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Modeling Structural Equation of Relationship Between Emotional Regulation and Self-Motivation and Their Impact on Athletic Performance Under Competitive Pressure Among Elite Athletes

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Abstract

This study examined the structural associations among cognitive reappraisal, autonomous motivation, and perceived athletic performance under competitive pressure among competitive athletes. A cross-sectional design was employed with 248 athletes (162 males and 86 females; mean age = 23.65 years, SD = 3.42) recruited from individual and team sports in Iraq. Cognitive reappraisal was assessed using the Cognitive Reappraisal subscale of the Emotion Regulation Questionnaire, autonomous motivation using selected intrinsic and identified regulation items from the Sport Motivation Scale-II, and perceived athletic performance using a six-item self-report measure referring to recent competitive performance. Covariance-based structural equation modeling was conducted in AMOS 28, and indirect effects were examined using bias-corrected bootstrapping with 5,000 resamples. The structural model demonstrated good fit to the data ($\chi^2/df = 1.84$, CFI = .962, TLI = .953, RMSEA = .048, SRMR = .042). Cognitive reappraisal was positively associated with autonomous motivation ($\beta = .482$, $p < .001$) and perceived athletic performance ($\beta = .310$, $p < .001$), while autonomous motivation was positively associated with perceived athletic performance ($\beta = .420$, $p < .001$). The indirect association between cognitive reappraisal and perceived athletic performance through autonomous motivation was significant ($\beta = .202$, 95% CI [.134, .282], $p = .001$), indicating partial statistical mediation. These findings support a theoretically coherent structural model linking cognitive reappraisal, autonomous motivation, and perceived performance under competitive pressure. However, given the cross-sectional and self-report design, the relationships should be interpreted as associations rather than causal effects.

Keywords: cognitive reappraisal; autonomos motivation; perceid athletic performance; competitive pressure; structural equation modeling; athletes.

INTRODUCTION

Athletes' performance in competitive situations must do not only with physical, technical, and tactical capacity, but also with how the athlete responds to psychological demands before and during a game. Competitive pressure can increase anxiety, attention load, and uncertainty in decision-making, but the consequences on performance are not always uniform. In shooting athletes, differences in state anxiety and physiological responses were found to be related to performance variation (Zhao et al., 2024), while decision-making ability in stressful conditions was also seen as an important part of an athlete's response to competitive demands (Stepanyan & Lalayan, 2024). In basketball players, environmental pressure and sensory uncertainty modulate anxiety as well as free throw success (Cruz, 2025) while in near-elite ice hockey players, competitive demands are related to executive function and diverse patterns of emotion regulation (Tamás et al., 2024)

The relationship between psychological stress and performance is also not always linear. In advanced swimmers, changes in performance do not always run parallel to changes in self-efficacy and emotional responses (Richard et al., 2021). Similarly, in high-pressure environments, demanding conditions are not necessarily directly related to decreased performance although they are associated with increased stress and decreased vitality (Bencker et al., 2025). The literature on mental fatigue in

college athletes also suggests that stress, competitive anxiety, psychological regulation, and recovery interact with each other in the context of performance (Gao et al., 2026). Thus, competitive stress is more appropriately understood as a context that demands the management of psychological resources rather than as a single cause of decreased performance.

One such resource is emotion regulation. However, emotion regulation is not a homogeneous ability. A systematic review shows a heterogeneity of strategies, instruments, sports, and competition contexts in the relationship between emotion regulation and performance (Boas et al., 2024a). In young athletes, expressive suppression is associated with less favorable psychological adjustments, while other regulatory strategies show different patterns (Cunha et al., 2024). In athletes who have experienced injuries, positive reappraisal and suppression also show different characteristics of use (Tatsumi, 2023). Studies across educational, work, and sports contexts subsequently show that the use and effectiveness of regulatory strategies change according to social contexts (Da Costa Dutra et al., 2023). Therefore, this study does not equate all emotion regulation strategies, but specifically focuses predictors on cognitive reappraisal.

The main problem in the literature is not only the limited research on athlete psychology and performance, but the inconsistency of construct separation and the lack of clarity between the regulation of emotions, motivation, and performance. In university athletes in Baghdad and Delhi, the emotional control component showed a pattern that varied in relation to performance characteristics and cultural context (Abiyra et al., 2025). In elite beach volleyball athletes, the emotion regulation style emerged along with variations in psychological characteristics, performance, and team satisfaction (Klatt et al., 2021). Meanwhile, in team sports, individual and interpersonal emotion regulation strategies were found to differ between collective team collapse and performance recovery (Wergin et al., 2025). These findings suggest that the relationship between emotion–performance regulation cannot be assumed to be identical in all sports contexts.

A similar conceptual problem is found in motivation. The terms self-motivation, intrinsic motivation, and autonomous motivation should not be used interchangeably. Research on university athletes shows that the emotional dimension is related to a specific motivational orientation, not to one general, undifferentiated motivational construct (Mercader-Rubio et al., 2022). In junior athletes facing extreme competitive situations, self-motivation, emotional awareness, and coping also appear as distinct but interconnected psychological components (Halian et al., 2024). The findings in athletes with disabilities also show that emotion regulation is related to other psychological resources such as optimism (Jannah et al., 2023). Therefore, this study consistently uses autonomous motivation as a mediator and does not treat it as a synonym for all forms of sports motivation.

Recent literature is beginning to lead to more integrated psychological models. Cognitive reappraisal has been found to play a role in the relationship between awareness of mental fatigue and athletes' psychological recovery (Kara et al., 2025), while mixed-methods research suggests that emotion regulation operates alongside coping and social context, rather than as a single mechanism (Zuo & Bai, 2025). In volleyball competition, achievement motivation and confidence also emerge as central components in the network that connects psychological experience and performance (F. Li & Mao, 2026). The perspective of self-regulated learning further suggests that cognitive, emotional, and motivational regulation are intertwined in the way athletes manage competitive training and demands (Young et al., 2025).

