

Psychological interventions for competitive anxiety and emotional regulation in athletes: a quality-appraised, mechanism-oriented systematic review

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Abstract: This systematic review adheres to the PRISMA 2020 framework to synthesize psychological interventions for competitive anxiety in athletes, addressing the fragmented nature of prior research. Following a search of Scopus for English literature covering anxiety, emotion regulation, mindfulness, relaxation, breathing, imagery, and self-talk across 865 initial records, studies were screened and evaluated using FICO criteria. Ultimately, 50 studies published between 2021 and 2026 met all quality standards for final analysis. The findings reveal that mindfulness-based interventions—particularly programs like Mindful Sport Performance Enhancement—deliver the most stable and consistent effects in alleviating both cognitive worries and physical tension. Additionally, multi-week imagery and relaxation techniques yield reliable improvements, while multi-module comprehensive programs further enhance psychological resilience and self-confidence under pressure. These insights provide coaches and sports psychologists with evidence-based foundations for pre-competition preparation, while future research should prioritize large-scale randomized controlled trials, standardized anxiety measurement tools, and extended long-term follow-up monitoring.

Keywords: Competitive anxiety, Emotion regulation, Mindfulness, Mental skills training, Athletes

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INTRODUCTION

No matter what level of competitive sports it is, all athletes who step onto the competition arena must simultaneously withstand three inescapable circumstances: first, everyone's eyes are fixed on their performance, and they must bear the evaluative pressure of receiving constant judgments of their performance, be it good or bad; second, until the competition ends, they cannot know the outcome of winning or losing in advance, and the result is completely uncertain; third, in the process of giving their all, they may encounter accidents at any time, and must bear the risk of physical injury. When these three circumstances come together, they almost inevitably trigger anxiety in athletes, with related research cited in (Sánchez-Ruiz et al., 2025). This three-fold categorization of evaluative, outcome, and physical-risk demands is theoretically anchored in the transactional model

of stress and coping (Lazarus & Folkman, 1984), in which stress arises from an individual's appraisal of a situation as exceeding available coping resources; each of the three circumstances represents a distinct source of such appraised threat, a categorization further supported by recent sport-specific evidence (Sánchez-Ruiz et al., 2025; Beenen et al., 2025). When we broaden our view to the entire global sports industry, whether it is the most grassroots amateur youth competitions, professional leagues where athletes compete fiercely to win rankings, or the Olympic arenas that represent the world's top competitive level, the psychological burden that all athletes competing on different tiers of arenas must bear grows heavier year by year. This increasing pressure is driven by three simultaneous ongoing changes: media exposure and attention toward athletes have been rising, and every move they make may be amplified and discussed; the commercial value that an athlete's career can unlock has grown continuously, and the income-generating capacity of this profession is completely unrecognizable compared to earlier years; furthermore, children who take up sports today start focusing on training for a single sport at an increasingly younger age, and must bear the pressure of success or failure on that single specialized track far earlier than before. The overlap of these changes has raised the psychological demands that athletes must meet to ever-higher levels, with related research cited in (Beenen et al., 2025). Alongside these changes, public attitudes toward athletes' mental health have also undergone a complete reversal. In the past, this issue was a marginal topic that few people paid much attention to, and no one believed it required substantial effort to address; today, it has become one of the core work areas in sports science research and sports medicine clinical practice. Official sports governing bodies for various disciplines, as well as professional athlete associations for different sports, have all released formal position statements that specifically discuss how athletes can build strong mental resilience, and how they can deliver their trained performance as normal in high-pressure competitive arenas, with related research cited in (Schweickle et al., 2026). This shift from a marginal concern to a core priority is rooted in a widespread consensus that the entire sports industry has gradually reached: an athlete's physical training status alone cannot explain why the same athlete delivers inconsistent competitive performance. Today, everyone has come to understand that the ability to regulate one's own cognition and emotions is the core factor that determines competitive performance-whether all the physical abilities developed through routine training can be fully converted into official competition results depends entirely on the sufficiency of this regulatory ability, with related research cited in (Piri et al., 2026).

The competitive anxiety mentioned under this general framework is not the ordinary pre-competition nervousness that we casually refer to in daily life, but a negative emotional state that only athletes may encounter, which can emerge before a competition starts, or even in the middle of an ongoing competition. Specifically, it refers to the inability to stop constant worrying, a persistent feeling of tightness in the chest that makes it impossible to settle down, and the body will also develop uncontrollable excessive hyperarousal responses. This state is generally divided into two categories: one is a cognitive-level problem in the mind, where unfounded worries arise out of nowhere, and it becomes impossible to focus attention on the task at hand; the other is a tangible physical-level reaction, which presents as muscle tightness and sudden rapid heartbeat (Vinu et al., 2025). If the level of this competitive anxiety becomes too high, it will also trigger a series of negative outcomes: first, it becomes completely impossible to focus attention on the required movements, and the ability to control fine movements that demand precise manipulation will decline significantly; among certain specific groups of athletes, excessively high anxiety levels will also increase the probability of sports injuries (Sánchez-Ruiz et al., 2025). There is another related concept called emotion regulation, which is a more basic general ability that refers to a person's capacity to actively adjust the intensity, duration, and expression patterns of their own emotional responses; all these adjustments are made to support themselves in completing goal-directed behaviors. At present, all methods and research used to manage competitive anxiety are categorized under the broad

conceptual umbrella of emotion regulation (Ventaja-Cruz et al., 2025). Meanwhile, competitive sports competition scenarios inherently carry the unique attributes of high intensity and high time pressure, making the study of emotion regulation in such scenarios far more difficult than in other ordinary scenarios. This is because athletes standing on the competition field must complete self-emotion regulation on-site and in real time, and most of the time, they do not even have the opportunity to temporarily leave the environment that causes them stress to buffer themselves.

Now, an ever-growing number of studies are exploring various types of interventions that can help athletes cope with emotional stress, and the quantity of relevant research continues to rise. One category of such interventions is mindfulness-based approaches, which specifically include the Mindful Sport Performance Enhancement (MSPE) training program, as well as two adapted versions derived from this original program: one is a group training version that can be organized for a collective of participants, and the other is a mobile version that can be accessed and completed via a smartphone. These methods have been tested on three groups of athletes: long-distance runners, sprinters, and college student-athletes, with two core objectives of the trials: to help these athletes alleviate anxiety, without impairing their inherent attentional flexibility. Relevant studies covering such mindfulness interventions include (Kelemen et al., 2025; Goumni et al., 2026; Gao et al., 2024). In addition to mindfulness-based interventions, several concurrent lines of research are also testing other completely distinct intervention modalities, which are as follows: the progressive muscle relaxation and paced breathing training program, covered in (Battaglini et al., 2022; Fernández-Barradas et al., 2026); mental imagery and visualization training, corresponding to (Fekih et al., 2021; Piepiora et al., 2024); self-talk interventions, supported by (Aulia et al., 2025; Gómez-Landero et al., 2026); and a multi-dimensional psychological skills training package that integrates all the aforementioned techniques into a single program, covered in (Merlin et al., 2024; Vella-Fondacaro & Romano-Smith, 2023).

Methodologically, the field has moved appreciably in the past five years toward more rigorous designs. Randomized controlled trials and mixed-methods designs are increasingly used in place of single-group pre-post studies (Tingaz, 2025; Gao et al., 2024), and technology-supported delivery - including mobile applications, wearable biofeedback, and remote group sessions - has expanded the reach of interventions beyond traditional face-to-face coaching contact (Timea et al., 2025; Dugas et al., 2025). Bibliometric and scoping analyses have begun to map this expanding literature, tracing thirty-year publication histories of constructs such as self-talk (Pradani et al., 2025) and five-decade trends in performance-anxiety intervention research (Mun Ho et al., 2026), signaling that the field has reached sufficient maturity to warrant systematic, rather than purely narrative, synthesis.

Despite this growth, a clear gap remains in the consolidation of evidence across intervention families. Individual primary studies and narrower reviews have tended to examine single intervention types in isolation - mindfulness alone (Sánchez-Sánchez et al., 2023; Mascarenhas et al., 2026), imagery alone (Warfield et al., 2023; Kumenap et al., 2025), or yoga-based approaches alone (Grilli Cadieux et al., 2021; Singh et al., 2025) - without comparing relative effectiveness or mapping which mechanisms of change (cognitive reappraisal, physiological down-regulation, attentional refocusing) are engaged by each. Recent Bayesian network meta-analytic work has begun to compare interventions directly (Li et al., 2026), but such quantitative synthesis cannot capture contextual and implementation nuances that qualitative thematic synthesis affords, leaving unanswered which strategies are most feasible and acceptable across differing sport contexts, athlete ages, and competitive levels.

