

Solid as a rock? Psychological skills, mood states and mental health indicators in young rugby players

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ABSTRACT

Rugby is a high-contact team sport involving substantial physical, emotional and social demands. This study examined the associations between psychological skills related to sport performance and mental health indicators, including sleep quality, fatigue, mood states and injury history, in young rugby players. An empirical, cross-sectional and associative study was conducted with 27 regional under-16 and under-18 rugby players aged 14–17 years. Participants completed an ad hoc questionnaire on sociodemographic, sport-related and injury variables, together with the Psychological Characteristics Related to Sports Performance Questionnaire, the Profile of Mood States and the Pittsburgh Sleep Quality Index. Non-parametric analyses were performed. Players generally reported adequate perceived sleep quality, low negative mood states, moderate tension and preserved vigour. Stress control was positively associated with the influence of performance evaluation and motivation, while motivation was related to team cohesion. Higher influence of performance evaluation was associated with lower tension. Players with previous injuries showed higher mental skills and cohesion. Cluster analysis identified a profile characterized by better psychological skills, higher motivation and lower tension. These findings suggest that psychological skills, cohesion, sleep perception and mood states may be relevant dimensions for understanding well-being in youth rugby.

Keywords: youth sport; team sports; psychological well-being; sleep quality; fatigue; injury history.

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INTRODUCTION

In recent decades, sport psychology has shown increasing interest in understanding the psychological characteristics associated with participation in different sports. Early research attempted to determine whether athletes' personality traits could explain their preference for particular sport disciplines, although the evidence has often been inconsistent and sometimes contradictory (Allen et al., 2013). More recent approaches have shifted the focus from the idea that certain personality profiles predispose individuals to choose specific sports towards a more dynamic perspective, in which sport participation itself may contribute to the development, modification, or reinforcement of psychological characteristics over time (Allen et al., 2021; Thornton et al., 2024; White et al., 2024).

This perspective is particularly relevant in youth sport, where athletes are still developing their psychological, emotional, and social resources. During adolescence, competitive sport may act both as a demanding context and as a formative environment in which young athletes learn to cope with pressure, fatigue, performance evaluation, team demands, and injury-related experiences. These factors are closely linked to mental health, understood not only as the absence of psychological symptoms, but also as the presence of adaptive functioning, emotional regulation, perceived competence, social support, and well-being.

Rugby represents a particularly relevant context for studying these processes. It is a high-contact team sport characterized by intense physical demands, repeated exposure to collisions, tolerance to discomfort and pain, and a strong emphasis on cooperation, collective identity, and commitment. Previous work on sport commitment, including research conducted with elite rugby players such as the New Zealand All Blacks, has highlighted rugby as a useful setting for understanding adherence, motivation, and persistence under demanding practice conditions (Scanlan et al., 2003, 2016). In addition, recent consensus work on elite youth athletes has emphasized that demanding sport environments may provide developmental, psychological, and social benefits, but may also involve threats to health and well-being when training, competition, recovery, and psychosocial support are not adequately managed (Bergeron et al., 2024). In this sense, rugby may provide a unique framework for analysing how young athletes manage emotional activation, fatigue, sleep routines, perceived evaluation, injury-related experiences, and team belonging.

Among the psychological variables involved in sport performance and mental health, mood states, fatigue, sleep quality, and injury history deserve particular attention. Mood states are relevant because they reflect athletes' emotional responses to training and competition and may be associated with both performance and psychological well-being (Brandt et al., 2017; Campo et al., 2019; Fullagar et al., 2015; Nédélec et al., 2012; Shearer et al., 2015). Fatigue, in turn, is a common consequence of demanding training loads and may influence recovery, emotional regulation, perceived stress, and readiness to perform. Sleep quality is also a central indicator of recovery and mental health, particularly in adolescent athletes, as insufficient or poor-quality sleep may affect mood, attention, physical recovery, injury risk, and vulnerability to psychological distress (Charest & Grandner, 2020).

Injury history is another important dimension when analysing athletes' psychological functioning. Sports injuries are not only physical events; they may also involve emotional, cognitive, and social consequences. Previous research has shown that injury experiences can be associated with anxiety, mood disturbances, perfectionistic tendencies, coping processes, and broader indicators of mental health in athletes (Gil-Caselles et al., 2023, 2025). Moreover, recent consensus work on the psychology of sport injury has highlighted the need to consider psychological factors across the whole injury process, including injury risk, rehabilitation, return to sport, and long-term adjustment (Tranaeus et al., 2024). However, injury may also become a context

for psychological learning when athletes receive appropriate support during recovery and return to play. In this regard, the relationship between injury, psychological skills, and mental health should be understood in a nuanced way, considering both vulnerability and adaptation.

Psychological skills related to sport performance, such as stress control, motivation, mental skills, mental toughness, and team cohesion, may play a protective role in demanding sport environments. These skills can help athletes interpret external evaluation, physical demands, fatigue, and competitive pressure as manageable challenges rather than as overwhelming threats. In team sports, cohesion and cooperation may be especially relevant, as the perception of belonging and shared effort can buffer the negative impact of stress and contribute to more adaptive emotional functioning. Regarding the conceptual issue at hand, previous systematic review and meta-analytic evidence has shown that the most adequate theoretical frameworks for to explain and put together these variables is twofold. On one hand, there are the concept of mental toughness, which we know is positively associated with athletic performance (Hsieh et al., 2024). Mental toughness may mediate athletes' responses to demanding or adverse sporting situations by helping them remain determined, focused, confident, and emotionally composed. This psychological capacity allows athletes to sustain, or even enhance, their performance despite pressure, setbacks, and fatigue (Hsieh et al., 2024). It supports effective skill execution and decision-making under high-stakes conditions, promotes recovery from injury, failure, or poor performance by transforming adversity into a learning opportunity, and may protect against burnout. Indeed, athletes with greater mental toughness tend to report lower emotional exhaustion and sport devaluation (Poulus et al., 2024). Importantly, mental toughness is not necessarily a fixed attribute, as it can be strengthened through psychological skills training in sport (Pocius & Malinauskas, 2024).

On the other hand, there are the psychological wellbeing (Peris-Delcampo et al., 2024), intrinsically related with the mental health, which provides knowledge about the way -for the athletes- to perform exigent sports without breaking psychologically. This combination of psychological concepts, with its derived variables, is particularly important in rugby, where collective effort and exposure to demanding physical situations are central elements of the sport culture. In line with recent evidence, psychological skills training and other psychological interventions may contribute to athletes' mental well-being, although more robust research designs are still needed to clarify their effectiveness across different sport populations (Wang et al., 2025).