Empirical evidence also suggests that the mechanisms towards performance can differ

according to the context of the sport. In professional roller hockey, performance under pressure is studied through a combination of psychological resources, recovery, pre-competition conditions, and flow (Pitacho & Cordeiro, 2026). In athletes from different disciplines, differences were found in emotional management and motivational components (Petrovska et al., 2021). Meanwhile, objective evidence in volleyball players suggests that emotion regulation relates to performance indicators differently by position, gender, and level of competition (Millán-Sánchez et al., 2023) and studies in shooting athletes show that the effectiveness of regulation strategies also depends on strategies and situational demands (Lulu et al., 2025). The literature on autonomous sports motivation further suggests that the construct can function as a mediator in structural models, even if the outcomes studied are not competitive performance (Xiang, 2026).

The evidence shows a more specific gap than just a "lack of research". First, studies on cognitive reappraisal or emotion regulation have mostly linked it to recovery, coping, mental health, or performance directly, but have not consistently tested autonomous motivation as an intermediate pathway to perceived competitive performance. Second, research on motivation often uses constructs such as achievement motivation, motivational orientation, or self-motivation that are conceptually different from autonomous motivation. Third, the evidence across sports shows considerable heterogeneity, so that reappraisal strategies cannot be equated with suppression or the entire domain of emotion regulation. Fourth, performance must be distinguished from anxiety, confidence, coping, recovery, and other psychological outcomes because these variables can be related to performance without being indicators of performance itself. Thus, a model is needed that simultaneously tests cognitive reappraisal as a predictor, autonomous motivation as a mediator, and perceived athletic performance under competitive pressure as conceptually separate outcomes.

This study aims to analyze the structural relationship between cognitive reappraisal, autonomous motivation, and perceived athletic performance under competitive pressure and test the indirect relationship between cognitive reappraisal and perceived performance through autonomous motivation. The novelty of the study lies in the integration of the three constructs in a mediation model with explicit conceptual boundaries: cognitive reappraisal is distinguished from expressive suppression; autonomous motivation is not confused with intrinsic motivation or self-motivation; and perceived athletic performance is separated from anxiety, confidence, coping, and other psychological states. The scope of the study is limited to direct and indirect relationships in competitive athletes. Because the study uses cross-sectional and self-report designs, SEM relationships are interpreted as structural associations consistent with the theoretical model, rather than as evidence of temporal causality or intervention effectiveness.

METHODS

Research Design and Subject

This study employed a cross-sectional explanatory-correlational design and covariance-based structural equation modeling (CB-SEM) to examine the structural associations among cognitive reappraisal, autonomous motivation, and perceived athletic performance under competitive pressure. The hypothesized model included direct associations from cognitive reappraisal to autonomous motivation and perceived athletic performance, as well as an indirect association between cognitive reappraisal and perceived athletic performance through autonomous motivation.

Although directional paths were specified based on the theoretical model, the design did not involve experimental manipulation or longitudinal observation. Therefore, the estimated structural

coefficients were interpreted as theory-consistent statistical associations rather than evidence of temporal or experimental causality. This interpretation is consistent with recent cross-sectional SEM research in sport and exercise psychology, in which mediation models are used to examine theoretically specified indirect associations while acknowledging the limitations of causal inference from single-time-point data (Kim & Choi, 2024); (Xiang, 2026); (Chen et al., 2026).

The target population comprised elite athletic competitors in Iraq. Operational criteria for 'elite status' required participants to: (a) hold active registration in national premier leagues or national representative sports federations in Basra, Baghdad, or Missan; (b) possess a minimum of three years of continuous formal competitive experience at the senior national level; and (c) actively compete in official league tournaments during the data collection window. Athletes recovering from severe physical injury or missing major competitive events were excluded.

Using a purposive sampling strategy across major sports complexes and clubs, 270 athletes were approached following competitive fixtures. A total of 255 questionnaires were returned, of which 7 were discarded due to incomplete responses (>10% missing data) or unengaged responding patterns. The final verified sample consisted of N = 248 elite athletes (162 males, 86 females; mean age = 23.65 years, SD = 3.42; mean competitive experience = 5.84 years, SD = 2.11). The sample encompassed individual sports (n = 108; e.g., athletics, martial arts, swimming) and team sports (n = 140; e.g., football, basketball, volleyball). This sample size exceeds the minimum threshold (N > 200) recommended for stable CB-SEM estimation with 6 latent indicators (Kline, 2016).

Measuring instruments

Emotion Regulation Questionnaire (ERQ): Emotion regulation was operationalized using the Cognitive Reappraisal subscale of the ERQ (Gross & John, 2003), adapted into Arabic via standard forward-backwards translation protocols. The subscale comprises 6 items (e.g., 'When I want to feel less negative emotion during competition, I change the way I'm thinking about the situation') scored on a 7-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree).

Sport Motivation Scale (SMS-II): Autonomous motivation was evaluated using the Autonomous Motivation subscale from the Revised Sport Motivation Scale (Pelletier et al., 2013). Combining intrinsic regulation and identified regulation sub-dimensions, this composite measure includes 6 items evaluating internal drivers (e.g., 'Because it gives me pleasure to learn more about my sport') scored on a 7-point Likert scale.

Subjective Athletic Performance Scale (SAPS): Athletic performance under competitive pressure was evaluated using a composite 6-item Subjective Athletic Performance Scale adapted from the Perceived Performance Index (Martens et al., 1990) Items capture athlete self-perceptions of skill execution, attentional focus under high pressure, emotional stability, and goal achievement during recent official matches on a 5-point Likert scale (1 = Poor to 5 = Excellent).