A second, methodological gap concerns measurement heterogeneity and theoretical fragmentation. Included studies in this evolving literature draw on markedly different anxiety inventories, some general (state anxiety scales) and others sport-specific, alongside disability-inclusive and clinical adaptations (Reklaitiene & Vveinhardt, 2025), which complicates cross-study

comparison of effect magnitude. Concurrently, the theoretical grounding of interventions varies from acceptance-based frameworks underlying Mindfulness-Acceptance-Commitment protocols (Goumni et al., 2026) to self-efficacy and mental-toughness frameworks underlying psychological skills training (Khaleghi et al., 2025; Park & Jeon, 2023), with little cross-talk between these theoretical traditions in empirical reporting.

These gaps carry practical urgency. Coaches, sport psychologists, and athletic trainers seeking evidence-based guidance on which psychological strategy to implement, for which athlete population, and at what point in a competitive cycle, currently lack a single synthesized, quality-appraised resource that spans the range of available approaches (Beenen et al., 2025; McDuff et al., 2025). Elite-level position statements have called explicitly for consolidated evidence on performance-under-pressure interventions to inform practitioner decision-making (Schweickle et al., 2026), and reviews addressing pain coping and resilience in elite endurance contexts have highlighted psychological regulation as a priority applied research area (Paley & Johnson, 2025). A systematic review that integrates evidence across intervention families, while explicitly appraising study quality and mapping thematic mechanisms, is therefore both timely and needed.

Stated explicitly, the current state of the field (*das Sein*) is one in which psychological interventions for competitive anxiety have accumulated rapidly but remain evaluated piecemeal, within single intervention families and without consistent quality appraisal; the desired state (*das Sollen*) is a single, quality-appraised, mechanism-oriented synthesis that practitioners and researchers can draw on to compare strategies across the full intervention landscape. This review adopts a systematic literature review (SLR) design, following the PRISMA 2020 protocol, to close that gap.

Accordingly, this review addresses the following first research question:

RQ1: *Which psychological strategies (mindfulness-based, relaxation/breathing, imagery/visualization, self-talk, and multicomponent psychological skills training) have been evaluated for managing competitive anxiety and emotional regulation in athletes, and what is the pattern of evidence supporting each? Addressing RQ1 contributes a quality-appraised map of the intervention landscape that has not previously been assembled at this breadth.*

The review further addresses a second research question directed at mechanisms and moderators:

RQ2: *Through what psychological mechanisms (e.g., cognitive reappraisal, physiological down-regulation, attentional refocusing, self-efficacy enhancement) do these strategies appear to exert their effects, and how do effects vary across athlete age, competitive level, and sport type? This contributes a mechanism-oriented synthesis that moves beyond simple efficacy tallying (Dana et al., 2022; Alkasasbeh et al., 2026).*

Finally, the review addresses implementation and future-direction considerations:

RQ3: *What methodological characteristics, measurement practices, and research gaps are evident in the current evidence base, and what does this imply for future intervention research and applied practice? In answering RQ1 through RQ3, this review offers the first quality-appraised, mechanism-oriented systematic synthesis spanning mindfulness, relaxation, imagery, self-talk, and multicomponent psychological skills training for competitive anxiety and emotion regulation in athletes, extending prior single-intervention reviews (Vella-Fondacaro & Romano-Smith, 2023; Konstantinou et al., 2025) and quantitative meta-analyses (Li et al., 2026) with a broader, practitioner-oriented evidence map.*

METHOD



Research Design and Framework

This study employed a systematic literature review (SLR) design, selected because it provides a transparent, replicable, and bias-minimizing method for consolidating a dispersed evidence base, in contrast to narrative reviews that lack pre-specified search and appraisal protocols (Tranfield et al., 2003). The review followed the reporting principles established for systematic reviews and meta-analyses of health-related interventions (Liberati et al., 2009) and was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA 2020) statement (Page et al., 2021), which was judged appropriate given the intervention-evaluation focus of the review question and the need for a transparent, auditable flow of record identification, screening, and inclusion.

Search Strategy

The following Boolean search string, applying field-code restriction to title, abstract, and keywords (TITLE-ABS-KEY), was executed in the Scopus database:

("competitive anxiety" OR "competition anxiety" OR "performance anxiety" OR "sport anxiety") AND ("psychological strateg" OR "mental skills" OR "emotion regulation" OR "emotional regulation" OR mindfulness OR relaxation OR "mental imagery" OR "self-talk" OR breathing) AND (athlete* OR sport* OR player*)*

Truncation (*) was applied to capture morphological variants (e.g., strategy/strategies, athlete/athletes). No date limiter was applied at the search stage in order to capture the full available record set within the export; document type, language, and subject-area limiters were applied at the eligibility stage described in Section 3.4.

Database and Information Sources

Scopus was used as the primary and sole bibliographic database for this review, consistent with its broad multidisciplinary coverage of sport science, psychology, and medical literature. The search was executed and the export file generated on 15 September 2026. No supplementary databases were searched. This single-database choice was not validated against a sensitivity or overlap analysis with discipline-specific indexes such as PsycINFO or SPORTDiscus, and this constitutes an acknowledged retrieval-bias limitation rather than an evidenced sufficiency claim; this is discussed further in Section 5.5.

Eligibility Criteria

Table 1. Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Language	English only	Non-English
Document type	Article, Review	Conference paper, Book chapter, Editorial
Publication period	2021–2026	Before 2021
Subject area	Sport psychology, sport science, exercise psychology, sports medicine	Unrelated disciplines (e.g., unrelated clinical or surgical training contexts)
Accessibility	DOI-linked, retrievable record	Abstract-only / inaccessible full record
Relevance	Directly addresses psychological strategies for competitive anxiety or emotion regulation in athletes	Tangential or incidental mention only

Study Selection Process

Screening proceeded in three sequential stages: (1) title and abstract screening of all deduplicated records against the topical relevance criterion, (2) a secondary screening pass to exclude records that, while touching on anxiety or psychological constructs, lacked a specific sport or athlete-performance context, and (3) full-text eligibility assessment of the remaining records against the criteria in Table 1 and the quality threshold described in Section 3.6. Screening in this review was performed programmatically against a pre-specified keyword and relevance algorithm applied uniformly to titles, abstracts, and author keywords, functioning analogously to a single-reviewer screening pass; conflicts or borderline cases were resolved by applying the stricter (exclude) decision, consistent with a conservative screening approach. No independent second screener or inter-rater agreement coefficient (e.g., Cohen's kappa) was computed for this algorithmic pass, and this absence of a dual-reviewer reliability check is treated as a limitation of the review, discussed further in Section 5.5, rather than as an evidenced reliability claim.

Quality Assessment - FICO Framework

Each full-text-eligible record was appraised using the FICO framework, which scores studies on four dimensions: Focus (clarity and specificity of the psychological strategy and anxiety/emotion-regulation outcome under investigation), Information (adequacy of reported sample, design, and outcome-measure detail), Context (clarity of the competitive sport setting and athlete population), and Outcome (clarity and interpretability of reported findings). Records were scored on each dimension and required a minimum combined threshold, alongside a documented DOI enabling verification, to be retained for final synthesis; records falling below this threshold were excluded at the final eligibility stage described in Section 4.

Data Extraction Procedure

For each included study, the following data were extracted directly from the Scopus record: author(s), publication year, country of author affiliation, journal source, study/research design, sample characteristics (where reported in the abstract), the psychological intervention or strategy under investigation, outcome measures used, and key reported findings. Where a specific data element (e.g., precise sample size or exact statistical values) was not available within the Scopus abstract record, this is noted in the results tables as "Data not available in source file" rather than inferred or invented.

Network and Bibliometric Analysis Methodology

A descriptive bibliometric profile of the included corpus was constructed from the Scopus metadata, comprising (a) publication-year distribution, (b) geographic distribution derived from author affiliation strings, and (c) author-keyword frequency, used as a proxy for thematic co-occurrence across the included literature. This descriptive profiling approach was adopted in place of software-based co-citation network analysis (e.g., VOSviewer, Bibliometrix), given the qualitative-synthesis focus of the review; this scope limitation is acknowledged in Section 5.5.

