

## Exploring emotional intelligence and mood states variations in combat sports athletes: insights from sport modality, gender, and training experience

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### Abstract

Recent studies suggest that combat sports which require athletes to adapt high-pressure situations and manage their emotions may enhance emotional intelligence (EI) and influence mood states. The present study examined the EI and mood states among combat sports athletes according to sport modality, gender and training experience. A total of 226 athletes from grappling (judo, wrestling) and striking (taekwondo, karate, boxing) disciplines completed the *Arabic emotional intelligence scale* (A-EIS) and the *Arabic Mood Scale* (ARAMS). Results indicated that striking athletes demonstrated higher EI and more positive mood profiles than grappling athletes. Male athletes showed greater EI and more favorable mood states compared to females. In addition, greater training experience was associated with higher emotional intelligence and positive mood dimensions. The study findings highlight the role of sport type, gender, and experience in shaping athletes' emotional and psychological profiles, suggesting that emotional skills and mood regulation may be enhanced through training and experience in combat sports.

**Keywords:** Martial arts; combat sports; Sport Psychology; striking sports; grappling sports; invariance.

**Análisis de la inteligencia emocional y de las variaciones en los estados de ánimo en deportistas de combate: relación con la modalidad deportiva, género y experiencia en el entrenamiento**

### Resumen

Estudios recientes sugieren que los deportes de combate, que exigen a los deportistas adaptarse a situaciones de alta presión y gestionar sus emociones, pueden potenciar la inteligencia emocional (IE) e influir en los estados de ánimo. El presente estudio examinó la IE y los estados de ánimo en deportistas de combate en función de la modalidad deportiva, género y experiencia en el

**Exploração da inteligência emocional e das variações nos estados de humor em atletas de desportos de combate: relação com a modalidade desportiva, o género e a experiência de treino**

### Resumo

Estudos recentes sugerem que os desportos de combate, que exigem que os atletas se adaptem a situações de alta pressão e gerem as suas emoções, podem aumentar a inteligência emocional (IE) e influenciar os estados de humor. O presente estudo analisou a IE e os estados de humor entre atletas de desportos de combate, tendo em conta a modalidade desportiva, o género e a experiência

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entrenamiento. Un total de 226 deportistas de disciplinas de lucha (judo, lucha libre) y golpeo (taekwondo, kárate, boxeo) completaron la *Arabic emotional intelligence scale* (A-EIS) y la *Arabic Mood Scale* (ARAMS). Los resultados indicaron que los deportistas de golpeo mostraron una mayor IE y perfiles de estado de ánimo más positivos que los de lucha. Los hombres mostraron mayor IE y estados de ánimo más favorables que las mujeres. Además, una mayor experiencia de entrenamiento se asoció con una mayor IE y dimensiones de estado de ánimo positivo. Los resultados del estudio destacan el papel del tipo de deporte, el género y la experiencia en la configuración de los perfiles emocionales y psicológicos de los deportistas, lo que sugiere que las habilidades emocionales y la regulación del estado de ánimo pueden mejorarse a través del entrenamiento y la experiencia en los deportes de combate.

**Palabras clave:** Artes marciales; deportes de combate; Psicología del deporte; deportes de golpeo; deportes de lucha; invarianza.

de treino. Um total de 226 atletas de disciplinas de luta (judo, wrestling) e de golpeo (taekwondo, karaté, boxe) preencheram a *Arabic emotional intelligence scale* (A-EIS) e a *Arabic Mood Scale* (ARAMS). Os resultados indicaram que os atletas de golpeo demonstraram maior IE e perfis de humor mais positivos do que os atletas de luta corpo a corpo. Os homens apresentaram maior IE e estados de humor mais favoráveis em comparação com as mulheres. Além disso, uma maior experiência de treino foi associada a uma IE mais elevada e a dimensões de humor positivo. Os resultados do estudo destacam o papel do tipo de desporto, género e experiência na formação dos perfis emocionais e psicológicos dos atletas, sugerindo que as competências emocionais e a regulação do humor podem ser melhoradas através do treino e da experiência em desportos de combate.

**Palavras-chave:** Artes marciais; desportos de combate; Psicologia do Desporto; desportos de golpe; desportos de luta; invariância.