Despite the growing interest in athlete mental health and their psychological wellbeing, there is still limited evidence on how psychological skills, sleep quality, fatigue, mood states, and injury history are related in young rugby players. Most research has focused on adult or elite athletes, whereas adolescent players in regional development contexts have received less attention. Studying these populations is important because early identification of adaptive and maladaptive psychological profiles may help to design preventive interventions aimed at promoting mental health, recovery, emotional regulation, and positive sport development.

Therefore, the aim of this study was to examine the associations between psychological skills related to sport performance and mental health indicators, including sleep quality, fatigue, mood states, and injury history, in young rugby players from regional under-16 and under-18 teams. Based on previous literature, it was expected that higher psychological skills, particularly stress control, motivation, and cohesion, would be associated with more adaptive mood profiles and better indicators of psychological well-being.

MATERIAL AND METHODS

Study design

This study followed an empirical, observational, cross-sectional, and associative design (Ato et al., 2013). Its aim was to examine the relationships between psychological skills related to sport performance and several mental health indicators, including sleep quality, fatigue, mood states, and injury history, in young rugby players. No experimental manipulation was conducted, and all variables were assessed in the participants' natural sport context during a training period.

Participants

Twenty-seven rugby players from regional under-16 and under-18 teams participated in the study. Participants were recruited through convenience sampling from a regional rugby development context. The sample was distributed across two age categories: under-16 ($n = 14$; 11 males and 3 females) and under-18 ($n = 13$; 11 males and 2 females). Overall, 81.5% of the participants were male and 18.5% were female, with ages ranging from 14 to 17 years.

The under-16 group had a mean age of 14.50 ± 0.67 years, had spent an average of 1.08 ± 0.29 years in the category, and had been registered with the federation for 5.58 ± 3.00 years. The under-18 group had a mean age of 16.55 ± 0.52 years, had spent 1.73 ± 0.47 years in the category, and had been registered with the federation for 4.82 ± 2.60 years. All participants were actively involved in federated rugby at the time of data collection.

Measures

Sociodemographic and sport-related information was collected using an ad hoc questionnaire designed for this study. The questionnaire included age, sex, competitive category, number of years practicing sport at the highest competitive level, number of years of continuous federated sport participation, weekly training frequency, and daily training duration.

Current and previous injury history was assessed using an ad hoc injury questionnaire. This questionnaire recorded the presence or absence of current injury, type of injury, injury severity, and the number of sport injuries sustained during the previous two seasons. Injury type included muscle injury, fracture, tendinopathy, contusion, sprain, and other injuries. Injury severity was categorised according to the number of days of sport absence. Mild injuries were defined as those involving one day without training; moderate injuries as those involving at least six days without training; severe injuries as those involving one to three months of sport absence; and very severe injuries as those involving more than four months of sport absence.

Psychological characteristics related to sport performance were assessed using the Psychological Characteristics Related to Sport Performance Questionnaire, known by its Spanish acronym CPRD, developed by Gimeno et al. (2001). The CPRD is based on the Psychological Skills Inventory for Sports developed by Mahoney et al. (1987) and consists of 55 items rated on a five-point Likert scale ranging from strongly disagree to strongly agree. It includes five subscales: Stress Control, Influence of Performance Evaluation, Motivation, Team Cohesion, and Mental Skills. Higher scores indicate higher levels of the corresponding psychological characteristic. Previous studies have reported acceptable internal consistency for the total scale, $\alpha = 0.85$, and for most subscales: Stress Control, $\alpha = 0.88$; Influence of Performance Evaluation, $\alpha = 0.72$; Motivation, $\alpha = 0.67$; Team Cohesion, $\alpha = 0.78$; and Mental Skills, $\alpha = 0.34$. According to Gimeno and Pérez-Llantada (2010), the low internal consistency of the Mental Skills subscale may be explained by the fact that this dimension includes a broad range of different psychological skills.

Nevertheless, the subscale was retained due to the factorial loadings of its items, which were above 0.30. Similar psychometric considerations have also been reported in previous research using the original Psychological Skills Inventory for Sports (Chartrand et al., 1992).

Mood states were assessed using the Spanish-adapted and validated short version of the Profile of Mood States, developed by Fuentes et al. (1995) from the original Profile of Mood States by McNair et al. (1971). This version includes 29 items rated on a five-point scale ranging from 0, not at all, to 4, very much. The questionnaire assesses five mood states: Tension, Depression, Anger, Vigour, and Fatigue. Previous studies have reported satisfactory Cronbach's alpha values for the five dimensions: Tension, $\alpha = 0.83$; Anger, $\alpha = 0.85$; Vigor, $\alpha = 0.83$; Fatigue, $\alpha = 0.82$; and Depression, $\alpha = 0.78$. Higher scores indicate higher levels of each mood state.

Sleep quality was assessed using the Spanish-language version of the Pittsburgh Sleep Quality Index (Escobar-Córdoba & Eslava-Schmalbach, 2005), a widely used self-report instrument for assessing perceived sleep quality (Smyth, 1999). Previous validation studies have reported adequate convergent and divergent validity and moderate reliability, with a Cronbach's alpha of .72 (Escobar-Córdoba & Eslava-Schmalbach, 2005). For the purposes of this study, two sleep-related indicators were analysed: sleep latency and perceived sleep quality.

Procedure

Participants were recruited from regional under-16 and under-18 rugby teams during three training camps held at a High-Performance Sports Centre in the final quarter of the season, between April and June.

The research project and data collection requirements were first explained to the federation representative. The representative then informed the coaches and players, and permission was obtained to conduct the study. All players were informed about the aims of the study, the voluntary nature of participation, and the confidentiality and anonymity of their data. Written informed consent was obtained from all participants and, in the case of minors, written authorization was also obtained from their parents or legal guardians. The study was approved by the Ethics Committee of the University of Murcia, Spain (reference: ID 4734/2023), and was conducted in accordance with the principles of the Declaration of Helsinki for research involving human participants (World Medical Association, 2025).

Data collection was conducted at three time points, corresponding to the three training camp periods at the High-Performance Sports Centre. In each session, the POMS and fatigue assessment were administered to the players. In the first session, participants also completed the sociodemographic, sport-related, and injury history questionnaires, which collected information on the number of injuries sustained during the previous two seasons, injury type and severity, years of federation membership, and time spent in their current competitive category.