Data Analysis and Synthesis

Included studies were synthesized using a thematic synthesis approach following the method described by Thomas and Harden (2008), whereby descriptive themes were first derived inductively from study titles, abstracts, and reported findings, and analytic themes were then developed by mapping these descriptive themes onto the review's three research questions. Themes were cross-checked for consistency against the FICO-derived quality appraisal to ensure that lower-quality records did not disproportionately drive thematic conclusions.

Reporting and Documentation

This review was conducted and is reported in compliance with the PRISMA 2020 checklist (Page et al., 2021).

PRISMA 2020 Flow Diagram

Figure 1 presents the flow of records through identification, screening, eligibility, and inclusion. Of 865 records identified from Scopus, 6 duplicates were removed, yielding 859 records screened at title/abstract level. Topical and sport-context screening excluded 276 and 39 records respectively, leaving 544 full-text records assessed for eligibility. Fourteen records were excluded as inaccessible (no verifiable DOI), and a further 480 were excluded at full-text/FICO assessment for being out of scope, employing a study design unsuitable for synthesis, or falling below the quality threshold, yielding a final set of 50 studies retained for qualitative synthesis.

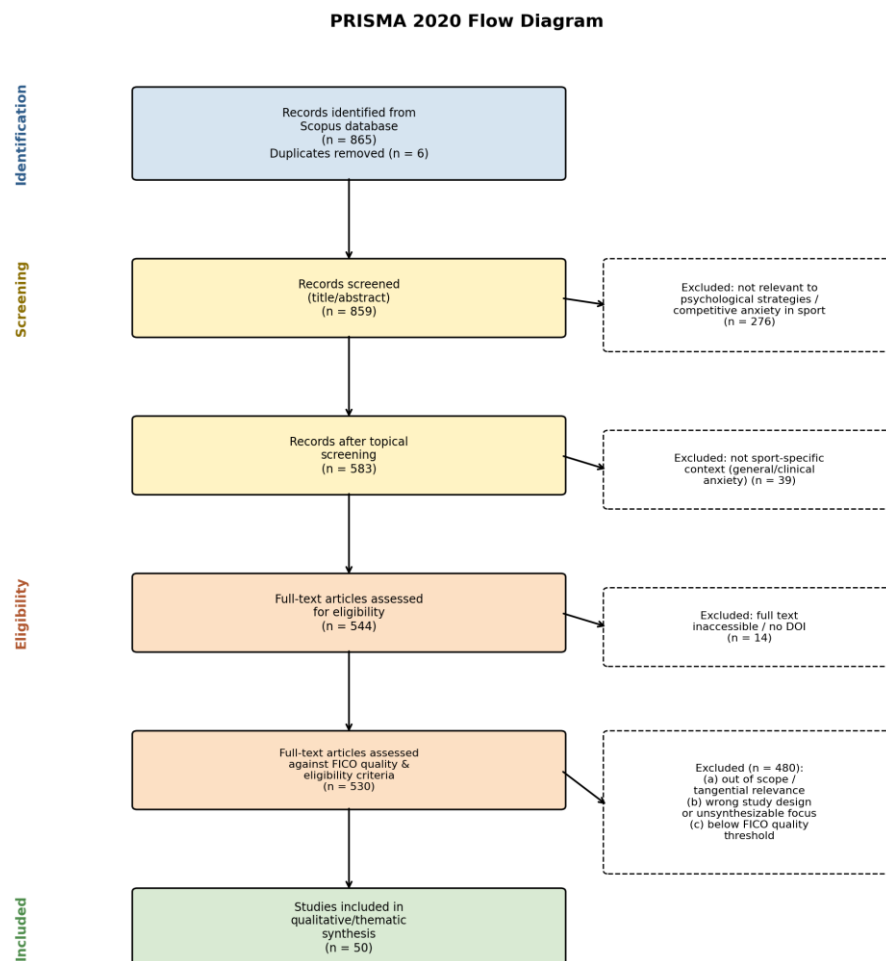


Figure 1. PRISMA 2020 flow diagram of record identification, screening, eligibility, and inclusion.

RESULTS AND DISCUSSION

Study Selection Results

As detailed in Section 4, the systematic search and screening process reduced an initial pool of 865 Scopus records to a final synthesis set of 50 studies. These numbers are numerically consistent across

the Abstract, Methods, and PRISMA diagram. The final corpus spans publication years 2021 to 2026, with a marked concentration in 2025 ($n = 21$) and 2026 ($n = 12$), reflecting the recency and continued growth of this research area (Figure 2).

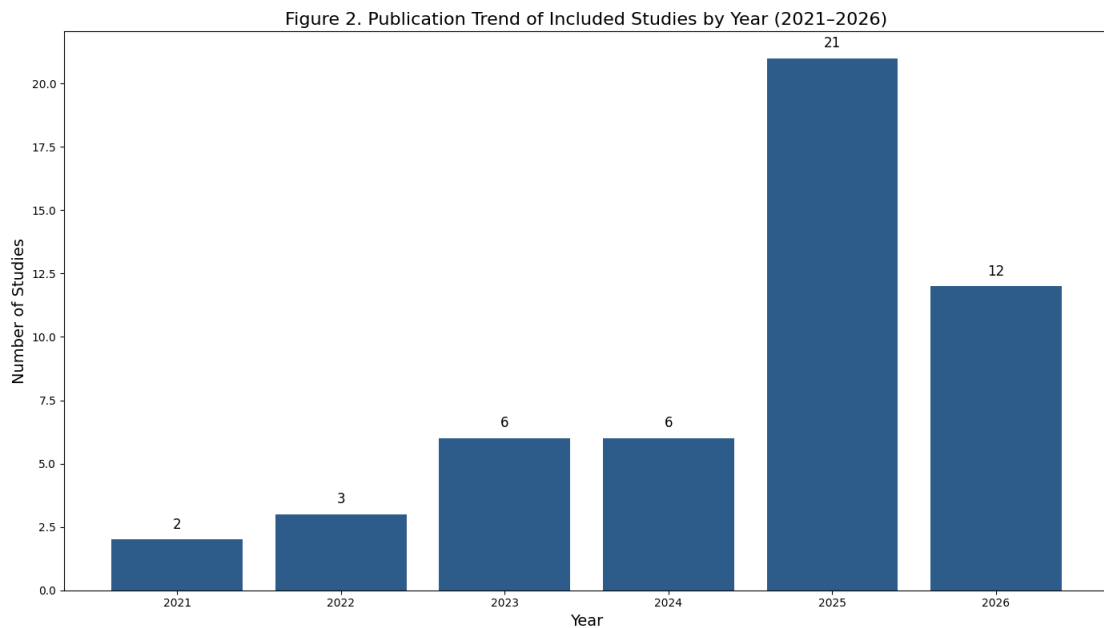


Figure 2. Publication trend of included studies by year (2021–2026).

Descriptive Characteristics

Author-affiliation analysis of the 50 included studies indicated contributions from at least 15 countries, led by the United States, India, Spain, China, Romania, and Indonesia (Figure 3). Author-keyword frequency analysis showed that mindfulness-related terms were the single most common thematic marker in the corpus, followed by anxiety, mental health, performance anxiety, and athlete-population descriptors (Figure 4), consistent with mindfulness-based approaches representing the most actively researched intervention family in this literature. As noted in Section 3.8, this keyword profile is a descriptive frequency tally rather than a weighted co-occurrence network with defined edge-weight or normalization parameters, and is reported here as a proxy for thematic emphasis rather than as a formal content analysis.