Validity and Reliability

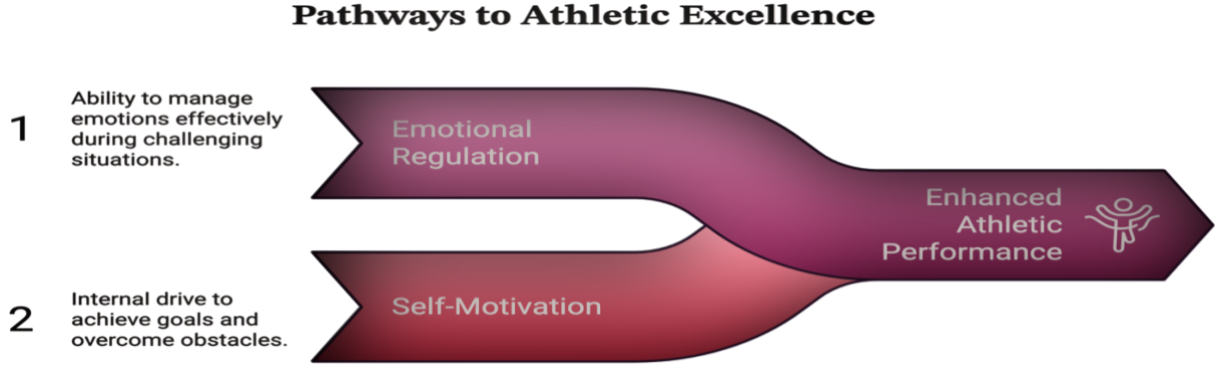
Construct validity was evaluated through confirmatory factor analysis. Standardized factor loadings of at least 0.50 were considered acceptable. Internal consistency was examined using Cronbach's alpha and composite reliability (CR), with values of 0.70 or higher interpreted as satisfactory. Convergent validity was assessed using Average Variance Extracted (AVE), with values of at least 0.50 considered acceptable (Fornell & Larcker, 1981; Hair et al., 2019). Discriminant validity was examined using the Fornell–Larcker criterion by comparing the square root of the AVE for each construct with the corresponding inter-construct correlations. The use of CFA in conjunction with reliability and convergent-validity assessment is consistent with recent psychometric studies

involving athlete and sport populations (Corvera-Velarde et al., 2025; Putra et al., 2025); Senturk et al., 2026)

Assumed structural model

Variables: Independent: Emotional regulation. Mediator: self-motivation. Follower: Athletic performance under pressure. Presumed paths: Emotional regulation ⟶ Motivation Self. Emotional regulation ⟶ Performance The athlete. Self-motivation ⟶ Performance The athlete Hypotheses (H): H1: Emotional regulation positively affects intrinsic motivation. H2: Emotional regulation positively affects athletic performance under pressure. H3: Self-motivation positively affects athletic performance. H4: There is an indirect effect of emotional regulation on performance via intrinsic motivation (mediation).

Figure 1. Structural model



Procedure and Statistical processing

CB-SEM was conducted using AMOS version 28 with Maximum Likelihood estimation. Analysis proceeded in two stages. First, the measurement model was evaluated using CFA to assess the adequacy of the three-factor structure, reliability, convergent validity, and discriminant validity. Second, the structural model was estimated to test the hypothesized direct and indirect associations. Model fit was evaluated using multiple complementary indices, including χ^2/df, Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Values of $\chi^2/df \leq 3.0$, CFI and TLI ≥ 0.90, and RMSEA and SRMR ≤ 0.08 were considered indicative of acceptable fit, while more stringent values were interpreted as evidence of good fit (Hu et al., 2026; Hair et al., 2019)

The indirect association between cognitive reappraisal and perceived athletic performance through autonomous motivation was evaluated using bias-corrected bootstrapping with 5,000 resamples and 95% confidence intervals. An indirect association was regarded as statistically significant when the bootstrap confidence interval did not include zero. Bootstrapped mediation procedures are commonly applied in recent SEM studies of athlete psychological processes (Kim & Choi, 2024); (Xiang, 2026); (Chen et al., 2026). All tests used a two-tailed significance level of $p \leq .05$. Because the data were cross-sectional, statistically significant direct or indirect paths were interpreted as structural associations compatible with the proposed theoretical model and not as definitive evidence of causal mechanisms.

RESULTS

Preliminary Analysis and Measurement Model

Data screening indicated that the distributions were within acceptable limits, with skewness values below 1.5 and kurtosis values below 2.0. These results supported the use of Maximum

Likelihood estimation for the subsequent confirmatory factor analysis and structural equation modeling.

The three-factor measurement model comprising cognitive reappraisal, autonomous motivation, and perceived athletic performance under competitive pressure demonstrated a good fit to the empirical data: $\chi^2(132) = 242.88$, $\chi^2/df = 1.84$, CFI = 0.962, TLI = 0.953, RMSEA = 0.048, 90% CI [0.035, 0.061], and SRMR = 0.042. These indices satisfied the recommended criteria for an acceptable measurement model (Hu & Bentler, 1999; Hair et al., 2019).

The psychometric evaluation further indicated adequate construct reliability and convergent validity. As presented in Table 1, standardized factor loadings ranged from 0.70 to 0.82 and therefore exceeded the recommended minimum value of 0.50. Cronbach's α ranged from 0.811 to 0.858, whereas composite reliability (CR) ranged from 0.814 to 0.863. In addition, all Average Variance Extracted (AVE) values exceeded 0.50, ranging from 0.528 to 0.612. Collectively, these results demonstrate satisfactory internal consistency and convergent validity of the three latent constructs (Fornell & Larcker, 1981; Hair et al., 2019).

Table 1. Psychometric Properties of the Measurement Model

Construct & Indicators	Standardized Loading (λ)	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)
Cognitive Reappraisal (ERQ)	0.72 – 0.80	0.842	0.845	0.528
Item ERQ_1	0.75	-	-	-
Autonomous Motivation (SMS-II)	0.70 – 0.82	0.858	0.863	0.612
Item SMS_1	0.81	-	-	-
Athletic Performance Under Pressure	0.71 – 0.79	0.811	0.814	0.531
Item SAPS_1	0.79	-	-	-

Discriminant validity was subsequently examined using the Fornell–Larcker criterion. As shown in Table 2, the square root of the AVE for each construct exceeded its correlations with the other constructs. The square-root AVE values were 0.727 for cognitive reappraisal, 0.782 for autonomous motivation, and 0.729 for athletic performance. Thus, the three constructs demonstrated satisfactory empirical distinctiveness.

Table 2. Discriminant Validity Assessment Using the Fornell–Larcker Criterion

Construct	Cognitive Reappraisal	Autonomous Motivation	Athletic Performance
Cognitive Reappraisal	**0.727**	-	-
Autonomous Motivation	0.482***	**0.782**	-
Athletic Performance	0.512***	0.569***	**0.729**

Note. Bold diagonal values represent the square root of AVE; off-diagonal values represent inter-construct correlations. ***p* < .001.

Structural Model Fit

Following confirmation of the measurement model, the hypothesized structural model was evaluated. The model retained a satisfactory fit to the data, with all major fit indices meeting their recommended thresholds (Table 3). The results therefore supported further examination of the hypothesized direct and indirect structural relationships.