Statistical analysis

Data distribution was examined using the Shapiro–Wilk test (Shapiro & Wilk, 1965). The CPRD factors met the assumption of normality, except for Mental Skills, which showed a non-normal distribution. Regarding the POMS, only Tension and Vigor met the assumption of normality. None of the PSQI variables analysed met the assumption of normality. Given the small sample size and the distribution of the study variables, non-parametric analyses were performed.

For the PSQI, only two variables were included in the analyses: sleep latency and perceived sleep quality. Descriptive statistics were calculated for all study variables. Means and standard deviations were reported for continuous variables, whereas frequencies and percentages were reported for categorical variables. Spearman's rank correlation coefficients were used to examine associations between CPRD dimensions, mood states, and sleep-related variables. Between-group comparisons were performed using the Mann–Whitney U test for two-group comparisons and the Kruskal–Wallis test for comparisons involving more than two groups. A hierarchical cluster analysis was conducted to identify psychological profiles based on CPRD dimensions and POMS tension scores. All variables were standardized prior to analysis (transformation to Z-scores). Clustering was performed using Ward's hierarchical clustering method (ward.D2 algorithm) with Euclidean distance metrics. A two-cluster solution was established to classify athletes into distinct psychological profiles, based on theoretical interpretability and separation between groups. The statistical significance level for descriptive comparisons between clusters was set at $p < .05$.

RESULTS

Reliability testing

The CPRD and POMS questionnaires showed Cronbach's alpha values above .80, indicating good reliability. The PSQI showed a Cronbach's alpha value above .73, indicating acceptable reliability.

Descriptive analysis

As shown in Table 1, the mean and standard deviation values of the rugby players placed them within the medium percentiles of the CPRD scale: Stress Control, 50th percentile; Influence of Performance Evaluation, 80th percentile; Motivation, 65th percentile; Mental Skills, 55th percentile; and Cohesion, 55th percentile. It should also be noted that higher scores on Influence of Performance Evaluation indicate greater control over the impact of external evaluation on one's own performance.

Furthermore, the scores for the POMS factors placed the players within the low percentiles of the POMS scale: Tension, 38th percentile; Depression, 40th percentile; Anger, 37th percentile; Vigor, 52nd percentile; and Fatigue, 43rd percentile.

Table 1. Descriptive statistics for CPRD and POMS factors.

	Stress control	Influence of evaluation	Motivation	Mental skills	Cohesion	Tension	Depression	Anger	Vigour	Fatigue
$\bar{x}$	54.7	31.7	21.2	20.9	19.3	7.73	2.05	2.41	16.2	5.50
SD	10.5	7.13	4.40	4.68	2.27	3.83	2.54	3.02	3.35	2.89

Table 2. Descriptive statistics for sleep latency and perceived sleep quality.

Category	Frequency	%
Minutes to fall asleep		
Less than 15 minutes	14	60.9
Between 16 and 30 minutes	6	26.1
Between 31 and 45 minutes	2	8.7
More than 60 minutes	1	4.3
Perceived sleep quality		
Very poor	1	4.3
Fairly poor	5	21.7
Fairly good	13	56.5
Very good	4	17.4

Regarding sleep routines, as shown in Table 2, 87.0% of the sample reported falling asleep within 30 minutes, after combining the categories “less than 15 minutes” and “between 16 and 30 minutes”. Similarly, 73.9% of the sample reported good perceived sleep quality, after combining the categories “fairly good” and “very good”. No correlations were found between the PSQI variables and the CPRD or POMS factors. Likewise, no differences were observed in the CPRD or POMS factors according to the sleep latency and perceived sleep quality categories.

The relationships between the study variables were examined using Spearman’s correlation matrix, as shown in Table 3. Significant positive correlations were observed between Stress Control and Influence of Performance Evaluation, and between Stress Control and Motivation. In addition, Motivation was positively correlated with Cohesion.

Table 3. Spearman’s correlation matrix for CPRD and POMS factors.

Variable	Stress control	Influence of evaluation	Motivation	Mental skills	Cohesion	Tension	Depression	Anger	Vigour	Fatigue
Stress control	—									
Influence of Evaluation	.563**	—								
Motivation	.576**	.199	—							
Mental skills	.168	-.154	-.056	—						
Cohesion	-.099	-.224	.433*	.016	—					
Tension	-.220	-.479*	.081	-.095	.225	—				
Depression	.149	.029	.313	.182	.010	.403	—			
Anger	.228	-.028	.079	.286	-.056	.320	.623**	—		
Vigour	.072	-.251	.300	.080	.366	.280	.184	.247	—	
Fatigue	-.247	-.377	.031	-.037	.522*	.108	-.134	.053	.374	—

Note. * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

The analysis of the correlations between the CPRD and POMS factors revealed a significant negative correlation between Influence of Performance Evaluation and Tension, indicating that higher scores in Influence of Performance Evaluation were associated with lower levels of tension. A significant positive correlation was also observed between Cohesion and Fatigue. Finally, within the POMS factors, Depression and Anger were positively correlated.

Group comparisons

A Mann–Whitney U test was conducted to compare CPRD dimensions between categories (under-16 vs. under-18). The results showed that the under-18 group scored significantly higher on Mental Skills ($p = .015$). No significant differences were observed for the remaining variables: Stress Control, Influence of Performance Evaluation, Motivation, and Cohesion.

Additional differences were found when comparing CPRD factors according to the number of injuries using the Kruskal–Wallis test. Significant differences were observed for Mental Skills ($p = .048$) and Cohesion ($p = .028$).

To further examine the relationship between injury history and CPRD factors, and based on these findings, the categories of one and two injuries were combined, resulting in two groups: “Yes”, including athletes who had sustained at least one injury, and “No”, including athletes who had never sustained an injury. The Mann–Whitney U test revealed that athletes who had sustained one or more injuries scored significantly higher on Mental Skills ($p = .009$) and Cohesion ($p = .006$).

Although significant differences were observed only for Mental Skills and Cohesion, a tendency towards higher scores in Stress Control and Motivation was also evident among athletes who had sustained injuries (Table 4).

Table 4. Descriptive statistics for CPRD factors according to injury history (Yes/No).