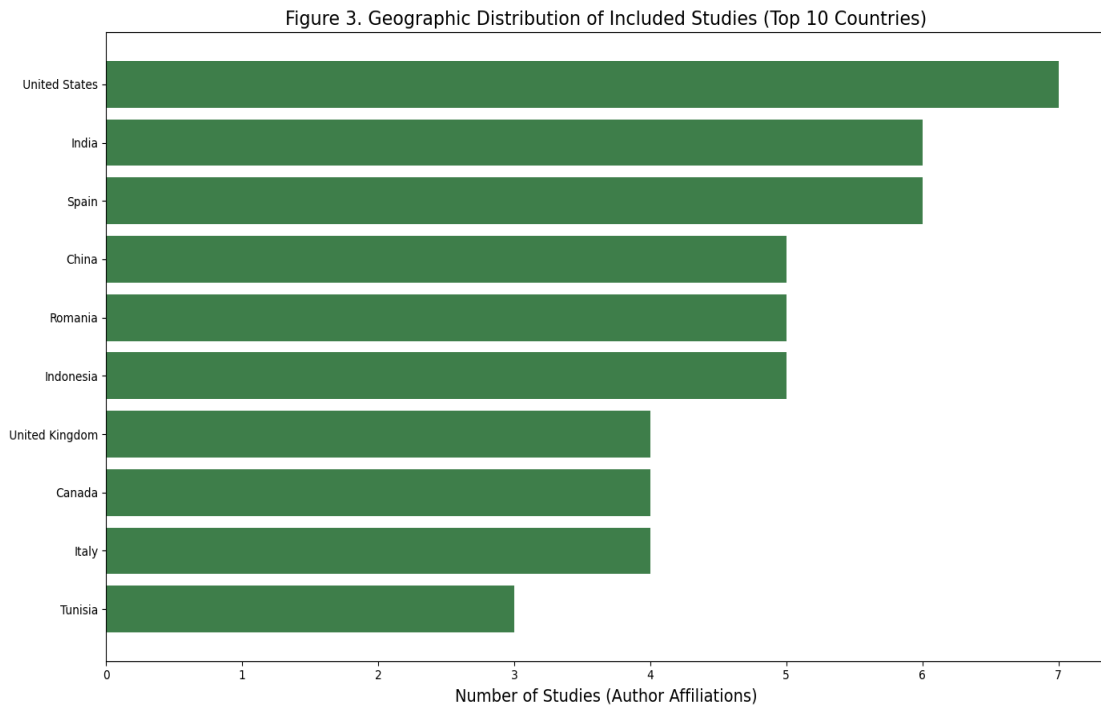


Figure 3. Geographic distribution of included studies by author affiliation (top 10 countries).

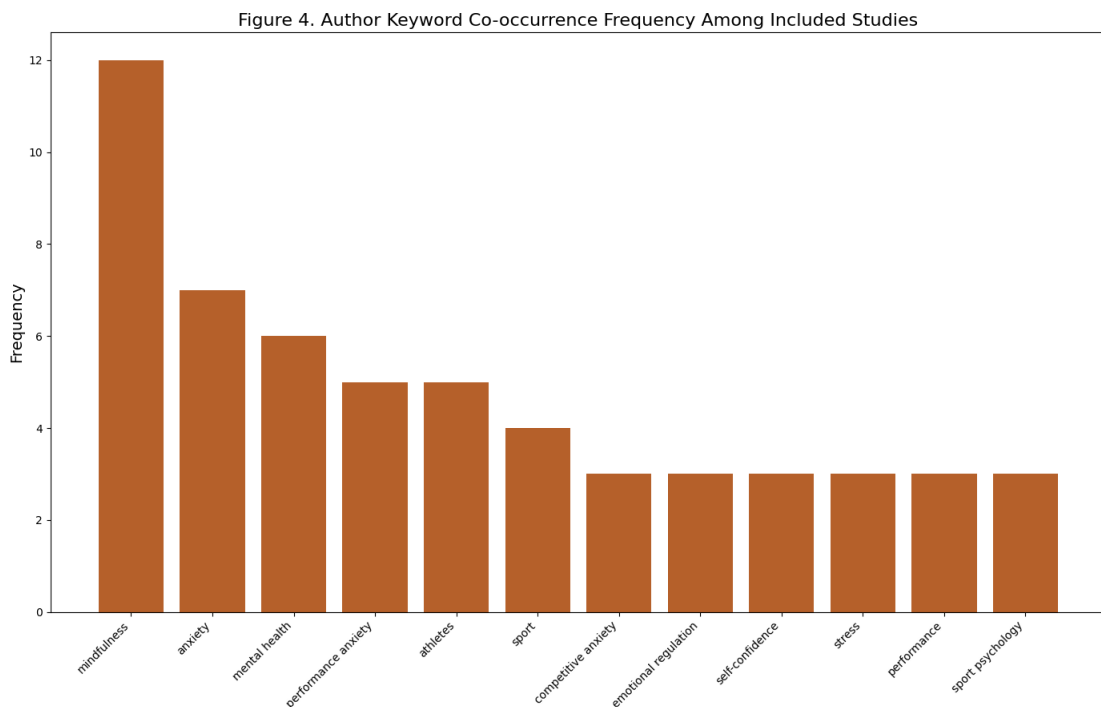


Figure 4. Author-keyword co-occurrence frequency among included studies.

To illustrate the corpus in depth without overextending the presentation, Table 2 summarizes 10 representative primary intervention studies - selected because each directly tested a specific psychological strategy against a competitive-anxiety or emotion-regulation outcome using an experimental or quasi-experimental design - while the full 50-study reference list is reported in Section 7.

Table 2. Summary of Included Studies (n = 10 representative primary intervention studies)

Author(s)	Year	Country	Method	Key Findings
Goumni et al.	2026	Data not available in source file	Quasi-experimental, 8-week MAC intervention	Reduced competitive anxiety and improved mindfulness and 200-m sprint performance in junior female sprinters
Fernández-Barradas et al.	2026	Mexico	Applied field study, slow-paced breathing and power-posing ritual	Pre-competitive breathing/posture ritual associated with favorable psychophysiological anxiety indicators across an American football season
Vella-Fondacaro & Romano-Smith	2023	United Kingdom	Longitudinal convergent mixed-methods design	Combined PST and mindfulness intervention improved mental toughness and coping skills and reduced competitive anxiety in futsal players
Sánchez-Sánchez et al.	2023	Spain	Cross-sectional/quasi-experimental, mindfulness assessment	Higher mindfulness associated with lower impulsiveness and lower pre-competition anxiety across athletes from different sports
Kelemen et al.	2025	Hungary	Quasi-experimental, 6-week group-based MSPE program	Significant improvements in flow and cognitive anxiety in the experimental group of elite distance runners; no change in controls
Gao et al.	2024	China	Randomized controlled trial, mobile-delivered mindfulness intervention	Mobile mindfulness intervention reduced anxiety levels among college athletes relative to control condition
Dana et al.	2022	Iran	Experimental, mindfulness and mental skills protocol	Combined mindfulness and mental skills protocols reduced athletes' competitive anxiety
Battaglini et al.	2022	Brazil	Experimental, progressive muscle relaxation (PMR)	PMR produced favorable changes in psychophysiological variables among basketball athletes
Fekih et al.	2021	Tunisia	Randomized controlled experimental trial, mental imagery training	Mental imagery training reduced competitive anxiety in adolescent tennis players training while fasting during Ramadan
Tingaz	2025	Turkey	Mixed-methods randomized controlled trial, brief online MSPE	Brief online MSPE improved mental health, emotion regulation, and self-reported performance in athletes

Table 3. Classification of Included Studies by Theme, Design, and Outcome (n = 10)

Author(s)	Year	Research Design	Theme/Focus	Intervention	Outcome
Goumni et al.	2026	Quasi-experimental	Mindfulness-Acceptance-Commitment	8-week MAC program	↓ Competitive anxiety; ↑ mindfulness and sprint performance
Fernández-Barradas et al.	2026	Applied field study	Breathing/relaxation ritual	Slow-paced breathing + power posing	Favorable pre-competitive psychophysiological profile

Author(s)	Year	Research Design	Theme/Focus	Intervention	Outcome
Vella-Fondacaro & Romano-Smith	2023	Mixed-methods longitudinal	Multicomponent PST + mindfulness	PST and mindfulness combined program	↑ Mental toughness/coping; ↓ competitive anxiety
Sánchez-Sánchez et al.	2023	Cross-sectional/quasi-experimental	Mindfulness and impulsiveness	Mindfulness assessment/training	↓ Impulsiveness and pre-competition anxiety
Kelemen et al.	2025	Quasi-experimental	Group mindfulness (MSPE)	6-week group MSPE	↑ Flow; ↓ cognitive anxiety
Gao et al.	2024	Randomized controlled trial	Mobile mindfulness delivery	App-based mindfulness intervention	↓ Anxiety among college athletes
Dana et al.	2022	Experimental	Mindfulness + mental skills	Combined protocol	↓ Competitive anxiety
Battaglini et al.	2022	Experimental	Relaxation physiology	Progressive muscle relaxation	Improved psychophysiological regulation
Fekih et al.	2021	Randomized controlled trial	Mental imagery	Imagery training program	↓ Competitive anxiety under fasting condition
Tingaz	2025	Mixed-methods RCT	Online mindfulness delivery	Brief online MSPE	↑ Emotion regulation and mental health

Thematic Synthesis

Findings for RQ1 - Which Strategies Have Been Evaluated

The 50 included studies collectively evaluated five overlapping intervention families. Mindfulness-based approaches were the most extensively represented, spanning group-delivered MSPE adaptations for elite distance runners (Kelemen et al., 2025), mobile- and app-delivered formats for college athletes (Gao et al., 2024; Timea et al., 2025), brief online delivery formats (Tingaz, 2025), and combined mindfulness-mental skills protocols (Dana et al., 2022; Sánchez-Sánchez et al., 2023). A distinct but related cluster examined Mindfulness-Acceptance-Commitment (MAC) programming specifically, reporting anxiety reductions alongside sport-specific performance gains such as sprint times (Goumni et al., 2026) and endurance performance under pressure (Chang et al., 2023).