Table 3. Structural Model Fit Indices

Fit Index	Obtained Value	Recommended Criterion	Evaluation
χ^2/df	1.84	≤ 3.00	Good
CFI	0.962	≥ 0.90	Good
TLI	0.953	≥ 0.90	Good
RMSEA	0.048	≤ 0.08	Good
SRMR	0.042	≤ 0.08	Good

Note. *RMSEA 90% CI = [0.035, 0.061].*

Direct Structural Relationships and Hypothesis Testing

The standardized structural coefficients indicated statistically significant positive relationships among all three constructs (Table 4). Cognitive reappraisal was positively associated with autonomous motivation (β = 0.482, t = 6.85, p < .001), supporting H1. Thus, athletes reporting greater use of cognitive reappraisal also tended to report higher autonomous motivation.

Cognitive reappraisal was also positively associated with perceived athletic performance under competitive pressure (β = 0.310, t = 4.32, p < .001), supporting H2. In addition, autonomous motivation showed a positive association with athletic performance (β = 0.420, t = 5.76, p < .001), supporting H3.

Table 4. Direct Structural Path Estimates and Hypothesis Testing

Hypothesis / Structural Path	Unstandardized (B)	SE	Standardized (β)	t-value	p-value	Decision
H1: Cognitive Reappraisal → Autonomous Mot.	0.452	0.066	0.482	6.85	< .001	Supported
H2: Cognitive Reappraisal → Athletic Perf.	0.285	0.066	0.310	4.32	< .001	Supported
H3: Autonomous Mot. → Athletic Perf.	0.398	0.069	0.420	5.76	< .001	Supported

The direction of these structural relationships is consistent with previous empirical evidence. Mercader-Rubio et al. (2023) reported systematic relationships between emotional regulation and dimensions of intrinsic motivation, while Popovych et al. (2023) found that athletes' ability to manage emotions and self-motivation was associated with stronger motivational orientations. Similarly, SEM evidence reported by (J. Li et al., 2025) demonstrated significant associations of both emotional regulation and cognitive reappraisal with athletes' performance-related outcomes. A systematic review by Boas et al. (2024) likewise concluded that emotion regulation is meaningfully related to sport performance, although the magnitude and form of this relationship may depend on the sporting and competitive context.

Mediation Analysis

The mediating role of autonomous motivation was tested using bias-corrected bootstrapping with 5,000 resamples. As presented in Table 5, cognitive reappraisal had a statistically significant indirect association with athletic performance through autonomous motivation (β = 0.202, Boot SE

= 0.038, 95% CI [0.134, 0.282], p = .001). Because the bootstrap confidence interval did not include zero, H4 was supported. Moreover, because the direct path from cognitive reappraisal to athletic performance remained statistically significant after autonomous motivation was incorporated into the model, the pattern indicates complementary partial mediation, rather than full mediation.

Table 5. Bootstrap Mediation Analysis for the Indirect Effect

Mediational Path	Indirect Effect (β)	Boot SE	Lower 95% CI	Upper 95% CI	p-value
Cognitive Reappraisal ⟶ Auto. Mot. ⟶ Perf.	0.202	0.038	0.134	0.282	.001

The mediation pattern is also compatible with recent evidence showing that cognitive reappraisal can operate as an intermediate psychological mechanism linking antecedent psychological resources to adaptive outcomes among athletes. For example, (Zhong et al., 2025) identified a significant mediating role of cognitive reappraisal in an SEM-based model of athletes' psychological adaptation. Although the outcome examined in that study differed from athletic performance, the findings support the broader premise that emotion-regulation processes can operate through interconnected psychological pathways rather than exclusively through direct associations.

Explained Variance and Overall Hypothesis Evaluation

The structural model explained 23.2% of the variance in autonomous motivation (R^2 = .232) and 42.6% of the variance in perceived athletic performance under competitive pressure (R^2 = .426). Thus, cognitive reappraisal accounted for a meaningful proportion of individual differences in autonomous motivation, while cognitive reappraisal together with autonomous motivation explained a substantial proportion of variance in perceived performance. Overall, H1, H2, H3, and H4 were supported. The findings indicate that cognitive reappraisal was positively associated with perceived athletic performance both directly and indirectly through autonomous motivation. Importantly, given the cross-sectional design, these coefficients should be interpreted as structural associations consistent with the hypothesized theoretical model rather than evidence of temporal or experimental causality.

DISCUSSION

The findings of this study indicate that emotional regulation is a fundamental psychological factor in explaining athletes' self-motivation and performance under competitive pressure. Empirically, the direction of the relationship suggests that athletes who can regulate their emotions adaptively tend to demonstrate stronger psychological readiness, maintain internal motivation, preserve attentional focus, and perform more consistently in demanding competitive situations. In elite sport contexts, performance is not determined solely by physical capacity and technical skill, but also by the athlete's ability to interpret pressure as a controllable challenge. Therefore, emotional regulation functions as an initial psychological mechanism that helps athletes reduce affective disturbance, control competitive anxiety, and direct psychological energy toward performance goals. The findings support the proposed theoretical model but must be interpreted according to the cross-sectional design. Thus, the results show a pattern of covariation consistent with the hypothesized structural sequence and not evidence that cognitive reappraisal temporally leads to increased motivation or performance.

Support for H1 suggests that athletes who reported higher use of cognitive reappraisal also tended to report higher autonomous motivation. These findings make conceptual sense because

cognitive reappraisal is concerned with the way individuals change their interpretation of situations that elicit emotions, whereas autonomous motivation describes engagement based on relatively internalized reasoning. Cognitive reappraisal in this study should be understood specifically as one of the emotion regulation strategies and not generalized to the overall emotion regulation ability (Gross & John, 2003); (Lane et al., 2012); (Uphill et al., 2014)

This interpretation is also important because the motivation construct in this study is autonomous motivation, not just intrinsic motivation or the general term "self-motivation". SMS-II distinguishes between different forms of motivational regulation, so that intrinsic regulation and identified regulation have a certain conceptual position in the motivational continuum (Pelletier et al., 2013). The perspective of self-determination also distinguishes the quality of the reasons underlying sports behavior, not just the amount of motivation (Deci & Ryan, 2000); (Ryan & Deci, 2017); (Brooke et al., 2022)

H1 results are generally in line with the literature linking emotional processes to the quality of exercise motivation. (Mercader-Rubio, Gutiérrez Ángel, et al., 2023b) reported an association between the dimension of intrinsic motivation and emotional factors, while (González-Hernández et al., 2023) showed that psychological conditions and motivational climate are related to the quality of motivation in athletes. However, this study did not measure perceived competence, autonomy support, or basic psychological needs. Therefore, these variables cannot be considered as mechanisms that explain the H1 coefficient; at most, the literature provides a theoretical context for the observed relationship.