CPRD Factor	Injury history	Mean	SD
Influence of evaluation	Yes	31.3	6.24
	No	32.2	8.28
Motivation	Yes	21.8	4.47
	No	20.6	4.46
Mental skills	Yes	23.0	3.28
	No	18.6	5.05
Cohesion	Yes	20.5	1.51
	No	18.0	2.28
Stress control	Yes	55.3	8.61
	No	54.0	12.71

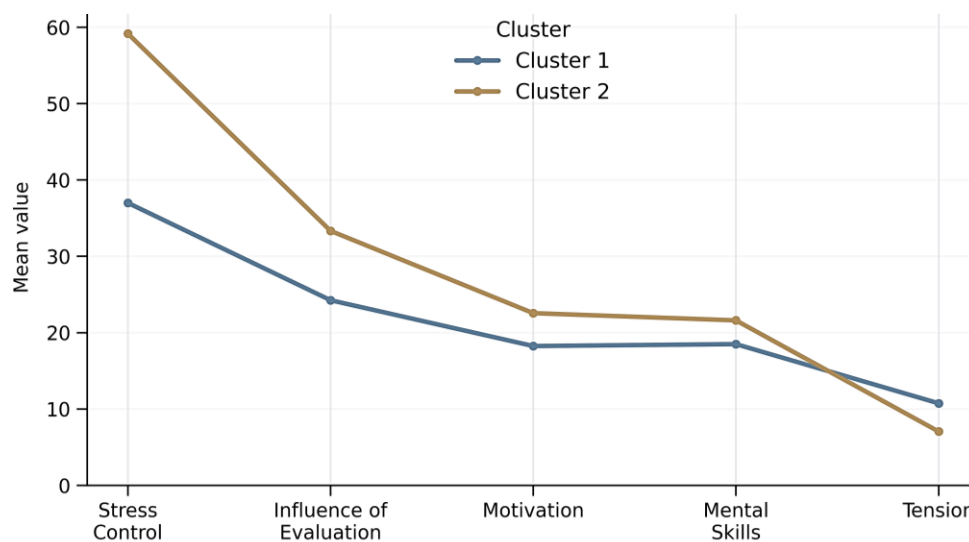
When comparing athletes reporting fatigue with those who did not report fatigue, athletes with fatigue showed significantly higher scores on the Tension factor ($p = .012$). Furthermore, athletes with higher Cohesion scores also reported higher levels of Fatigue ($p = .003$). Significant differences in Fatigue were also observed between the under-16 and under-18 groups ($p = .019$).

Profiles of psychological skills

A hierarchical cluster analysis identified two profiles of rugby players based on psychological skills, assessed through the CPRD, and Tension, assessed through the POMS.

Table 5. Centroids of the hierarchical cluster analysis.

Cluster	Stress control	Influence of evaluation	Motivation	Mental skills	Tension
1	37.000	24.250	18.250	18.500	10.750
2	59.167	33.333	22.556	21.611	7.056



Note. Cluster 1 = lower psychological skills and higher tension profile; Cluster 2 = higher psychological skills and lower tension profile. CPRD = Psychological Characteristics Related to Sport Performance Questionnaire; POMS = Profile of Mood States.

Figure 1. Mean values across the psychological profiles identified through hierarchical cluster analysis.

As shown in Table 5, Profile 2 was characterized by higher scores in Stress Control, Influence of Performance Evaluation, Motivation, and Mental Skills, together with lower scores in Tension. In contrast, Profile 1 showed lower scores in the CPRD dimensions and higher scores in Tension. These findings suggest that higher psychological skill scores were associated with lower tension levels, as shown in Figure 1.

DISCUSSION

The results of this study suggest that young rugby players may present a psychological profile compatible with adaptive functioning and favourable indicators of psychological well-being, despite being exposed to a demanding sport environment. Overall, participants reported adequate perceived sleep quality, low levels of negative mood states, moderate Tension, and preserved Vigour. In addition, psychological skills related to sport performance, particularly Stress Control, Influence of Performance Evaluation, Motivation, Mental Skills, and Cohesion, showed meaningful associations with mood-related variables and injury history. From a mental health perspective, understood not only as the absence of psychological symptoms but also as the presence of psychological resources, emotional regulation, and adaptive functioning, these findings contribute to a better understanding of well-being in young athletes exposed to demanding training contexts (Ryff, 1989; White et al., 2024).

Viewed within contemporary mental-health frameworks, these findings should not be interpreted solely as isolated questionnaire scores, but as a multidimensional pattern of psychological functioning. The combination of low negative mood states, preserved Vigour, adequate perceived sleep quality, team cohesion, and psychological skills may be considered compatible with psychological well-being and adaptive functioning in this specific group of young rugby players. From a positive youth development perspective, these personal and social resources may help athletes manage the demands associated with training, performance evaluation, fatigue, and injury-related experiences (Bergeron et al., 2024; Núñez et al., 2025; Ryff, 1989; White et al., 2024). Nevertheless, given the cross-sectional design, these findings should not be interpreted as evidence that rugby participation directly promotes resilience, flourishing, or psychological development.

Therefore, the higher scores observed in mental skills and cohesion among athletes with a history of injury may reflect processes of psychological growth stemming from adversity, rather than mere recovery. Thus, the experience of a physical injury acts as a catalyst, prompting athletes to develop coping mechanisms and emotional self-regulation skills, as well as to seek support within their social environment (Roy-Davis et al., 2017).

Perceived sleep quality is a relevant factor for understanding sport performance, recovery, and psychological adjustment, although it is not always systematically analysed in young athletes (García-Mas et al., 2003). In the present study, most players reported low sleep latency and good perceived sleep quality. Moreover, no significant correlations were found between the sleep-related variables analysed and the CPRD or POMS factors. These findings suggest that, in this sample, perceived sleep was not negatively associated with psychological skills or mood states. This result should be interpreted in light of the assessment context, as data were collected during a preparation and training period rather than during competition. Therefore, sleep patterns may have been more closely related to training routines and recovery demands than to competition-related anxiety or emotional dysregulation (Sargent et al., 2014).