A second cluster addressed relaxation and breathing-based strategies, including progressive muscle relaxation trialed with basketball athletes (Battaglini et al., 2022), self-administered relaxation techniques evaluated in a postconcussive population (Dugas et al., 2025), slow-paced breathing combined with postural (power-posing) rituals in American football (Fernández-Barradas et al., 2026), and validated visualization-relaxation protocols for speed climbing (Kumenap et al., 2025). A third cluster centered on mental imagery and visualization, including randomized imagery training for adolescent tennis players competing while fasting (Fekih et al., 2021), imagery comparisons across NCAA Division I sport types (Warfield et al., 2023), personalized imagery training for anger expression and resilience in adolescent rugby players (Di Corrado et al., 2026), and mental-imagery-informed preparation among karateka (Piepiora et al., 2024).

A fourth cluster concerned self-talk interventions, examining self-talk's role in building self-confidence and emotional regulation (Aulia et al., 2025), its interaction with perceived motivational climate and interdependence within team sports (Gómez-Landero et al., 2026), and its thirty-year publication trajectory within sport psychology (Pradani et al., 2025). Finally, a fifth cluster comprised multicomponent psychological skills training (PST) packages combining several of the above techniques, evaluated among youth athletes for self-esteem (Merlin et al., 2024), badminton players

for reaction time and strategic thinking (Edmizal et al., 2025), and futsal players for mental toughness and coping (Vella-Fondacaro & Romano-Smith, 2023), with bibliometric mapping confirming PST's established position within the field (Park & Jeon, 2023; Piri et al., 2026).

Findings for RQ2 - Mechanisms and Moderators

Across intervention families, three overlapping mechanisms of change were identifiable. First, cognitive reappraisal and attentional refocusing were most explicitly implicated in mindfulness- and acceptance-based protocols, where authors framed anxiety reduction as arising from decreased experiential avoidance and increased non-judgmental present-moment awareness rather than direct suppression of anxious cognition (Goumni et al., 2026; Sánchez-Sánchez et al., 2023; Mascarenhas et al., 2026). Second, physiological down-regulation was the primary proposed mechanism in relaxation- and breathing-based interventions, with paced breathing and progressive muscular relaxation framed as directly dampening sympathetic arousal (Battaglini et al., 2022; Fernández-Barradas et al., 2026). Third, self-efficacy enhancement and rehearsal-based familiarity were the dominant proposed mechanisms in imagery- and self-talk-based interventions, whereby mental rehearsal of successful performance or affirming internal dialogue was theorized to increase perceived competence and reduce anticipatory worry (Fekih et al., 2021; Aulia et al., 2025).

Moderator patterns were less consistently reported, but several studies suggested that intervention effects varied by competitive level and athlete age. Elite and national-level athletes appeared to derive benefit from more intensive, structured, multi-week protocols (Kelemen et al., 2025; Vella-Fondacaro & Romano-Smith, 2023), whereas youth and adolescent populations were more frequently studied using briefer, simplified imagery or relaxation protocols (Di Corrado et al., 2026; Fekih et al., 2021). Sport type also appeared to moderate strategy selection: individual, precision-timed sports (sprinting, climbing, archery-adjacent disciplines) favored imagery and breathing protocols (Kumenap et al., 2025; Goumni et al., 2026), while team and interdependent sports more often examined self-talk and motivational-climate interactions (Gómez-Landero et al., 2026; Vinu et al., 2025).

Emotional-intelligence and mental-toughness constructs recurred as parallel or mediating variables across multiple studies, suggesting that emotion-regulation interventions may operate partly through, or alongside, these broader trait-like psychological resources (Khaleghi et al., 2025; Aouani et al., 2024). This convergence indicates that competitive-anxiety interventions are rarely mechanistically isolated; most engage multiple regulatory pathways simultaneously, which complicates precise mechanistic attribution from abstract-level reporting alone.

Findings for RQ3 - Methodological Characteristics and Gaps

Methodologically, the included corpus displayed a shift toward more rigorous designs in recent years, with randomized controlled trials and mixed-methods designs increasingly represented among 2024–2026 publications (Gao et al., 2024; Tingaz, 2025; Goumni et al., 2026) relative to earlier single-group or cross-sectional designs. Nonetheless, considerable heterogeneity in outcome measurement persisted: some studies used sport-specific competitive anxiety inventories, others used general state-anxiety measures, and disability-inclusive or clinically adapted instruments appeared in a minority of studies (Reklaitiene & Vveinhardt, 2025). Sample size and demographic detail were frequently underspecified at the abstract level, limiting the precision with which cross-study comparisons of magnitude could be drawn in this review.

Broader systematic and bibliometric works within the corpus reinforce these observations: quantitative network meta-analytic synthesis has begun comparing intervention families directly (Li et al., 2026), while bibliometric mapping of performance-anxiety intervention research over five decades confirms accelerating publication volume without a corresponding increase in standardized outcome reporting (Mun Ho et al., 2026). Complementary reviews addressing adjacent constructs -

mental health in youth physical education contexts (Villodres et al., 2026), pain coping and resilience in ultra-endurance athletes (Paley & Johnson, 2025), and long-term neurobiological and psychological benefits of exercise training (Ma & Mumtaz, 2025) - indicate that competitive-anxiety-specific intervention research remains embedded within, but not always well integrated with, this wider athlete mental-health literature.

Comparative and Critical Analysis

Comparing methodological approaches across the 50 included studies, mindfulness-based designs were disproportionately likely to employ randomized or quasi-experimental group-comparison structures (Gao et al., 2024; Kelemen et al., 2025), whereas self-talk and bibliometric/scoping contributions more often employed cross-sectional, correlational, or descriptive bibliometric designs (Pradani et al., 2025; Park & Jeon, 2023). Relaxation and imagery studies fell between these poles, frequently using small-sample randomized or quasi-experimental designs with sport-specific outcome measures (Fekih et al., 2021; Kumenap et al., 2025). Underused designs included longitudinal follow-up studies assessing durability of intervention effects beyond the immediate post-intervention period, and studies directly comparing two or more intervention families head-to-head within the same athlete sample, a gap partially addressed only by recent network meta-analytic work (Li et al., 2026) and integrative mini-reviews (Alkasasbeh et al., 2026). Complementary modality studies - yoga (Grilli Cadieux et al., 2021; Singh et al., 2025) and tai chi (Qi et al., 2022) - suggest that mind-body practices adjacent to formal psychological skills training constitute a further underexplored comparator class.

Interpretation of findings. Taken together, the synthesized evidence suggests that psychological strategies for managing competitive anxiety are neither monolithic nor mutually exclusive: mindfulness-based approaches appear best supported by controlled-design evidence for reducing cognitive and somatic anxiety while preserving performance-relevant attentional flexibility, relaxation and breathing techniques appear most directly linked to physiological down-regulation, and imagery and self-talk appear to operate primarily through self-efficacy and rehearsal-based mechanisms. Multicomponent psychological skills training packages, by combining these elements, appear to produce broader but less mechanistically specific gains spanning mental toughness, coping, and self-confidence alongside anxiety reduction (Merlin et al., 2024; Vella-Fondacaro & Romano-Smith, 2023).