H2 showed a positive direct association between cognitive reappraisal and perceived athletic performance under competitive pressure. This pattern is consistent with evidence that certain emotion regulation strategies are related to sports performance. (Millán-Sánchez et al., 2023a) reported the association between emotion regulation and performance indicators in national volleyball players, while (Lulu et al., 2025) showed that emotion regulation strategies are related to shooting athletes' performance during competitions. More broadly, the systematic review of Boas et al. (2024) concluded that emotion regulation is related to sports performance, but the strength and form of the relationship differ according to regulation strategies, athlete characteristics, type of sport, and competition context.

The difference in the type of outcome must be considered. The research of (Millán-Sánchez et al., 2023a) uses performance indicators that are closer to sports performance data, while the outcome of this study is self-perceived performance. Therefore, the H2 coefficient does not prove that cognitive reappraisal objectively improves match statistics or competition results. Athletes who assess their reappraisal abilities positively may also be more likely to give a positive assessment of their performance. This possibility is relevant because both constructs are obtained through self-reports.

The findings of (Zhao et al., 2024) also remind that psychological conditions and performance must be maintained as different constructs. State anxiety and shooting performance can be interrelated without meaning that anxiety is an indicator of performance. For the same reason, the results of this study should not be used to conclude that anxiety reduction or confidence increase is an H2 mechanism because they are not included in the model.

H3 shows that autonomous motivation has a positive association with perceived athletic performance ($\beta = 0.420$). This pattern is consistent with the perspective of self-determination that places motivational quality as a factor related to persistence, engagement, and more self-endorsed

involvement in sports activities (Deci & Ryan, 2000; (Hagger & Chatzisarantis, 2007); Ryan & Deci, 2017; (Ntoumanis, 2012). (Mercader-Rubio, Ángel, et al., 2023) also show the relevance of the intrinsic motivation dimension to engagement and achievement in the context of sports.

H4 further shows indirect association of cognitive reappraisal with perceived performance through autonomous motivation. Because direct association remains significant, the statistical pattern is consistent with partial mediation. However, "mediation" in this context should be understood as a statistical decomposition of the relationship between variables at a single measurement time, not evidence that changes in cognitive reappraisal first result in changes in autonomous motivation that then improve performance. Alternative relationship sequences are still possible. For example, athletes who rated their performance high after competition may report higher autonomous motivation and evaluate their emotion regulation abilities more positively. Reciprocal relationships are also possible: autonomous motivation may be related to the athlete's tendency to use reappraisal strategies, not just the other way around. Since temporal ordering is not observed, such alternative models have not been eliminated by current data.

One of the important contributions of the emotion regulation literature is to show that not all regulatory strategies have the same consequences. Cognitive reappraisal and expressive suppression are conceptually different processes (Gross & John, 2003). Therefore, the positive findings on cognitive reappraisal in this study should not be extended to the claim that "emotion regulation" in general is always positively related to performance. Lane et al. (2012) and (Uphill et al., 2014) show that the function of emotion regulation in sport depends on the strategy and the situation of its use, while Boas et al. (2024) emphasize the heterogeneity of results across sports contexts.

The literature also shows that competitive pressure does not have a uniform relationship with performance. Zhao et al. (2024) found a relationship between state anxiety, physiological indicators, and shooting performance, while (Stepanyan & Lalayan, 2024) showed that the response to pressure is related to decision-making demands. Therefore, the results of this study are more accurately understood as associations patterns in the context of competitive pressure than as evidence that pressure is always bad and reappraisals always eliminate its impact. The context of sports is also a potential source of heterogeneity. The study sample included 108 individual athletes and 140 team sports athletes. Performance demands in shooting or athletic athletes can differ substantially from soccer, basketball, or volleyball. The literature used in the manuscript itself comes from heterogeneous contexts, including volleyball, shooting, football, and high-performance sports (Millán-Sánchez et al., 2023b). Since this study did not test measurement invariance or multi-group structural differences, coefficient similarity between individual and team sports cannot be assumed.

The theoretical contribution of this study mainly lies in the integration of three constructs that are more clearly defined. First, the predictor is defined as cognitive reappraisal, not emotion regulation. Second, the mediator is positioned as autonomous motivation and is not equated with self-motivation or intrinsic motivation. Third, the outcome is defined as perceived athletic performance under competitive pressure and is distinguished from anxiety and self-confidence. This model thus provides evidence that the three constructs can form coherent structural patterns in a single SEM model. These findings complement previous studies that examined emotion regulation and performance directly or placed various psychological factors simultaneously (J. Li et al., 2025; Boas et al., 2024). The research contribution is not a demonstration of a new causal mechanism, but rather an identification of structural association patterns that can be tested more rigorously through temporal and multi-source design in subsequent studies.

The practical implications should be limited to the variables that are measured. Results show that cognitive reappraisal, autonomous motivation, and perceived performance assessments can provide complementary information when practitioners monitor athletes' psychological responses to competition. Coaches and sports psychologists can use these profiles as part of athlete evaluations, especially when there are differences between athletes' perceptions of performance and technical evaluations or match statistics. However, this study did not test intervention programs. Therefore, the results are insufficient to conclude that cognitive reappraisal training will improve autonomous motivation or performance. Intervention recommendations should be tested independently using experimental or longitudinal designs. The most defensible implication of this study is that cognitive reappraisal and motivational quality deserve to be considered as part of psychological assessments, not that a particular mental training package has been shown to be effective by these data.

Several limitations need to be considered. First, cross-sectional designs do not establish temporal precedence so causal mediation, reverse directionality, and reciprocal relationships cannot be distinguished. Future research will need to use longitudinal, cross-lagged, or repeated-measures designs to test whether reappraisal changes precede changes in motivation and performance. Second, all major constructs are collected through self-reports in the context of the same measurement. This condition increases the likelihood of common-method variance, including consistency motifs and shared response tendencies. Although the CFA shows discriminant validity between constructs, discriminant validity does not by itself eliminate common-method bias. Future research may combine athlete reports with coach ratings, match statistics, sensors or physiological measures, as well as use temporal separation or statistical methods specific to common-method variance.