## 1. Introduction

In sport psychology, emotional intelligence (EI) and mood states are increasingly recognized as critical psychological factors influencing athletes' behavior, performance, and well-being, particularly in high-demanding competitive environments (Laborde et al., 2016; Fernández et al., 2020). Emotions and mood regulate attention, decision-making, stress responses, and interpersonal interactions, all of which are essential for optimal athletic functioning (Lane & Terry, 2000). According to Affective Events Theory (AET), emotional experiences influence both immediate affective reactions and longer-term outcomes such as motivation, satisfaction, and performance (Weiss & Cropanzano, 1996). Within this framework, EI—defined as the ability to perceive, understand, regulate, and use emotions effectively—plays a central role in how athletes manage competitive stress, cope with pressure, and adapt to emotionally charged situations (Mayer et al., 2008; Salovey & Mayer, 1990).

Combat sports represent a particularly relevant context for investigating EI and mood states due to their intense physical contact, direct interpersonal confrontation, and high emotional demands (Fernández et al., 2023). Athletes are frequently exposed to various stressors such as fear of failure, risk of injury, weight-management pressure, and direct physical aggression from opponents (Acebes-Sánchez et al., 2021; Fernández et al., 2022). Previous research showed that higher EI in combat sport athletes was associated with improved emotional regulation, reduced anxiety, and enhanced competitive performance (Fernández et al., 2020; Laborde et al., 2016). In parallel, mood states—such as vigor, tension, fatigue, and anger—have been consistently linked to performance outcomes, with optimal mood profiles characterized by high vigor and low negative affect (Terry et al., 2003; Brandt et al., 2021).

Importantly, combat sports can be broadly classified into grappling sports (e.g., judo, wrestling, jiu-jitsu), which emphasize close-contact engagement, physical control, and submission techniques, and striking sports (e.g., boxing, karate, taekwondo), where striking techniques are used such as punches/kicks or both, and that distance management, speed, precision, and explosive actions are prioritized (Franchini, 2017; Spanias et al., 2022). These modalities impose distinct physical, cognitive, and emotional demands that may differentially influence EI's development and mood regulation (Vertonghen et al., 2014). Compared to grappling sports which often involve sustained physical pressure and continuous opponent control, that may potentially increase tension and cognitive load, striking sports allow greater disengagement and reset opportunities, which may facilitate emotional clarity and regulation (Fernández et al., 2022, 2023). In addition, several hybrid combat sports exist, including mixed martial arts (MMA), which integrate techniques from multiple combat traditions under unified competitive rules (James et al., 2016; Telles et al., 2018).

Beyond sport modality, individual characteristics such as gender and training experience have been identified as relevant factors influencing EI and mood states in combat sport athletes



(Fernández et al., 2022). However, findings remain inconsistent. Some studies report higher emotional perception or attention in female athletes, while others indicate superior emotional regulation and overall EI in males (Costarelli & Stamou, 2009; Rutkowska & Gierczuk, 2017, 2020). Similarly, greater training experience has been associated with higher EI and more adaptive mood profiles, likely due to prolonged exposure to competitive stressors and repeated opportunities to develop emotional regulation strategies (Fernández et al., 2020; Gatsis et al., 2021). Nevertheless, the operationalization of “experience” varies widely across studies, often conflating years of practice with competitive level, which limits theoretical clarity and comparability (Kopp & Jekauc, 2018).

Despite the growing body of research on EI and mood states in combat sports, no study to date has simultaneously examined the combined effects of sport modality (striking vs. grappling), gender, and training experience within a single analytical framework. Moreover, comparative investigations that directly contrasting grappling and striking disciplines remain scarce. Addressing this gap, the present study aims to explore variations in EI and mood states among combat sports athletes according to sport modality, gender, and training experience. It is hypothesized that higher EI and more positive mood profiles will be observed among athletes practicing striking sports, male athletes, and those with greater training experience.

## 2. Materials and methods

### 2.1. Study design and procedure

This cross-sectional study was conducted from May to June 2024. Self-report assessments were given in a controlled setting using paper forms and standard directions to make sure that everyone understood and gave the same answers. Indeed, during the distribution of the measurement tools, only athletes were present to answer all the research items without any outside intervention and assisted by the first author of the present study. All measures were performed immediately before the training sessions to control any mood changes.

The anonymity of participants as well as the confidentiality of their responses was guaranteed by assigning unique identifications codes instead of names. Written informed consent was obtained from each participant or their parents after a comprehensive explanation of the study procedures. Concerning the limited access, only the first author of the study has access to the data.