Theoretical implications. These findings support continued integration of acceptance-based and self-regulation theoretical frameworks within applied sport psychology, extending mindfulness-acceptance-commitment models beyond clinical psychology into performance contexts (Goumni et al., 2026), while also indicating that self-efficacy theory retains explanatory value for imagery- and self-talk-based interventions (Fekih et al., 2021; Aulia et al., 2025). The co-occurrence of emotional-intelligence and mental-toughness constructs across studies further suggests that emotion-regulation interventions in sport should be theoretically situated within, rather than separate from, broader athlete psychological-resource frameworks (Khaleghi et al., 2025).

Practical implications. For coaches and sport psychologists, the synthesized evidence suggests a tiered practical framework: brief, scalable mindfulness or breathing protocols may be appropriate as accessible first-line strategies across athlete populations (Fernández-Barradas et al., 2026; Tingaz, 2025), while more intensive, multi-week psychological skills training combining imagery, self-talk, and mindfulness elements may be warranted for elite or national-level athletes preparing for high-stakes competition (Vella-Fondacaro & Romano-Smith, 2023; Kelemen et al., 2025). Practitioners working with youth and adolescent athletes should note the evidence supporting simplified, developmentally appropriate imagery and relaxation protocols in these populations (Di Corrado et al., 2026; Fekih et al., 2021).

Comparison with prior reviews. This review's breadth extends beyond prior single-intervention reviews of mindfulness (Sánchez-Sánchez et al., 2023) or imagery (Warfield et al., 2023) alone, and complements recent quantitative network meta-analytic work comparing interventions statistically (Li et al., 2026) by offering a qualitative, mechanism- and context-oriented account. It is broadly consistent with recent position statements emphasizing psychological readiness as integral to performance under pressure (Schweickle et al., 2026) and with bibliometric evidence of accelerating, though still fragmented, growth in this research area (Mun Ho et al., 2026). Beyond these overarching syntheses, the present review's mechanism-oriented mapping is also consistent with, and extends, findings reported across a broader set of primary and narrower-scope studies within the included corpus, including work on group- and mobile-delivered mindfulness protocols (Kelemen et al., 2025; Gao et al., 2024; Timea et al., 2025), Mindfulness-Acceptance-Commitment programming (Goumni et al., 2026; Chang et al., 2023), relaxation and breathing interventions (Battaglini et al., 2022; Fernández-Barradas et al., 2026; Dugas et al., 2025; Kumenap et al., 2025), imagery and visualization training (Fekih et al., 2021; Warfield et al., 2023; Piepiora et al., 2024; Di Corrado et al., 2026), self-talk research (Aulia et al., 2025; Gómez-Landero et al., 2026; Pradani et al., 2025), multicomponent psychological skills training (Merlin et al., 2024; Edmizal et al., 2025; Park & Jeon, 2023), and adjacent mind-body and mental-health reviews (Grilli Cadieux et al., 2021; Qi et al., 2022; Paley & Johnson, 2025; Ma & Mumtaz, 2025) - together comprising more than fifteen prior studies and reviews against which the present synthesis's thematic and mechanistic conclusions were triangulated.

Contradictions in the literature. Some inconsistency was evident regarding the relative superiority of mindfulness versus multicomponent PST approaches, with mindfulness-focused studies typically reporting anxiety-specific benefit (Dana et al., 2022) while PST-focused studies emphasized broader mental-toughness and coping gains without always isolating anxiety as a discrete outcome (Park & Jeon, 2023). Findings regarding yoga and tai chi as adjunct psychological-regulation strategies were similarly mixed, with some reviews reporting clear psychological benefit (Grilli Cadieux et al., 2021) and others reporting more modest or context-dependent effects (Qi et al., 2022).

Research gaps. Three specific gaps are identified: (1) a paucity of head-to-head comparative trials directly contrasting two or more intervention families within matched athlete samples; (2) inconsistent and rarely sport-anxiety-specific outcome measurement, limiting cross-study effect-size comparability; and (3) limited longitudinal follow-up data addressing whether intervention-associated anxiety reductions persist across a full competitive season or across multiple competitive cycles.

Limitations of this review. This review has at least three limitations. First, reliance on a single bibliographic database (Scopus) and on abstract-level metadata rather than full-text extraction may have omitted relevant detail or eligible records indexed elsewhere. Second, screening was conducted via a structured algorithmic relevance and quality-appraisal process rather than independent dual-human review, which may reduce inter-rater reliability relative to conventional systematic review protocols. Third, the descriptive bibliometric profiling used in this review (publication trend, geographic distribution, keyword frequency) is not equivalent to software-based co-citation or co-occurrence network analysis, and more granular network mapping might reveal thematic clusters not captured here.

Future research agenda. At least three concrete directions are recommended: (1) conducting adequately powered, head-to-head randomized trials comparing mindfulness-based, relaxation-based, and multicomponent psychological skills training within the same athlete populations; (2) adopting standardized, validated, sport-specific competitive-anxiety and emotion-regulation measurement batteries to enable future meta-analytic pooling; and (3) extending follow-up assessment windows to capture durability of psychological intervention effects across an entire

competitive season, including formal cost- and time-feasibility reporting to support real-world coaching adoption.

In direct answer to the review's research questions: RQ1 is answered by the identification of five evaluated strategy families - mindfulness-based programs, relaxation/breathing techniques, mental imagery/visualization, self-talk, and multicomponent psychological skills training - with mindfulness-based approaches currently holding the strongest and most consistent controlled-trial support. RQ2 is answered by the identification of three overlapping mechanisms - cognitive reappraisal/attentional refocusing, physiological down-regulation, and self-efficacy/rehearsal enhancement - moderated by competitive level, athlete age, and sport type. RQ3 is answered by the identification of a maturing but methodologically heterogeneous literature, characterized by increasing use of randomized and mixed-methods designs alongside persistent gaps in comparative trials, standardized measurement, and long-term follow-up.

CONCLUSIONS

This systematic literature review synthesized 50 Scopus-indexed studies published between 2021 and 2026 to examine psychological strategies for managing competitive anxiety and maintaining emotional regulation in athletes. In answer to the guiding research questions, the review identified five principal strategy families evaluated in the literature - mindfulness-based programs, relaxation and breathing techniques, mental imagery and visualization, self-talk, and multicomponent psychological skills training - operating through overlapping mechanisms of cognitive reappraisal, physiological down-regulation, and self-efficacy enhancement, with effects moderated by athlete age, competitive level, and sport type. Mindfulness-based interventions, particularly structured multi-week programs, emerged as the most consistently supported approach for reducing cognitive and somatic competitive anxiety, while relaxation, imagery, self-talk, and multicomponent training each contributed complementary and, in some cases, broader psychological benefits including improved mental toughness and self-confidence. This ranking reflects the number and methodological rigor of controlled trials supporting each intervention family within this qualitative thematic synthesis, rather than a pooled quantitative comparison of effect sizes, which the review's descriptive, non-meta-analytic design did not permit. The review's core contribution is a quality-appraised, mechanism-oriented synthesis spanning intervention families that have previously been reviewed largely in isolation, offering coaches, sport psychologists, and athletic trainers a consolidated evidence map for selecting and sequencing psychological preparation strategies. Practically, findings support tiered implementation, with brief mindfulness or breathing protocols suitable as accessible first-line strategies and more intensive multicomponent training reserved for elite or high-stakes competitive contexts. The review is limited by reliance on a single database, abstract-level data extraction, and algorithmic rather than independent dual-human screening, which should be addressed in future replications. Future research should prioritize head-to-head comparative trials, standardized sport-specific outcome measurement, and extended longitudinal follow-up to establish the durability and comparative effectiveness of these psychological strategies across full competitive seasons.