Previous research has shown that sleep quality may influence physical performance, mental performance, injury risk, recovery, medical health, and mental health in athletes (Charest & Grandner, 2020). However, the

relationship between sport participation and sleep is complex. Some systematic evidence suggests that elite sport may be associated with poorer sleep quality, including insomnia symptoms and sleep fragmentation (Gupta et al., 2017), whereas other studies indicate that many athletes maintain adequate sleep quality, particularly when appropriate recovery routines are present (Brandt et al., 2017; Leeder et al., 2012). This is especially relevant in team sports, where training load, recovery routines, travel, competition schedules, and accumulated fatigue may influence both sleep and perceived readiness to perform (Fullagar et al., 2015; Nédélec et al., 2012; Sargent et al., 2014). In the present study, the absence of significant associations between perceived sleep and psychological variables may therefore suggest that sleep quality was relatively preserved during the assessment period, possibly because data were collected in a preparation and training context rather than during competition. In this regard, the findings support the idea that demanding sport participation, by itself, is not necessarily associated with poorer perceived sleep or worse psychological well-being indicators in young athletes, particularly when training demands are accompanied by adequate recovery routines.

The mood profile observed in this sample also points towards adaptive functioning. The players showed low levels of Depression and Anger, moderate levels of Tension, and relatively preserved Vigor. This pattern may be interpreted as compatible with functional activation rather than psychological distress. Previous research has shown that mood states are sensitive to training and competitive demands and may provide useful information about athletes' recovery, readiness, and psychological adjustment (Brandt et al., 2017; Campo et al., 2019; Shearer et al., 2015). In rugby, emotional activation may be particularly relevant because the sport involves repeated physical contact, collective effort, tactical decision-making, and exposure to demanding performance situations (Campo et al., 2019; Shearer et al., 2015). Therefore, moderate Tension and Fatigue should not necessarily be interpreted as maladaptive when they are not accompanied by high Depression or Anger. In the present study, the coexistence of moderate activation, preserved Vigor, and low negative mood states suggests a mood pattern closer to adaptive sport involvement than to emotional maladjustment.

Regarding psychological skills, the descriptive results showed medium scores in most CPRD dimensions, with a particularly high score in Influence of Performance Evaluation. This dimension was positively associated with Stress Control and negatively associated with Tension. These findings are coherent with the conceptual basis of the CPRD, which assesses psychological characteristics related to sport performance, including the athlete's ability to manage stress, external evaluation, motivation, cohesion, and mental skills (Gimeno et al., 2001; Gimeno & Pérez-Llantada, 2010). From this perspective, players who report greater control over the influence of performance evaluation may be better able to interpret coaches' feedback, peer comparison, selection processes, and competitive demands as manageable aspects of sport participation rather than as threatening experiences. This interpretation is also consistent with previous research highlighting the relevance of psychological skills for sport performance and adaptation to demanding contexts (Chartrand et al., 1992; Hsieh et al., 2024; Mahoney et al., 1987). In youth sport contexts, perceived evaluation from coaches, peers, and competitive environments can be a relevant source of psychological pressure. However, when athletes develop better stress regulation skills, external evaluation may become integrated into the learning and performance process rather than being experienced as a source of maladaptive tension.

Motivation was positively associated with Stress Control and Cohesion, which reinforces the importance of the team environment in rugby. Rugby is characterized by high physical contact, shared effort, tactical cooperation, and collective identity. In this context, cohesion may contribute to the regulation of demanding experiences by strengthening belonging, perceived support, and commitment to the group. Previous research

has highlighted the role of team belonging and group processes in sport environments (Davis et al., 2022; Gu et al., 2022), and the present findings are consistent with this perspective.

An interesting result was the positive association between Cohesion and Fatigue. Although fatigue is usually considered a potential risk factor when it accumulates or is poorly managed, in this study it was not associated with higher Depression or Anger. This may indicate that fatigue was experienced as part of a shared training process rather than as an isolated or aversive experience. In team sports, demanding training contexts may contribute to group cohesion when athletes perceive that effort, tiredness, and commitment are shared among teammates. In this sense, fatigue may have represented a normative adaptive load within a structured training environment rather than a marker of psychological maladjustment, particularly when shared effort is accompanied by cohesion, belonging, and perceived group support (Davis et al., 2022; Gu et al., 2022). This interpretation is also consistent with research on rugby teams showing that social identity and cohesion may be linked to perceptions of group functioning and performance (Coffey, 2023).

The differences observed according to age category also deserve attention. Under-18 players showed higher Mental Skills than under-16 players, suggesting that psychological skills may develop progressively alongside sport experience, technical learning, tactical understanding, and exposure to competitive demands. This finding should be interpreted cautiously due to the small sample size, but it is consistent with the idea that youth sport can provide a context for the development of self-regulation, coping strategies, and performance-related psychological resources.

Injury history was also associated with psychological variables. Players who had sustained one or more injuries reported higher Mental Skills and Cohesion, with non-significant tendencies towards higher Stress Control and Motivation. Although sports injuries are commonly associated with negative emotional, cognitive, and behavioural consequences, they may also become opportunities for psychological learning when athletes receive adequate support during recovery and return to play. These findings are consistent with the global psychological model of sport injuries (Olmedilla & García-Mas, 2009) and with previous work suggesting that sport injury may be followed by positive psychological changes once recovery and return to sport have been achieved (Haugen, 2022). In this sample, previous injury may have contributed to the development of psychological skills and team belonging, although longitudinal studies are needed to clarify this interpretation.

The cluster analysis reinforced the relationship between psychological skills and mood states. One profile was characterized by higher Stress Control, Influence of Performance Evaluation, Motivation, and Mental Skills, together with lower Tension. In contrast, the second profile showed lower psychological skill scores and higher Tension. These findings suggest that psychological skills may be relevant for understanding how young rugby players manage sport demands. From a well-being perspective, this pattern is consistent with eudaimonic approaches that emphasize personal growth, environmental mastery, and self-regulation as central dimensions of psychological adjustment (Ryff, 1989). Similarly, Núñez et al. (2025) suggest that the progressive development of psychological skills may help athletes interpret environmental demands as manageable challenges rather than as threats.

The identification of these profiles may provide sports psychologists with a useful tool for early detection. Cluster-based characterization may help professionals identify athlete profiles that could be more vulnerable to burnout or psychological distress during periods of high demand, thereby facilitating the implementation of targeted preventive interventions. Nevertheless, these findings should be interpreted with caution because of the relatively small sample size. Future studies using larger longitudinal samples and cross-validation

procedures are needed to determine whether this two-cluster configuration can be replicated across different competitive levels and sporting contexts.

Consistent with this perspective, evidence suggests an association between psychological skills, flow states, and athlete wellbeing. Flow may mediate the relationship between psychological skills and athlete wellbeing. Skills such as attentional control, emotional regulation, goal setting, and self-confidence create favourable conditions for flow by helping athletes remain focused and balance perceived challenges with their abilities. In turn, the absorption, enjoyment, and fulfilment associated with flow may enhance both hedonic and eudaimonic wellbeing (Isham & Jackson, 2022).