The protocol was conducted according to the latest version of the Declaration of Helsinki (World Medical Association, 2024) after being approved by the local research ethics committee of the High Institute of Sport and Physical Education of El Kef, University of Jendouba, Tunisia (Protocol No. [12/2021], dated October 01, 2021).

### 2.2. Participants

An a priori power analysis was calculated using the G\*Power software (Version 3.1.9.7, University of Kiel, Kiel, Germany) and the F test family (ANOVA: Fixed effects, special, main effects and interactions). The analysis revealed that a total sample size of 158 would be sufficient to find significant medium-sized effects of condition (effect size  $f = 0.25$ ,  $\alpha = 0.05$ ) with an actual power of 80%.

A convenience sample of 226 active combat sports athletes was recruited from 11 clubs of varying categories (sub-elite and elite athletes), located in various regions of northern Tunisia (Kef, Jendouba, Siliana, Beja and Tunis). Within this clubs, all athletes who met the inclusion criteria and were present during the scheduled data collection periods were invited to participate. Athletes were eligible for inclusion if they: (1) had at least one year of formal combat sports training with a minimum frequency of three to four sessions per week; (2) were aged 15 years or older; and (3) reported no psychological, neurological, or medical conditions that could affect participation. Exclusion criteria included: (1) simultaneous participation in other sports; and (2) the presence of acute injuries, chronic conditions affecting performance, or ongoing rehabilitation. The final sample consisted of 90 athletes from grappling (judo,  $n = 35$  and wrestling,  $n = 55$ , age:  $18.18 \pm 2.56$  years, body height:  $165.14 \pm 5.95$  cm, body mass:  $60.60 \pm 8.12$  kg, training experience:  $7.30 \pm 3.14$  years) and 136 from striking (taekwondo,  $n = 38$ , karate,  $n = 64$ , and boxing,  $n = 34$ ; age:  $17.80 \pm 3.02$  years, body height:  $170.07 \pm 9.44$  cm, body mass:  $62.15 \pm 11.57$  kg, training experience:  $6.85 \pm 3.61$  years).

Moreover, demographic information including participants age, gender, training experience, and sport modality was obtained through structured forms. Anthropometric characteristics such as height and body mass are reported for descriptive purposes only and were not used as primary variables in the study. Regarding sport modality, athletes from grappling (i.e., judo and wrestling) and striking (i.e., taekwondo, karate, and boxing) combat sports were compared. The classification of the sport into modalities for grappling or striking was checked by either self-reports or confirmation from coaches to make sure it was correct.

For training experience, athletes were divided into three groups: less than 5 years of experience, 5-10 years of experience, and greater than 10 years of experience. Participants were classified into three groups based on their years of formal training: novice/intermediate (<5 years), advanced (5-10 years), and expert (>10 years). This categorization is consistent with established models of skill acquisition (Ericsson et al., 1993) and reflects significant milestones in the development of technical proficiency, tactical intelligence, and physiological adaptation in combat sports (Franchini et al., 2011; Ripoll et al., 1995).