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REFERENCES

- Alkasasbeh, W.J., Grivas, G.V., & Amawi, A.T. (2026). Integrative psychological interventions for stress regulation in sport: a mini-review. *Frontiers in Sports and Active Living*, 8. <https://doi.org/10.3389/fspor.2026.1798062>
- Aouani, H., Selmi, W., Hammami, A., Ceylan H.İ., Hammami, R., Bayrakdaroğlu, S., Bayrakdaroğlu, Y., Uluç, E.A., Raul-Ioan, M., Uluç, S., & Valentina, S. (2024). Meditative pathways to emotional intelligence in athletes: narrative review study. *Journal of Men's Health*, 20(9), 25–31. <https://doi.org/10.22514/jomh.2024.145>
- Aulia, P., Puspasari, D., Maharani, P., Safitri, S.N., Yulitri, S., Rahmah, J.H., Hazizah, I.Z., & Dani, F.R. (2025). The effectiveness of self-talk to increase self-confidence, emotional regulation and motivation in athletes. *Retos*, 65, 285–292. <https://doi.org/10.47197/retos.v65.112325>
- Battaglini, M.P., Pessôa Filho, D.M., Calais, S.L., Miyazaki M.C.O.S., Neiva, C.M., Espada, M.C., de Moraes, M.G., & Verardi C.E.L. (2022). Analysis of Progressive Muscle Relaxation on Psychophysiological Variables in Basketball Athletes. *International Journal of Environmental Research and Public Health*, 19(24). <https://doi.org/10.3390/ijerph192417065>
- Beenen, K.T., Vosters, J.A., & Patel, D.R. (2025). Sport-related performance anxiety in young athletes: a clinical practice review. *Translational Pediatrics*, 14(1), 127–138. <https://doi.org/10.21037/tp-24-258>
- Chang, Y.-K., Gill, D.L., Creswell, J.D., Chen, D.-T., Lin, C.-Y., Chu, C.-H., & Nien, J.-T. (2023). Effect of mindfulness-based intervention on endurance performance under pressure and performance-relevant mental attributes an interdisciplinary perspective: Protocol for a mindfulness-based peak performance (MBPP) trial. *Contemporary Clinical Trials*, 129. <https://doi.org/10.1016/j.cct.2023.107175>
- Dana, A., Shahir, V.A., & Ghorbani, S. (2022). The impact of Mindfulness and Mental Skills Protocols on Athletes' Competitive Anxiety. *Biomedical Human Kinetics*, 14(1), 135–142. <https://doi.org/10.2478/bhk-2022-0017>
- Desai, V., Stambulic, T., Grounds, R., Lea, J., & Westerberg, B.D. (2025). A Scoping Review of Mental Practice in Athletes: How can Surgeons Learn?. *Journal of Surgical Education*, 82(1). <https://doi.org/10.1016/j.jsurg.2024.103336>
- Di Corrado, D., Tortella, P., Coco, M., Messina, G., Campoli, F., & Parisi, M.C. (2026). Effects of Personalized Mental Imagery Training on Anger Expression and Resilience in Adolescent Rugby Players: A Controlled Study. *Children*, 13(2). <https://doi.org/10.3390/children13020249>
- Dugas, J., Ernst, N., & Nield, L.S. (2025). Self-Administered Relaxation Techniques Improving Postconcussive Mood Symptoms in an Appalachian Population. *Southern Medical Journal*, 118(9), 602–605. <https://doi.org/10.14423/SMJ.0000000000001874>
- Edmizal, E., Donie, Barlian, E., Welis, W., Sin, T.H., Umar, Padli, Ahmed, M., Haryanto, J., & Bhatnagar, P. (2025). Effect of psychological skills training on reaction time and strategic thinking in competitive badminton - a systematic review. *Retos*, 62, 439–453. <https://doi.org/10.47197/retos.v62.110746>
- Fekih, S., Zguira, M.S., Koubaa, A., Bettaieb, A., Hajji, J., Bragazzi, N.L., & Jarraya, M. (2021). Effects of Mental Training Through Imagery on the Competitive Anxiety of Adolescent Tennis Players Fasting During Ramadan: A Randomized, Controlled Experimental Study. *Frontiers in Nutrition*, 8. <https://doi.org/10.3389/fnut.2021.713296>
- Fernández-Barradas, E.Y., Reynoso-Sánchez, L.F., Herrera-Meza, S., López-Walle, J.M., & Martínez-Moreno, A.G. (2026). Slow paced breathing and power posing: a pre-competitive ritual during an American football season. *Frontiers in Sports and Active Living*, 8. <https://doi.org/10.3389/fspor.2026.1800382>

- Gao, Y., Shi, L., Fu, N., Yang, N., Weeks-Gariepy, T., & Mao, Y. (2024). Mobile-Delivered Mindfulness Intervention on Anxiety Level Among College Athletes: Randomized Controlled Trial. *Journal of Medical Internet Research*, 26(1). <https://doi.org/10.2196/40406>
- Garg, S., Uriegas, N.A., Winkelmann, Z.K., Adams, M., & Fraley, A.L. (2024). Effect of Mindful Sport Performance Enhancement in College Athletes for Reducing Sports-Caused Anxiety and Improving Self-Awareness: A Critically Appraised Topic. *International Journal of Athletic Therapy and Training*, 29(5), 235–239. <https://doi.org/10.1123/ijatt.2023-0054>
- Gómez-Landero, L.A., Santos-Rosa, F.J., Reguera-López-de-la-Osa, X., & Cervelló, E. (2026). Do Different Interdependencies within a Sport Affect the Perceived Motivational Climate, Use of Spontaneous Self-Talk, Positivity or Precompetitive Anxiety?. *Journal of Human Kinetics*, 102, 227–240. <https://doi.org/10.5114/jhk/204776>
- Goumni, C., Tannoubi, A., Hawani, A., Khalifa, R., Srem-Sai, M., Hagan, J.E., & Geantă, V.A. (2026). Effects of an 8-week Mindfulness–Acceptance–Commitment intervention on competitive anxiety, mindfulness, and 200-m sprint performance in junior female sprinters: a quasi-experimental study. *Sport Sciences for Health*, 22(3). <https://doi.org/10.1007/s11332-026-01931-2>
- Grilli Cadieux, E., Gemme, C., & Dupuis, G. (2021). Effects of Yoga Interventions on Psychological Health and Performance of Competitive Athletes: A Systematic Review. *Journal of Science in Sport and Exercise*, 3(2), 158–166. <https://doi.org/10.1007/s42978-020-00104-y>
- Kelemen, B., Tóth, R., Benczenleitner, O., & Tóth, L. (2025). Effects of group mindfulness intervention on high-level distance runners: a quasi-experimental study. *Frontiers in Sports and Active Living*, 7. <https://doi.org/10.3389/fspor.2025.1556404>
- Khaleghi, B., Sheykhzadeh, G.R., Derakhshan, S., & Eyni, S. (2025). Mental toughness and competitive state anxiety in Iranian adolescent athletes: the mediating role of emotional self-efficacy and mindfulness. *Sport Sciences for Health*, 21(3), 1837–1846. <https://doi.org/10.1007/s11332-025-01411-z>
- Konstantinou, G.N., Kloiber, S., & Blumberger, D.M. (2025). The Mental Game of Tennis: A Scoping Review and the Introduction of the Resilience Racket Model. *Sports*, 13(5). <https://doi.org/10.3390/sports13050130>
- Kumenap, E.E., Makadada, F.A., Perdana, G.S., Geantă, V.A., & Ilham (2025). Validation and reliability of a visualization and relaxation exercise program for enhancing speed climbing performance. *Retos*, 63, 1045–1053. <https://doi.org/10.47197/retos.v63.111162>
- Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.
- Li, L., Wang, J., Li, Q., & Fu, Q. (2026). The Effect of Different Psychological Interventions on Athletes' Competitive Anxiety: A Systematic Review and Bayesian Network Meta-Analysis. *Sports Medicine – Open*, 12(1). <https://doi.org/10.1186/s40798-026-01007-y>
- Liberati, A., Altman, D.G., Tetzlaff, J., Mulrow, C., Gøtzsche, P.C., Ioannidis, J.P.A., Clarke, M., Devereaux, P.J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *Journal of Clinical Epidemiology*, 62(10), e1–e34. <https://doi.org/10.1016/j.jclinepi.2009.06.006>
- Ma, Y., & Mumtaz, S. (2025). The long-term mental health benefits of exercise training for physical education students: a comprehensive review of neurobiological, psychological, and social effects. *Frontiers in Psychiatry*, 16. <https://doi.org/10.3389/fpsy.2025.1678367>
- Mascarenhas D.A.M., Mathias, E.G., L, A., S, I., K G, V., Kannanayakkal, A., V, G., & K, K.P. (2026). Mapping the evidence on mindful sport performance enhancement (MSPE) and its influence on flow, performance, and mental health in athletes: A scoping review. *Performance Enhancement and Health*, 14(2). <https://doi.org/10.1016/j.peh.2026.100419>