Overall, the findings indicate that poorer psychological well-being was not observed in this specific sample of young rugby players despite the demands of their sport context. Rather, the results describe a multidimensional profile in which situational activation, fatigue, and perceived evaluation coexist with stress regulation, team cohesion, preserved sleep perception, and low negative mood states. These characteristics may be understood as personal and social resources compatible with adaptive functioning in youth sport environments. However, longitudinal research is required to determine whether sport participation contributes to the development of these resources over time.

Limitations and future research

This study has several limitations that should be considered when interpreting the findings. First, the sample size was small and drawn from a specific context, namely regional under-16 and under-18 rugby teams, which limits the generalizability of the results to other competitive levels, cultural contexts, and sport modalities. In addition, the sample showed a clear male predominance, preventing comparative analyses by sex and limiting the extrapolation of the findings to female athletes.

Second, the cross-sectional design does not allow causal relationships to be established between the variables analysed. Although associations were observed between psychological skills, mood states, fatigue, cohesion, sleep perception, and injury history, it is not possible to determine the directionality of these relationships or their evolution over time.

Third, a further limitation concerns the exclusive use of self-report questionnaires to assess all study variables. Although the instruments employed are well validated and widely used in sport psychology research and are particularly appropriate for capturing athletes' subjective perceptions and experiences, reliance solely on self-report measures may increase the risk of common-method variance and social desirability bias. Furthermore, the absence of complementary objective indicators, such as actigraphy to assess sleep, training load metrics, or physiological markers of recovery, limits data triangulation and the validation of the observed associations.

Finally, data were collected during preparation and training period rather than during competition, which may have influenced the reported levels of tension, fatigue, mood states, and sleep perception. Future studies should include larger and more balanced samples, longitudinal designs, and assessments conducted at different phases of the competitive season. Moreover, combining validated self-report questionnaires with objective measures of sleep, training load, and recovery would provide a more comprehensive understanding of the relationships among psychological skills, sleep, performance demands, injury history, and mental health indicators in young athletes.

Practical applications

From an applied perspective, the findings support the inclusion of psychological well-being and recovery as routine components of youth rugby development. Coaches and sport psychology professionals could implement brief, periodic monitoring of tension, fatigue, mood states, perceived recovery, and sleep-related difficulties at relevant points of the season, particularly during demanding training periods, competition phases, and return-to-play processes. Rather than interpreting isolated scores, practitioners should monitor changes over time and use them to initiate conversations with athletes, adapt training or recovery demands when necessary, and facilitate referral to qualified mental-health professionals when persistent difficulties are detected.

The results also suggest several specific areas for intervention. Psychological-skills programs could include stress regulation, coping with performance evaluation, goal setting, attentional control, and strategies for managing competitive demands. Given the associations involving Cohesion, teams could reinforce belonging and perceived support through shared goal setting, structured team discussions, peer-support initiatives, and the active involvement of athletes in team decision-making. These strategies may be especially relevant during injury rehabilitation, when maintaining contact with teammates, providing regular psychological support, and progressively preparing athletes for return to play may help reduce isolation and support adaptive recovery.

At an organizational level, rugby federations and youth development programs could incorporate psychological well-being, team climate, recovery, and injury-related support into their quality standards. This may include coach education in adolescent mental health, clearly defined referral pathways, access to sport psychology services, and coordinated monitoring involving coaches, medical staff, psychologists, athletes, and families. Given the cross-sectional nature and small sample of the present study, these recommendations should be regarded as applied directions to be evaluated in future longitudinal and intervention-based research.

CONCLUSIONS

This study suggests that young rugby players may present a psychological profile compatible with adaptive functioning and favourable indicators of psychological well-being, despite exposure to a demanding training environment. In this sample, players reported generally adequate perceived sleep quality, low negative mood states, moderate tension, and preserved vigour.

The findings also suggest that psychological skills, particularly Stress Control, Mental Skills, Motivation, and Cohesion, may play an important role in how young rugby players adapt to fatigue, perceived evaluation, and injury-related experiences. Previous injury was associated with higher Mental Skills and Cohesion, which may indicate that, when appropriately supported, the injury and return-to-play process can become a context for psychological learning, coping development, and strengthening of team belonging.

Taken together, these results support the idea that youth rugby may provide valuable context for the development of psychological resources and the promotion of psychological well-being, provided that training environments combine performance demands with adequate recovery, social support, and attention to athletes' emotional and psychological needs.

AUTHOR CONTRIBUTIONS

All authors meet the criteria for authorship in accordance with established ethical guidelines. Contributions are specified according to the CRediT (Contributor Roles Taxonomy) as follows:

Conceptualisation: Verónica Gómez-Espejo, Antonio Núñez. Methodology: Verónica Gómez-Espejo, Antonio Núñez, Laura Gil-Caselles. Formal analysis: Laura Gil-Caselles. Investigation: Verónica Gómez-Espejo, Antonio Núñez, Laura Gil-Caselles, Paula Ortiz-Márholz. Data curation: Laura Gil-Caselles, Paula Ortiz-Márholz. Writing – original draft: Verónica Gómez-Espejo, Antonio Núñez. Writing – review & editing: Verónica Gómez-Espejo, Antonio Núñez, Alejandro García-Mas, Aurelio Olmedilla. Supervision: Verónica Gómez-Espejo, Antonio Núñez. Project administration: Aurelio Olmedilla. Manuscript adaptation to journal requirements: Aurelio Olmedilla.

All authors have critically reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was conducted in accordance with the principles of the Declaration of Helsinki for research involving human participants. The protocol was approved by the Ethics Committee of the University of Murcia, Spain (reference ID 4734/2023). All participants provided written informed consent. In the case of minor participants, written authorisation was also obtained from their parents or legal guardians.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

AI USE DISCLOSURE

In accordance with current publishing ethics and transparency recommendations, artificial intelligence (AI) tools were used solely to assist with translation and language editing, with the aim of improving clarity and readability. No AI tools were used in the generation of scientific content, including the study design, data collection, analysis, interpretation of results, or the formulation of conclusions. The authors retain full responsibility for the content of the manuscript and confirm its originality, integrity, and accuracy.