Third, outcomes are perceived, not objective, athletic performance. Therefore, generalizations about winning percentages, match statistics, scoring accuracy, or objective sports performance indicators should be avoided. Subsequent research should test whether the same structure persists when perceived performance is analyzed alongside actual performance indicators. Fourth, there is potential construct overlap because performance perception includes aspects such as task execution and attentional functioning that can conceptually relate to the evaluation of psychological states. Although measurement models show adequate separation of factors, the development of narrower, independent outcome measures will strengthen structural interpretations. Fifth, the incorporation of individual athletes and sports teams can hide sport-specific heterogeneity. Multi-group, measurement invariance, or moderator analysis based on sport type is required before concluding that the model has the same structure across all types of sports. Studies with larger samples can also compare the dominant branches of precision, endurance, combat, or interactive team performance.

Finally, the current model tests only one theoretically determined structural sequence. Subsequent studies should explicitly compare alternative models, such as autonomous motivation, cognitive reappraisal, perceived performance or perceived performance, autonomous motivation and test reciprocal models using longitudinal data. This approach will provide a stronger test of whether the proposed model is the most appropriate explanation compared to alternative structures.

CONCLUSION

This study examined the structural relationships among cognitive reappraisal, autonomous motivation, and perceived athletic performance under competitive pressure. The findings support a theoretically coherent model in which these psychological constructs are positively interconnected, including an indirect relationship involving autonomous motivation. However, these relationships

should be interpreted as statistical associations rather than causal mechanisms. The conclusions are subject to several limitations. The cross-sectional design does not establish temporal precedence, while the reliance on self-report measures may increase the risk of common-method bias. The use of purposive sampling may also limit the generalizability of the findings beyond the sampled athletes. In addition, combining individual and team-sport athletes may obscure sport-specific psychological patterns, and the performance construct reflects athletes perceived performance rather than objectively verified competitive outcomes. Accordingly, the proposed model should be considered a preliminary structural explanation of how cognitive reappraisal, autonomous motivation and perceived performance are related in competitive sport settings. Future studies should employ longitudinal or experimental designs, probability-based or broader sampling strategies, objective performance indicators, multi-source assessments and sport-specific analyses to clarify the direction, stability and generalizability of these relationships.

RECOMMENDATION

Based on the observed structural associations, future research should further examine the relationships among cognitive reappraisal, autonomous motivation, and perceived athletic performance using designs that permit stronger temporal and causal inference. Longitudinal, experimental, and repeated-measures studies are particularly recommended to determine the direction and stability of these relationships across competitive periods. Future studies should also incorporate objective indicators of athletic performance, such as competition statistics, rankings, scoring accuracy, or coach evaluations, alongside athletes' self-reported performance. Multi-source data may help reduce common-method bias and provide a more comprehensive assessment of competitive performance. Because the present sample included athletes from both individual and team sports, subsequent research should evaluate whether the proposed structural relationships differ across sport types, competitive levels, sex, and age groups. Larger and more diverse samples would also improve the generalizability of the findings. For applied practice, cognitive reappraisal and autonomous motivation may be considered relevant variables for psychological assessment and athlete monitoring. However, the present study did not evaluate any psychological training program or intervention. Therefore, recommendations concerning cognitive-reappraisal training, motivational programs, or other psychological interventions should be regarded as hypotheses for future testing rather than as practices whose effectiveness has been demonstrated by this study.

REFERENCES

Abiyra, A. J., Tiwari, S., Tiwari, S., & Haq, M. A. U. (2025). Analyzing Emotional Control in University Athletes: A Cross-Cultural and Gender Perspective. *Physical Education Theory and Methodology*, *25*(2), 293–300. Scopus. https://doi.org/10.17309/tmfv.2025.2.10

Bencker, A., Larsson, G., Fors Brandebo, M., Johnson, U., & Ivarsson, A. (2025). High-level military and sport leaders' everyday challenges and psychological skills: A cross-contextual repeated measures study. *Military Psychology*, *37*(5), 398–409. Scopus. https://doi.org/10.1080/08995605.2024.2376970

Boas, M. V., Ucha, F. G., de Souza, V. H., Manzini, M., de Freitas Corrêa, M., Angelo, D. L., Corcuera-Bustamante, S., Reyes-Bossio, M., Viveiros, L., & Brandão, M. R. F. (2024a). The Relationship Between Emotional Regulation and Sports Performance: A Systematic Review.

Journal of Physical Education (Maringa), *35*(1). Scopus. https://doi.org/10.4025/jphyseduc.35i1.3530

Boas, M. V., Ucha, F. G., de Souza, V. H., Manzini, M., de Freitas Corrêa, M., Angelo, D. L., Corcuera-Bustamante, S., Reyes-Bossio, M., Viveiros, L., & Brandão, M. R. F. (2024b). The Relationship Between Emotional Regulation and Sports Performance: A Systematic Review. *Journal of Physical Education (Maringa)*, *35*(1). Scopus. https://doi.org/10.4025/jphyseduc.35i1.3530

Brooke, L. E., Gucciardi, D. F., Ntoumanis, N., Chapman, M. T., Lines, R. L. J., Perry, Y., Gilbey, D., Formby, T., Phillips, T., & Lin, A. (2022). Enhancing functional recovery for young people recovering from first episode psychosis via sport-based life skills training: Outcomes of a feasibility and pilot study. *Health Psychology and Behavioral Medicine*, *10*(1), 1136–1158. Scopus. https://doi.org/10.1080/21642850.2022.2147073

Chen, X., Yue, Y., Xiang, J., & Zhang, F. (2026). The relationship between coaching leadership practices and athlete burnout among college athletes in China: The mediating role of psychological resilience and emotion regulation. *BMC Psychology*, *14*(1). Scopus. https://doi.org/10.1186/s40359-026-04891-x

Corvera-Velarde, F., Cantú-Berrueto, A., Mendoza-Farias, F. J., & López-Walle, J. M. (2025). Group Environment Questionnaire (GEQ): Validation in Mexican university athletes. *Societies*, *15*(9). https://doi.org/10.3390/soc15090259

Cruz, E. (2025). Butterfly in stomach: Investigation on the influence of pre-competition anxiety on perceived athletic performance during SCUAA games season. *Sportis: Scientific Technical Journal of School Sport, Physical Education and Psychomotricity*, *11*(3). Scopus. https://doi.org/10.17979/sportis.2025.11.3.11773

Cunha, M., Sofia, R., & Dias, C. (2024). The role of implicit beliefs about emotions and emotion regulation on psychological adjustment: A study among youth athletes. *Human Movement*, *25*(4), 87–95. Scopus. https://doi.org/10.5114/hm/194016

Da Costa Dutra, S. C., Oriol Granado, X., Paéz-Rovira, D., Díaz, V., Carrasco-Dajer, C., & Izquierdo, A. (2023). Emotion Regulation Strategies in Educational, Work and Sport Contexts: An Approach in Five Countries. *International Journal of Environmental Research and Public Health*, *20*(19). Scopus. https://doi.org/10.3390/ijerph20196865

Deci, E. L., & Ryan, R. M. (2000). The what and why of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50.