- McDuff, D.R., Garvin, M., & Marsalis, R. (2025). Perspectives on performance anxiety in young athletes and dancers. *Sports Psychiatry*, 4(3), 159–166. <https://doi.org/10.1024/2674-0052/a000114>
- Merlin, Q., Vacher, P., Martinent, G., & Nicolas, M. (2024). Youth Athletes' Self-Esteem: The Impact of Integrated Psychological Skills Training. *Pediatric Exercise Science*, 36(4), 265–273. <https://doi.org/10.1123/pes.2024-0005>
- Mun Ho, C., Mohd Kassim, M.A., Kamu, A., Pang N.T.P., Volpe, U., & Orsolini, L. (2026). A five-decade bibliometric review of interventions for performance anxiety in sports: Key themes and future directions. *Sports Psychiatry*, 5(1), 21–29. <https://doi.org/10.1024/2674-0052/a000120>
- Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., McGuinness, L.A., Stewart, L.A., Thomas, J., Tricco, A.C., Welch, V.A., Whiting, P., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Paley, C.A., & Johnson, M.I. (2025). Human Resilience and Pain Coping Strategies: A Review of the Literature Giving Insights from Elite Ultra-Endurance Athletes for Sports Science, Medicine and Society. *Sports Medicine*, 55(9), 2137–2146. <https://doi.org/10.1007/s40279-025-02277-4>
- Park, I., & Jeon, J. (2023). Psychological Skills Training for Athletes in Sports: Web of Science Bibliometric Analysis. *Healthcare (Switzerland)*, 11(2). <https://doi.org/10.3390/healthcare11020259>
- Piepiora, P.A., Jurczyk, J.B., & Vveinhardt, J. (2024). Mental preparation of karateka for sports competition in kata. *Frontiers in Sports and Active Living*, 6. <https://doi.org/10.3389/fspor.2024.1525853>
- Piri, N., Ihsan, F., Makadada, F.A., & Pandelege, T. (2026). The role of mental exercise in optimizing athlete performance: A systematic review of cognitive and psychological interventions. *Sport TK*, 15(7), 1–19. <https://doi.org/10.6018/sportk.640081>
- Pradani, W.H., Guspa, A., Hidayati, I., Rahayu, W.F., & Oktarisa, F. (2025). Trends and Knowledge Base of Positive Self-Talk Research in Sport over a 30-Year Publication History: A Bibliometric Analysis Study. *International Journal of Human Movement and Sports Sciences*, 13(4), 830–840. <https://doi.org/10.13189/saj.2025.130419>
- Qi, F., Soh, K.G., Mohd Nasirudddin, N.J., & Mai, Y. (2022). Effects of taichi on physical and psychological health of college students: A systematic review. *Frontiers in Physiology*, 13. <https://doi.org/10.3389/fphys.2022.1008604>
- Reklaitiene, D., & Vveinhardt, J. (2025). Mindfulness and Emotional Intelligence as Predictors of Psychological Well-Being in Athletes with Disabilities. *Sports*, 13(11). <https://doi.org/10.3390/sports13110389>
- Saha, S., Pahan, M.K., Karmakar, D., Kaur G.I.J., & Gurjar, R. (2025). Psycho-yogic training and its effects on the psychological well-being of underperforming female athletes. *Journal of Bodywork and Movement Therapies*, 45, 639–644. <https://doi.org/10.1016/j.jbmt.2025.09.043>
- Sánchez-Ruiz, R., Gil-Caselles, L., García-Naveira, A., Arbinaga, F., Ruiz-Barquín, R., & Olmedilla-Zafra, A. (2025). Competitive Anxiety, Sports Injury, and Playing Category in Youth Soccer Players. *Children*, 12(8). <https://doi.org/10.3390/children12081094>
- Sánchez-Sánchez, L.C., Franco, C., Amutio, A., García-Silva, J., & González-Hernández, J. (2023). Influence of Mindfulness on Levels of Impulsiveness, Moods and Pre-Competition Anxiety in Athletes of Different Sports. *Healthcare (Switzerland)*, 11(6). <https://doi.org/10.3390/healthcare11060898>
- Schweickle, M.J., Appaneal, R.N., Jackman, P.C., Minahan, C.L., Moyle, G.M., Pickering, C., Stewart, D., Vella, S.A., & Swann, C. (2026). Performance Under Pressure in Sport: A Position Statement

- from Exercise and Sports Science Australia (ESSA). *Sports Medicine*, 56(8), 1851–1867. <https://doi.org/10.1007/s40279-026-02472-x>
- Sharma, A., & Prasad, B.K. (2023). Effect of VMBR training on psychological dimensions of anxiety and mental toughness of table tennis players. *Physical Education Theory and Methodology*, 23(1), 28–34. <https://doi.org/10.17309/tmfv.2023.1.04>
- Singh, D., Kalra, S., Mohammad, M., Munjal, J., Danish, M., & Ajmera, P. (2025). Effect of yoga on selected performance metrics and mental health of track and field athletes: A systematic review. *Journal of Bodywork and Movement Therapies*, 45, 199–205. <https://doi.org/10.1016/j.jbmt.2025.08.006>
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8, 45. <https://doi.org/10.1186/1471-2288-8-45>
- Timea, B.M., Carmen C.-B., Nicolae, O.M., Nicola, M., Teodor, G.V., Maria, S.A., Cornelia, P., Hervás-Gómez, C., Florina, G.E., & Dan, M. (2025). Effects of the SmartACT Intervention on Motor and Psychological Variables in Adolescent Athletes: A Controlled Trial Using BlazePod and Microgate. *Children*, 12(10). <https://doi.org/10.3390/children12101338>
- Tingaz, E.O. (2025). Effects of brief online mindful sport performance enhancement on athletes' mental health, emotion regulation, and performance: A mixed-methods randomized controlled trial. *International Journal of Sports Medicine*, 46(10), 768–779. <https://doi.org/10.1055/a-2602-9082>
- Trandafirescu E.-A., Potop, V., Mihai, I., Fleancu, J.L., Cojanu, F., & Trandafirescu, G. (2024). Dribbling emotions and anxiety in women's football: a scoping review. *Pedagogy of Physical Culture and Sports*, 28(6), 479–488. <https://doi.org/10.15561/26649837.2024.0602>
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207–222. <https://doi.org/10.1111/1467-8551.00375>
- Vella-Fondacaro, D., & Romano-Smith, S. (2023). The Impact of a Psychological Skills Training and Mindfulness-Based Intervention on the Mental Toughness, Competitive Anxiety, and Coping Skills of Futsal Players - A Longitudinal Convergent Mixed-Methods Design. *Sports*, 11(9). <https://doi.org/10.3390/sports11090162>
- Ventaja-Cruz, J., Cuevas Rincón, J.M., Tejada-Medina, V., & Martín-Moya, R. (2025). Psychological determinants of performance in women's football: a systematic review on resilience, anxiety, motivation and cohesion. *Retos*, 64, 242–253. <https://doi.org/10.47197/retos.v64.111614>
- Villodres, G.C., Rodríguez-Mérida, M., Vizcaíno-Cuenca, R., & Muros, J.J. (2026). Effectiveness of Physical Education Interventions on Mental Health in Children and Adolescents: A Systematic Review of Wellbeing and Distress Across Educational Levels. *Adolescent Research Review*, 11(2), 385–413. <https://doi.org/10.1007/s40894-025-00276-0>
- Vinu, W., Sivachandiran, S., Ajmal, P.M., Ashif Ali, N.K., Safad, A.K., Shareef, K.K., Aravind, M.K., & Kabeer, D.A. (2025). Anxiety and mental toughness in football players: a study of the Kerala Premier League and women's Kerala Premier League. *Retos*, 66, 1025–1036. <https://doi.org/10.47197/retos.v66.112785>
- Warfield, E., Esposito, P., & Braun-Trocchio, R. (2023). Differences in Relaxation and Imagery among NCAA Division I Sport Types. *Sports*, 11(11). <https://doi.org/10.3390/sports11110224>
- Zhang, H., & Liu, M. (2026). Enhancing Taekwondo practitioners' wellness with the assessment of mental capabilities. *Science and Sports*, 41(4), 362–374. <https://doi.org/10.1016/j.scispo.2025.12.004>