**Table 1.** Sample distribution and characteristics (M  $\pm$  SD)

Combat sport group	Combat sport	Gender	Age (years)	Height (cm)	Body Mass (kg)	Training experience (years)
Grappling (n=90)	Judo (n=35)	Male(n=19)	18.79 $\pm$ 1.81	170.63 $\pm$ 1.61	67.84 $\pm$ 2.36	8.42 $\pm$ 2.78
		Female (n=16)	19.06 $\pm$ 2.43	165.81 $\pm$ 3.64	60.63 $\pm$ 6.38	8 $\pm$ 3.48
		Total (n=35)	18.91 $\pm$ 2.09	168.43 $\pm$ 3.62	64.54 $\pm$ 5.85	8.23 $\pm$ 3.08
	Wrestling (n=55)	Male (n=13)	17.69 $\pm$ 2.14	169 $\pm$ 3.21	63.92 $\pm$ 5.48	6.23 $\pm$ 2.39
		Female (n=42)	17.71 $\pm$ 2.92	161.21 $\pm$ 5.77	56.29 $\pm$ 8.38	6.86 $\pm$ 3.25
		Total (n=55)	17.71 $\pm$ 2.74	163.05 $\pm$ 6.22	58.09 $\pm$ 8.41	6.71 $\pm$ 3.06
Striking (n=136)	Taekwondo (n=38)	Male (n=20)	15.85 $\pm$ 0.75	166.65 $\pm$ 10.96	56 $\pm$ 8.64	6.05 $\pm$ 2.56
		Female (n=18)	15.67 $\pm$ 0.77	160.61 $\pm$ 5.39	50.83 $\pm$ 5.49	5.22 $\pm$ 3.02
		Total (n=38)	15.76 $\pm$ 0.75	163.79 $\pm$ 9.19	53.55 $\pm$ 7.68	5.66 $\pm$ 2.78
	Karate (n=64)	Male (n=43)	18.47 $\pm$ 3.49	177.26 $\pm$ 8.43	72.07 $\pm$ 10.10	8.42 $\pm$ 3.99
		Female (n=21)	20.33 $\pm$ 2.96	166.95 $\pm$ 3.46	62.43 $\pm$ 7.63	8.14 $\pm$ 4.30
		Total (n=64)	19.08 $\pm$ 3.49	173.88 $\pm$ 8.43	68.91 $\pm$ 10.10	8.33 $\pm$ 3.99
	Boxing (n=34)	Male (n=21)	17.43 $\pm$ 2.46	168.62 $\pm$ 8.94	59.10 $\pm$ 12.36	5.71 $\pm$ 2.43
		Female (n=13)	18.08 $\pm$ 2.10	172 $\pm$ 5.08	58.92 $\pm$ 5.48	4.92 $\pm$ 2.66
		Total (n=34)	17.68 $\pm$ 2.32	169.91 $\pm$ 7.79	59.03 $\pm$ 10.17	5.41 $\pm$ 2.51

### 2.3. Measures

#### Socio-demographic questionnaire

Socio-demographic information was collected from the participants such as age, gender, body height, body mass, combat sports modality and training experience through self-reported form.

#### Emotional intelligence scale (EIS)

Emotional intelligence was assessed using the Arabic version of the emotional intelligence scale (A-EIS) (Yahyaoui et al., 2025). The scale was developed based on the original version of the EIS (Lane, Meyer, et al., 2009). The A-EIS is a validated measure to assess emotional intelligence for use in sports and physical education context, with scores are obtained from a five-point Likert self-report scale ranging from 1 "strongly disagree" to 5 "strongly agree". The A-EIS included 16 items divided into five factors: *appraisal of others' emotions* (AOT; 4 items), *appraisal of own emotions* (AOW; 3 items), *regulation of emotions* (RE; 2 items), *social skills* (SK; 3 items), and *utilization of emotions* (UE; 4 items). The factorial loadings of items from the study of Yahyaoui et al. (2025) ranged from 0.625 to 0.821. As well, the Cronbach' alpha coefficients for the five factors of A-EIS were 0.796, 0.751, 0.695, 0.816 and 0.749 for AOT, AOW, RE, SK and UE, respectively (Yahyaoui et al., 2025). In this study, Cronbach's alpha coefficients ranged from 0.75 to 0.86.

#### The Arabic Mood Scale (ARAMS)

The Arabic version of the Brunel Mood Scale i.e., Arabic Mood Scale (ARAMS) (Sahli et al., 2023), is a self-report measure of distinct mood states. This scale was previously validated based on the original version of the Brunel Mood Scale (BRUMS) (Terry et al., 1999). The ARAMS is composed of 24 items that provide measures of six subscales (*anger, confusion, depression, fatigue, tension, and*

vigor), with four mood descriptors in each subscale. Anger items include “angry, annoyed, bad-tempered, and bitter”; confusion items include “confused, mixed-up, muddled, and uncertain”; depression items include “depressed, downhearted, miserable, and unhappy”; fatigue items include “exhausted, sleepy, tired, and worn-out”; tension items include “anxious, nervous, panicky, and worried”; and vigor items include “active, alert, energetic, and lively”. The scale is rated on a five-point Likert scale ranging from 0 “not at all” to 4 “extremely”. The reliability of the ARAMS was assessed by Cronbach’s alpha coefficient with values ranging from 0.749 to 0.858 (Sahli et al., 2023). In the present study, all subscales showed satisfactory internal consistency, with Cronbach’s alpha coefficients ranging from 0.86 to 0.91.