Gao, Z., Wan Pa, W. A. M., & Nazarudin, M. N. B. (2026). Mental Fatigue in Collegiate Athletes: A Behavioral Science Review of Stress Appraisal, Competitive Anxiety, and Resilience-Related Regulation. *Behavioral Sciences*, *16*(7). Scopus. https://doi.org/10.3390/bs16071133

González-Hernández, J., Gómez-López, M., Manzano-Sánchez, D., & Valero-Valenzuela, A. (2023). Motivated and without Fear of Failure: The Strength of Basic Psychological Needs in Youth Spanish Athletes in Team Sports. *Journal of Human Kinetics*, *87*, 235–245. Scopus. https://doi.org/10.5114/jhk/162449

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, *85*(2), 348–362.

Hagger, M. S., & Chatzisarantis, N. L. D. (2007). *Intrinsic motivation and self-determination in exercise and sport*. Human Kinetics.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th edn). Cengage Learning.

Halian, I., Popovych, I., Charkina, O., Halian, A., Danko, D., Zaverukha, O., Haponenko, L., & Kryzhanovskyi, O. (2024). Relationship between emotional intelligence and coping strategies in junior athletes' behavior during extreme competitive situations. *Journal of Physical Education and Sport*, *24*(11), 1518–1527. https://doi.org/10.7752/jpes.2024.11278

Hu, S. X., Liu, S., & Guo, Y. (2026). Differential factor effects in comorbid depressive and anxiety symptoms (CDAS): A machine learning approach to individualized mental health promotion. *Journal of Affective Disorders*, *397*. Scopus. https://doi.org/10.1016/j.jad.2025.120883

Jannah, M., Widohardhono, R., Makiko, N. R., Sholichah, I. F., & Hidayah, R. (2023). The Role of Optimism in the Emotion Regulation of Athletes with Disabilities. *International Journal of Human Movement and Sports Sciences*, *11*(3), 527–532. Scopus. https://doi.org/10.13189/saj.2023.110303

Kara, M., Ogras, E. B., Talaghir, L.-G., Iconomescu, T. M., & Gumus, H. (2025). Mental fatigue and return to well-being in athletes: Roles of cognitive reappraisal, gender, and alcohol consumption. *Frontiers in Psychology*, *16*. Scopus. https://doi.org/10.3389/fpsyg.2025.1569973

Kim, S.-K., & Choi, H. (2024). Effects of coaches' autonomy support on athletes' aggressive behavior and athlete burnout: Verification of the mediating effects of coach-athlete relationship and team efficacy. *Frontiers in Psychology*, *15*. https://doi.org/10.3389/fpsyg.2024.1388185

Klatt, S., Rückel, L.-M., Wagener, S., & Noël, B. (2021). Personality Traits and Emotion Regulation Styles of Elite Beach Volleyball Dyads: Examination of Intra-Team Differences, Performance and Satisfaction Levels. *Frontiers in Psychology*, *12*. Scopus. https://doi.org/10.3389/fpsyg.2021.719572

Lane, A. M., Beedie, C. J., Devonport, T. J., & Stanley, D. M. (2012). Instrumental emotion regulation in sport: Relationships between beliefs and emotion regulation strategies used by athletes. *Scandinavian Journal of Medicine & Science in Sports*, *22*(4), 445–451.

Li, F., & Mao, D. (2026). Network analysis of the relationship between stress coping mechanisms and performance in high school women's volleyball competitions. *Frontiers in Sports and Active Living*, *8*. Scopus. https://doi.org/10.3389/fspor.2026.1701323

Li, J., Wang, J., Liu, Y., & Li, L. (2025). Cultural narratives of basketball participation and psychological resilience: A mixed-methods study among university students in China, the USA, and Europe. *Frontiers in Psychology*, *16*. Scopus. https://doi.org/10.3389/fpsyg.2025.1635183

Lulu, Z., Huimin, L., & Hua, S. (2025). Effect of emotional regulation on performance of shooters during competition: An ecological momentary assessment study. *PLoS ONE*, *20*(3 March). Scopus. https://doi.org/10.1371/journal.pone.0318872

Martens, R., Vealey, R. S., & Burton, D. (1990). *Competitive anxiety in sport*. Human Kinetics.

Mercader-Rubio, I., Ángel, N. G., Granero-Gallegos, A., Ruiz, N. F. O., & Sánchez-López, P. (2022). Motivational Orientation in University Athletes: Predictions Based on Emotional Intelligence. *Behavioral Sciences*, *12*(10). Scopus. https://doi.org/10.3390/bs12100397

Mercader-Rubio, I., Ángel, N. G., Silva, S., Furtado, G., & Brito-Costa, S. (2023). Intrinsic Motivation: Knowledge, Achievement, and Experimentation in Sports Science Students—Relations with Emotional Intelligence. *Behavioral Sciences*, *13*(7). Scopus. https://doi.org/10.3390/bs13070589

Mercader-Rubio, I., Gutiérrez Ángel, N., Silva, S., Moisão, A., & Brito-Costa, S. (2023a). Relationships between somatic anxiety, cognitive anxiety, self-efficacy, and emotional intelligence levels in university physical education students. *Frontiers in Psychology*, *13*. Scopus. https://doi.org/10.3389/fpsyg.2022.1059432