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REFERENCES

- Allen, M. S., Greenlees, I., & Jones, M. V. (2013). Personality in sport: A comprehensive review. *International Review of Sport and Exercise Psychology*, 6(1), 184–208. <https://doi.org/10.1080/1750984X.2013.769614>
- Allen, M. S., Laborde, S., & Walter, E. E. (2021). Extraversion development in childhood, adolescence and adulthood: Testing the role of sport participation in three nationally representative samples. *Journal of Sports Sciences*, 39(19), 2255–2263. <https://doi.org/10.1080/02640414.2021.1930672>
- Ato, M., López-García, J. J., & Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología*, 29(3), 1038–1059. <https://doi.org/10.6018/analesps.29.3.178511>
- Bergeron, M. F., Côté, J., Cumming, S. P., Purcell, R., Armstrong, N., Basilico, L., Burrows, K., Charrin, J.-B., Felix, A., Groesswang, H., Iwasaki, Y., Kocher, M., Martowicz, M., McConnell, K., Moran, J., Holm-Moseid, C., Mountjoy, M., Soligard, T., Tetelbaum, E., ... Erdener, U. (2024). IOC consensus statement on elite youth athletes competing at the Olympic Games: Essentials to a healthy, safe and sustainable paradigm. *British Journal of Sports Medicine*, 58(17), 946–965. <https://doi.org/10.1136/bjsports-2024-108186>
- Brandt, R., Bevilacqua, G. G., & Andrade, A. (2017). Perceived sleep quality, mood states, and their relationship with performance among Brazilian elite athletes during a competitive period. *Journal of Strength and Conditioning Research*, 31(4), 1033–1039. <https://doi.org/10.1519/JSC.0000000000001551>
- Campo, M., Champely, S., Lane, A. M., Rosnet, E., Ferrand, C., & Louvet, B. (2019). Emotions and performance in rugby. *Journal of Sport and Health Science*, 8(6), 595–600. <https://doi.org/10.1016/j.jshs.2016.05.007>
- Charest, J., & Grandner, M. A. (2020). Sleep and athletic performance: Impacts on physical performance, mental performance, injury risk and recovery, medical health, and mental health. *Sleep Medicine Clinics*, 15(1), 41–57. <https://doi.org/10.1016/j.jsmc.2019.11.005>
- Chartrand, J. M., Jowdy, D. P., & Danish, S. J. (1992). The Psychological skills inventory for sports: Psychometric characteristics and applied implications. *Journal of Sport and Exercise Psychology*, 14(4), 405–413. <https://doi.org/10.1123/jsep.14.4.405>
- Coffey, M. (2023). *Athletes' intrateam social identities and perceptions of performance, group cohesion, and group membership in female rugby teams* [Master's thesis, University of Calgary]. PRISM Repository. <https://ucalgary.scholaris.ca/items/fec39a65-31bb-48f5-902d-1a9b0a601806>
- Davis, A. S., Kafka, A. M., González-Morales, M. G., & Feitosa, J. (2022). Team belonging: Integrating teamwork and diversity training through emotions. *Small Group Research*, 53(1), 88–127. <https://doi.org/10.1177/10464964211044813>
- Escobar-Córdoba, F., & Eslava-Schmalbach, J. (2005). Validación colombiana del índice de calidad de sueño de Pittsburgh. *Revista de Neurología*, 40(3), 150–155. <https://doi.org/10.33588/rn.4003.2004320>
- Fuentes, I., Balaguer, I., Meliá, J. L., & García-Merita, M. L. (1995). *Forma abreviada del Perfil de los Estados de Ánimo (POMS)*. In Actas del V Congreso Nacional de Psicología de la Actividad Física y el Deporte (pp. 29–39).
- Fullagar, H. H. K., Duffield, R., Skorski, S., Coutts, A. J., Julian, R., & Meyer, T. (2015). Sleep and recovery in team sport: Current sleep-related issues facing professional team-sport athletes. *International Journal of Sports Physiology and Performance*, 10(8), 950–957. <https://doi.org/10.1123/ijspp.2014-0565>
- García-Mas, A., Aguado, F. J., Cuartero, J., Calabria, E., Jiménez, R., & Pérez, R. (2003). Sueño, descanso y rendimiento en jóvenes deportistas de competición. *Revista de Psicología del Deporte*, 12(2), 181–195.

