, respectively, to improve performance and well-being [14].

Added to this, a study analyzed the complex interdependencies and temporal dynamics in these processes, their interrelationships with the observed stimulation behavior, performance, and biochemical variables, as well as their level of performance and

dependent variances of competition results. Twenty-three cyclists from different performance level categories engaged in individual and head-to-head competition time trials against an equally performing opponent. Perceived physical and mental exertion was primarily associated with observed stimulation behavior as needed to align the planned behavior with the current physiological state. The change in mindset associated with an action crisis was mostly associated with a non-adaptive psycho-neuroendocrinological distress response [28].

Also, peak performance videos accompanied by music can help athletes optimize their pre-competition mindset. Preparation techniques can be incorporated into these videos to influence the motivational state of athletes. In this regard, one study examined the psychological and psychophysiological effects of video and music when used as a pre-performance intervention for an anaerobic endurance task. Fifteen men (age = 26.3 ± 2.8 years) were exposed to four conditions before performing the Anaerobic Wingate Test: music only, video and music, video with music, and a no video/no music control. Results showed that the combined video and music conditions were the most effective in terms of influencing participants' pre-task effect and subsequent anaerobic performance, followed by the music-only condition [29].

Conclusion

It was concluded that mindsets such as believing in yourself after failure are very beneficial for athletes' perseverance, motivation, and performance improvement. Still, a positive mindset can positively influence the performance of athletes, showing that mental skills training can lead to better performance in competition. Thus, champion athletes attribute their good mindset as the main predictor of competitive success. However, it is necessary to inform and encourage these practices in coaches and support staff in the area of the psychological skills of athletes. Mindfulness can benefit athletes' mindsets and performance. Cognitive variables, such as coping with stress, are significantly correlated with performance. High-performance strategies include using honed mental rehearsal skills and practicing recovery.

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Informed consent

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Data sharing statement

No additional data are available.

Conflict of interest

The authors declare no conflict of interest.

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References

1. Callahan CE, Beisecker L, Zeller S, Donnelly KZ. LoveYourBrain Mindset: Feasibility, Acceptability, Usability, and Effectiveness of an Online Yoga, Mindfulness, and Psychoeducation Intervention for People with Traumatic Brain Injury. *Brain Inj.* 2023 Apr 16;37(5):373-382. doi: 10.1080/02699052.2023.2168062.
2. West SW, Clubb J, Torres-Ronda L, Howells D, Leng E, Vescovi JD, Carmody S, Posthumus M, Dalen-Lorentsen T, Windt J. More than a Metric: How Training Load is Used in Elite Sport for Athlete Management. *Int J Sports Med.* 2021 Apr;42(4):300-306. doi: 10.1055/a-1268-8791.
3. Christensen JF, Vartanian M, Sancho-Escanero L, Khorsandi S, Yazdi SHN, Farahi F, Borhani K, Gomila A. A Practice-Inspired Mindset for Researching the Psychophysiological and Medical Health Effects of Recreational Dance (Dance Sport). *Front Psychol.* 2021 Feb 25;11:588948. doi: 10.3389/fpsyg.2020.588948.
4. Čopec D, Karlović Vragolov M, Buško V. Individual Dispositions and Situational Stressors in Competitive Sport: The Role of Stress Mindset in the Cognitive Appraisals Processes. *Front Psychol.* 2022 May 24;13:829053. doi: 10.3389/fpsyg.2022.829053.
5. Russell S, Jenkins D, Smith M, Halson S, Kelly V. The application of mental fatigue research to elite team sport performance: New perspectives. *J Sci Med Sport.* 2019 Jun;22(6):723-728. doi:

- 10.1016/j.jsams.2018.12.008. Epub 2018 Dec 21. PMID: 30606625.
6. Fernández-Río J, Cecchini JA, Méndez-Giménez A, Terrados N, García M. Understanding olympic champions and their achievement goal orientation, dominance and pursuit and motivational regulations: A case study. *Psicothema*. 2018 Feb;30(1):46-52. doi: 10.7334/psicothema2017.302.
 7. Fletcher D, Sarkar M. A grounded theory of psychological resilience in Olympic champions. *Psychol Sport Exerc* 2012;13:669–78.
 8. Stambulova NB, Engström C, Franck A, Linnér L, Lindahl K. Searching for an optimal balance: Dual career experiences of Swedish adolescent athletes. *Psychol Sport Exerc* 2015;21:4–14.
 9. Gulbin JW J. Functional sport expertise systems. In: Damian Farrow JB, MacMahon C, eds. *Developing sport expertise: researchers and coaches put theory into practice*. London and New York: Routledge, 2013.
 10. Mountjoy M, Rhind DJ, Tiivas A, et al. Safeguarding the child athlete in sport: a review, a framework and recommendations for the IOC youth athlete development model. *Br J Sports Med* 2015;49:883–6.
 11. Wylleman P, Reints A. A lifespan perspective on the career of talented and elite athletes: perspectives on high-intensity sports. *Scand J Med Sci Sports* 2010;20 Suppl 2:88–94.
 12. Weissensteiner JR. How contemporary international perspectives have consolidated a best-practice approach for identifying and developing sporting talent. *Routledge handbook of talent identification and development in sport*: Taylor and Francis, 2017:50–67.
 13. Bergeron MF, Mountjoy M, Armstrong N, et al. International Olympic Committee consensus statement on youth athletic development. *Br J Sports Med* 2015;49:843–51.
 14. Burns L, Weissensteiner JR, Cohen M. Lifestyles and mindsets of Olympic, Paralympic and world champions: is an integrated approach the key to elite performance? *Br J Sports Med*. 2019 Jul;53(13):818-824. doi: 10.1136/bjsports2018-099217. Epub 2018 Oct 23. PMID: 30352862.
 15. West SW, Clubb J, Torres-Ronda L, Howells D, Leng E, Vescovi JD, Carmody S, Posthumus M, Dalen-Lorensen T, Windt J. More than a Metric: How Training Load is Used in Elite Sport for Athlete Management. *Int J Sports Med*. 2021 Apr;42(4):300-306. doi: 10.1055/a-1268-8791. Epub 2020 Oct 19. PMID: 33075832.
 16. MacNamara Á, Button A. The role of psychological characteristics in facilitating the pathway to elite performance. Part 1: identifying mental skills and behaviours. *The Sport Psychologist* 2010a;24:52–73.
 17. MacNamara Á, Button A, Collins D. The role of psychological characteristics in facilitating the pathway to elite performance. Part 2: examining environmental and stage related differences in skills and behaviours. *The Sport Psychologist* 2010b;24:74–96.
 18. Henriksen K, Stambulova N, Roessler KK. Holistic approach to athletic talent development environments: A successful sailing milieu. *Psychol Sport Exerc* 2010;11:212–22.
 19. Martindale RJJ, Collins D, Abraham A. Effective talent development: the elite coach perspective in UK Sport. *J Appl Sport Psychol* 2007;19:187–206.
 20. Rees T, Hardy L, Güllich A, et al. The great british medalists project: a review of current knowledge on the development of the world's best sporting talent. *Sports Med* 2016;46:1041–58.
 21. Mohamadi Turkmani E, Safari Jafarloo HR, Dehghan Ghahfarokhi A. Elite athletes' lifestyles: Consumerism to professionalism. *PLoS One*. 2022 Sep 26;17(9):e0269287. doi: 10.1371/journal.pone.0269287.
 22. Sparks KV, Ring C. A rowing-specific mindfulness intervention: Effects on mindfulness, flow, reinvestment, and performance. *Front Psychol*. 2022 Sep 7;13:871804. doi: 10.3389/fpsyg.2022.871804.
 23. Cnossen AM, Maarsingh BM, Jerčić P, Rosier I. The Effects of Stress Mindset, Manipulated Through Serious Game Intervention, on Performance and Situation Awareness of Elite Female Football Players in the Context of a Match: An Experimental Study. *Games Health J*. 2023 Apr;12(2):158-167. doi: 10.1089/g4h.2022.0209.
 24. Avery C, Shipherd AM, Gomez S, Barczarenner K. Exploring Stress Mindset and Perceived Stress between College Student-Athletes and Non-Athletes. *Int J Exerc Sci*. 2022 Nov 1;15(5):1554-1562.
 25. Gee CJ. How does sport psychology actually improve athletic performance? A framework to facilitate athletes' and coaches' understanding. *Behav Modif*. 2010 Sep;34(5):386-402. doi: 10.1177/0145445510383525. PMID: 20935240.
 26. Jukic I, Calleja-González J, Cos F, Cuzzolin F, Olmo J, Terrados N, Njaradi N, Sassi R, Requena B, Milanovic L, Krakan I, Chatzichristos K, Alcaraz PE. Strategies and Solutions for Team Sports

Athletes in Isolation due to COVID-19. *Sports (Basel)*. 2020 Apr 24;8(4):56. doi: 10.3390/sports8040056. PMID: 32344657; PMCID: PMC7240607.

27. Freeman P, Rees T. How does perceived support lead to better performance? An examination of potential mechanisms. *Journal of Applied Sport Psychology* 2009;21:429–41.
28. Venhorst A, Micklewright DP, Noakes TD. The Psychophysiological Determinants of Pacing Behaviour and Performance During Prolonged Endurance Exercise: A Performance Level and Competition Outcome Comparison. *Sports Med*. 2018 Oct;48(10):2387-2400. doi: 10.1007/s40279-018-0893-5. PMID: 29532418.
29. Loizou G, Karageorghis CI. Effects of psychological priming, video, and music on anaerobic exercise performance. *Scand J Med Sci Sports*. 2015 Dec;25(6):90920. doi: 10.1111/sms.12391.