Mercader-Rubio, I., Gutiérrez Ángel, N., Silva, S., Moisão, A., & Brito-Costa, S. (2023b). Relationships between somatic anxiety, cognitive anxiety, self-efficacy, and emotional intelligence levels in university physical education students. *Frontiers in Psychology*, *13*. Scopus. https://doi.org/10.3389/fpsyg.2022.1059432

Millán-Sánchez, A., Madinabeitia, I., de la Vega, R., Cárdenas, D., & Ureña, A. (2023a). Effects of emotional regulation and impulsivity on sports performance: The mediating role of gender and competition level. *Frontiers in Psychology*, *14*. Scopus. https://doi.org/10.3389/fpsyg.2023.1164956

Millán-Sánchez, A., Madinabeitia, I., de la Vega, R., Cárdenas, D., & Ureña, A. (2023b). Effects of emotional regulation and impulsivity on sports performance: The mediating role of gender and competition level. *Frontiers in Psychology*, *14*. Scopus. https://doi.org/10.3389/fpsyg.2023.1164956

Ntoumanis, N. (2012). A self-determination theory perspective on motivation in sport and physical education. In G. C. Roberts & D. C. Treasure (Eds), *Advances in motivation in sport and exercise* (pp. 91–128). Human Kinetics.

Pelletier, L. G., Rocchi, M. A., Vallerand, R. J., Deci, E. L., & Ryan, R. M. (2013). Validation of the revised Sport Motivation Scale (SMS-II). *Psychology of Sport and Exercise*, *14*(3), 329–341.

Petrovska, T., Kulish, N., Kostiukevych, V., Sluhenska, R., Reshetilova, N., & Yerokhova, A. (2021). Research of emotional intelligence as a psychological resource of an athlete. *Sport Mont*, *19*, 57–61. Scopus. https://doi.org/10.26773/smj.210910

Pitacho, L., & Cordeiro, J. P. (2026). Purpose under pressure: How calling, recovery, emotional regulation and flow shape elite athletic performance. *Frontiers in Psychology*, *17*. Scopus. https://doi.org/10.3389/fpsyg.2026.1894992

Popovych, I., Plokhikh, V., Hrys, A., Pavliuk, M., Nosov, P., & Zinchenko, S. (2023). Operationalization of footballers' emotional intelligence in the dimensions of motivational orientation: Analysis based on the basic positions. *Journal of Physical Education and Sport*, *23*(3), 772–781. Scopus. https://doi.org/10.7752/jpes.2023.03095

Putra, M. F. P., Rahayuni, K., Wanena, T., Larung, E. Y. P., Sinaga, E., Zainuri, A., Numberi, G. K. I., Hidayat, R. R., Wandik, Y., & Togodly, A. (2025). Adaptation and psychometric validation of the Indonesian version of the Athlete Psychological Strain Questionnaire. *Sport i Turystyka*, *8*(3), 157–176. https://doi.org/10.16926/sit.2025.03.09

Richard, V., Mason, J., Alvarez-Alvarado, S., Perry, I., Lussier, B., & Tenenbau, G. (2021). Effect of preperformance routine on advanced swimmers' performance and motor efficiency, self-efficacy, and idiosyncratic emotions. *Sport Psychologist*, *35*(2), 97–107. Scopus. https://doi.org/10.1123/TSP.2020-0023

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.

Senturk, H. E., Tanir, G., Erdogan Yuce, U., Karatut, A., & Karakaş, E. (2026). Attitudes towards sport in early adolescence: A scale adaptation study for sustainable good health and well-being. *Healthcare (Switzerland)*, *14*(7). https://doi.org/10.3390/healthcare14070842

Stepanyan, L., & Lalayan, G. (2024). Stress Resilience and Decision-Making Under Pressure: Enhancing Athletic Performance in Competitive Sports. *Georgian Medical News*, *352–353*(7–8), 32–37. Scopus.

Tamás, B., Géczi, G., Gurisatti, L., Gábor, L., Baracskai, Z., & Géczi, G. (2024). Executive Functions and Competitive Attitudes in Near-Elite Ice Hockey Players. *Physical Culture and Sport, Studies and Research*, *104*(1), 15–24. Scopus. https://doi.org/10.2478/pcssr-2024-0015

Tatsumi, T. (2023). Individual-differences affecting emotion regulation behaviors of injured athletes: A retrospective quantitative study. *PLoS ONE*, *18*(11 November). Scopus. https://doi.org/10.1371/journal.pone.0294551

Uphill, M. A., McCarthy, P. J., & Jones, M. V. (2014). Getting a grip on emotion regulation in sport. *International Review of Sport and Exercise Psychology*, *7*(1), 128–146.

Wergin, V. V., Wolf, S. A., Pasco, S., & Mallett, C. J. (2025). 'Like Emotional Zombies'—Individual and Interpersonal Emotion Regulation of Sport Teams in Collective Team Collapse and Performance Recovery Situations. *Journal of Sport and Exercise Psychology*, *47*(3), 185–198. Scopus. https://doi.org/10.1123/jsep.2024-0167

Xiang, X. (2026). Perceived physical literacy and subjective wellbeing in university students: The indirect association via autonomous sports motivation. *Frontiers in Psychology*, *17*. https://doi.org/10.3389/fpsyg.2026.1860366

Young, B. W., Bain, L., Wilson, S. G., Hoar, S., & Baker, J. (2025). How Mental Performance Consultants Describe Self-Regulated Learning, Its Merits, and Its Implementation in Competitive Adolescent Sport. *Sport Psychologist*, *39*(3), 176–189. Scopus. https://doi.org/10.1123/tsp.2025-0012

Zhao, C., Wang, K., Li, D., Li, Y., Wang, Z., Liu, Y., & Zhang, T. (2024). Relationship between state anxiety, heart rate variability, and shooting performance in adolescent shooters. *BMC Psychology*, *12*(1). Scopus. https://doi.org/10.1186/s40359-024-02062-4

Zhong, Z., Jiang, H., Wang, H., & Liu, Y. (2025). The Association Between Mindfulness and Athletes' Distress Tolerance: The Mediating Roles of Cognitive Reappraisal and Mental Toughness. *Behavioral Sciences*, *15*(3). Scopus. https://doi.org/10.3390/bs15030298

Zuo, J., & Bai, Y. (2025). Emotion regulation, coping strategies, and burnout among Chinese competitive athletes: A mixed-methods study. *BMC Psychology*, *13*(1). Scopus. https://doi.org/10.1186/s40359-025-03458-6