- Gil-Caselles, L., Martínez-López, M., González-Hernández, J., & Olmedilla-Zafra, A. (2023). Historia de lesiones, perfeccionismo, catastrofismo y vulnerabilidad a la ansiedad en triatletas. *Cuadernos de Psicología del Deporte*, 23(3). <https://doi.org/10.6018/cpd.550281>
- Gil-Caselles, L., Ruiz-Barquín, R. R., Giménez-Egido, J. M., García-Naveira, A., & Olmedilla, A. (2025). Perfectionism, mental health and vulnerability to injury in triathletes. *Frontiers in Psychology*, 16, 1561432. <https://doi.org/10.3389/fpsyg.2025.1561432>
- Gimeno, F., Buceta, J. M., & Pérez-Llantada, M. C. (2001). El cuestionario «Características Psicológicas Relacionadas con el Rendimiento Deportivo» (CPRD): Características psicométricas. *Análisis de Psicología*, 19(1), 93–113.
- Gimeno, F., & Pérez-Llantada, M. C. (2010). *Características psicométricas del cuestionario CPRD*. In F. Gimeno & J. M. Buceta (Eds.), *Evaluación psicológica en el deporte. El cuestionario CPRD* (pp. 81-124). Dykinson.
- Gu, S., Bi, S., Guan, Z., Fang, X., & Jiang, X. (2022). Relationships among sports group cohesion, passion, and mental toughness in Chinese team sports athletes. *International Journal of Environmental Research and Public Health*, 19(22), 15209. <https://doi.org/10.3390/ijerph192215209>
- Gupta, L., Morgan, K., & Gilchrist, S. (2017). Does elite sport degrade sleep quality? A systematic review. *Sports Medicine*, 47(7), 1317–1333. <https://doi.org/10.1007/s40279-016-0650-6>
- Haugen, E. (2022). Athlete mental health and psychological impact of sport injury. *Operative Techniques in Sports Medicine*, 30(1), 150898. <https://doi.org/10.1016/j.otsm.2022.150898>
- Hsieh, Y. C., Lu, F. J. H., Gill, D. L., Hsu, Y. W., Wong, T. L., & Kuan, G. (2024). Effects of mental toughness on athletic performance: A systematic review and meta-analysis. *International Journal of Sport and Exercise Psychology*, 22(6), 1317–1338. <https://doi.org/10.1080/1612197X.2023.2204312>
- Isham, A., & Jackson, T. (2022). Finding flow: Exploring the potential for sustainable fulfilment. *The Lancet Planetary Health*, 6(1), e66–e74. [https://doi.org/10.1016/S2542-5196\(21\)00286-2](https://doi.org/10.1016/S2542-5196(21)00286-2)
- Leeder, J., Glaister, M., Pizzoferrero, K., Dawson, J., & Pedlar, C. (2012). Sleep duration and quality in elite athletes measured using wristwatch actigraphy. *Journal of Sports Sciences*, 30(6), 541–545. <https://doi.org/10.1080/02640414.2012.660188>
- Mahoney, M. J., Gabriel, T. J., & Perkins, T. S. (1987). Psychological skills and exceptional athletic performance. *The Sport Psychologist*, 1(3), 181–199. <https://doi.org/10.1123/tsp.1.3.181>
- McNair, D. M., Lorr, M., & Droppleman, L. F. (1971). *Manual for the Profile of Mood States*. Educational and Industrial Testing Service.
- Nédélec, M., McCall, A., Carling, C., Le Gall, F., Berthoin, S., & Dupont, G. (2012). Recovery in soccer: Part I—Post-match fatigue and time course of recovery. *Sports Medicine*, 42(12), 997–1015. <https://doi.org/10.2165/11635270-000000000-00000>
- Núñez, A., Peris-Delcampo, D., Ortiz-Marholz, P., & García-Mas, A. (2025). El escudo de la salud: Relaciones entre la actividad física y el bienestar psicológico. *Retos*, 71, 412–428. <https://doi.org/10.47197/retos.v71.115757>
- Olmedilla, A., & García-Mas, A. (2009). El modelo global psicológico de las lesiones deportivas. *Acción Psicológica*, 6(2), 77–91. <https://doi.org/10.5944/ap.6.2.223>
- Peris-Delcampo, D., Núñez, A., Ortiz-Marholz, P., Olmedilla, A., Cantón, E., Ponseti, J., & García-Mas, A. (2024). The bright side of sports: A systematic review on well-being, positive emotions and performance. *BMC Psychology*, 12(1), 284. <https://doi.org/10.1186/s40359-024-01769-8>
- Pocius, E., & Malinauskas, R. (2024). Development of mental toughness among basketball sports school students. *Behavioral Sciences*, 14(4), 314. <https://doi.org/10.3390/bs14040314>
- Poulus, D. R., Sargeant, J., Zarate, D., Griffiths, M. D., & Stavropoulos, V. (2024). Burnout profiles among esports players: Associations with mental toughness and resilience. *Journal of Sports Sciences*, 42(18), 1685–1694. <https://doi.org/10.1080/02640414.2024.2405794>
- Roy-Davis, K., Wadey, R., & Evans, L. (2017). A grounded theory of sport injury-related growth. *Sport, Exercise, and Performance Psychology*, 6(1), 35–52. <https://doi.org/10.1037/spy0000080>

- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57(6), 1069–1081. <https://doi.org/10.1037/0022-3514.57.6.1069>
- Sargent, C., Lastella, M., Halson, S. L., & Roach, G. D. (2014). The impact of training schedules on the sleep and fatigue of elite athletes. *Chronobiology International*, 31(10), 1160–1168. <https://doi.org/10.3109/07420528.2014.957306>
- Scanlan, T. K., Chow, G. M., Sousa, C., Scanlan, L. A., & Knifsend, C. A. (2016). The development of the Sport Commitment Questionnaire-2 (SCQ-2). *Psychology of Sport and Exercise*, 22, 233–246. <https://doi.org/10.1016/j.psychsport.2015.08.002>
- Scanlan, T. K., Russell, D. G., Wilson, N. C., & Scanlan, L. A. (2003). Project on elite athlete commitment (PEAK): I. Introduction and methodology. *Journal of Sport and Exercise Psychology*, 25(3), 360–376. <https://doi.org/10.1123/jsep.25.3.360>
- Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality: Complete samples. *Biometrika*, 52(3–4), 591–611. <https://doi.org/10.1093/biomet/52.3-4.591>
- Shearer, D. A., Kilduff, L. P., Finn, C., Jones, R. M., Bracken, R. M., Mellalieu, S. D., Owen, N., Crewther, B. T., & Cook, C. J. (2015). Measuring recovery in elite rugby players: The brief assessment of mood, endocrine changes, and power. *Research Quarterly for Exercise and Sport*, 86(4), 379–386. <https://doi.org/10.1080/02701367.2015.1066927>
- Smyth, C. (1999). The Pittsburgh Sleep Quality Index (PSQI). *Journal of Gerontological Nursing*, 25(12), 10–11. <https://doi.org/10.3928/0098-9134-19991201-10>
- Thornton, C., Baird, A., & Sheffield, D. (2024). Athletes and experimental pain: A systematic review and meta-analysis. *The Journal of Pain*, 25(6), 104450. <https://doi.org/10.1016/j.jpain.2023.12.007>
- Tranaeus, U., Gledhill, A., Johnson, U., Podlog, L., Wadey, R., Wiese Bjornstal, D., & Ivarsson, A. (2024). 50 years of research on the psychology of sport injury: A consensus statement. *Sports Medicine*, 54(7), 1733–1748. <https://doi.org/10.1007/s40279-024-02045-w>
- Wang, W., Schweickle, M. J., Arnold, E. R., & Vella, S. A. (2025). Psychological interventions to improve elite athlete mental wellbeing: A systematic review and meta-analysis. *Sports Medicine*, 55(4), 877–897. <https://doi.org/10.1007/s40279-024-02173-3>
- White, R. L., Vella, S., Biddle, S., Sutcliffe, J., Guagliano, J. M., Uddin, R., Burgin, A., Apostolopoulos, M., Nguyen, T., Young, C., Taylor, N., Lilley, S., & Teychenne, M. (2024). Physical activity and mental health: A systematic review and best-evidence synthesis of mediation and moderation studies. *International Journal of Behavioral Nutrition and Physical Activity*, 21(1), 134. <https://doi.org/10.1186/s12966-024-01676-6>
- World Medical Association. (2025). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human participants. *JAMA*, 333(1), 71–74. <https://doi.org/10.1001/jama.2024.21972>