#### 2.4. Statistical analysis

All statistical analyses were performed using IBM software SPSS (v. 26.0; IBM Corp., Armonk, NY, USA). The Kolmogorov Smirnov test (Goodman, 1954) revealed the non-normal distribution of all considered variables. Therefore, data are presented as Median and interquartile range. Emotional intelligence and mood state values were compared between two groups of combat sports modality (grappling and striking), judo and wrestling, and gender (male and female), using the Mann-Whitney U test (MacFarland & Yates, 2016). Also, comparisons between three groups on striking modality (taekwondo, karate, and boxing); and groups of training experience (less than 5 years, 5-10 years, and greater than 10 years) were conducted using the Kruskal-Wallis H and Dunn’s test (Elliott & Hynan, 2011) and was used as post hoc analysis for multiple pairwise comparisons. The rank biserial correlation coefficient ( $r$ ) was calculated using the Wilcoxon z-scores (Colan, 2013) and the total number of observations ( $N$ ) (i.e.,  $r=Z/\sqrt{N}$ ) and considered as 0.1 to <0.3 (small), 0.3 to <0.5 (moderate) and  $\geq 0.5$  (large) (Tomczak & Tomczak, 2014). The statistical significance was accepted when  $p < 0.05$ .

### 3. Results

#### *Emotional intelligence and mood state scores according to sport modality and gender*

Significant effects of sport modality were found for several EI and mood states subscales. Striking group demonstrated significantly higher scores for appraisal of others’ emotions ( $U= 4498$ ;  $p= 0.001$ ;  $r= 0.23$ ), and appraisal of own emotions ( $U= 4553$ ;  $p= 0.001$ ;  $r= 0.22$ ) compared to grappling athletes. They also reported higher vigor scores ( $U= 4126.5$ ;  $p< 0.0001$ ;  $r= 0.28$ ). However, grappling athletes showed higher tension ( $U= 4735.5$ ;  $p= 0.002$ ;  $r= 0.20$ ). Regarding gender, male athletes presented higher EI scores for appraisal of others’ emotions ( $U= 3976$ ;  $p< 0.0001$ ;  $r= 0.33$ ), appraisal of own emotions ( $U= 4466.5$ ;  $p< 0.0001$ ;  $r= 0.26$ ), total EI ( $U= 4797.5$ ;  $p= 0.001$ ;  $r= 0.21$ ), and vigor ( $U= 5203.5$ ;  $p= 0.016$ ;  $r= 0.16$ ). In contrast, female athletes showed higher levels of anger ( $U= 4802.5$ ;  $p= 0.005$ ;  $r= 0.19$ ), confusion ( $U= 4916.5$ ;  $p= 0.008$ ;  $r= 0.18$ ), depression ( $U= 4526.0$ ;  $p= 0.001$ ;  $r= 0.22$ ), and tension ( $U= 4879.5$ ;  $p= 0.007$ ;  $r= 0.18$ ) (Table 2).

**Table 2.** Emotional intelligence (EI) and mood states (ARAMS) values’ comparison between grappling and striking modalities, between male and female combat sports athletes ( $n= 226$ )

Subscales	Modalities comparison		Gender comparison		
	Grappling (n=90)	Striking (n=136)	Male (n=116)	Female (n=110)	
EI	AOT	09 (05)	11.50 (07)**	12 (06)**	09 (06)
	AOW	09 (06)	10 (05.75)**	10 (06)**	09 (06)
	RE	05 (05)	04 (05)	05 (05)	04 (05)
	SK	08 (06)	08 (06)	08 (07)	08 (05)
	UE	10 (07)	09 (08)	10 (08.75)	09.50 (07)
	TT.EI	39 (16.25)	44 (25)	45 (17.75)**	37.50 (24.25)
	ARAMS	Anger	02 (06)	01 (06.75)	01 (06)**
Confusion		01 (05.25)	00 (04)	00 (04)**	01 (05)
Depression		01.50 (07)	01 (04)	00 (04)**	02 (06)
Fatigue		04 (06.25)	04 (07)	04 (05)	05 (07)
Tension		01.5 (06)	00 (03)**	00 (03)**	01 (05)
Vigor		08 (07.25)	11 (05)**	12 (07)*	09 (07)

Note. Values are expressed as Median (Interquartile range); \*  $p < 0.05$ , \*\*  $p < 0.01$ ; EI: emotional intelligence, AOT: appraisal of others’ emotions, AOW: appraisal of own emotions, RE: regulation of emotions, SK: social skills, UE: utilization of emotions, TT.EI: overall score of EI, ARAMS: Arabic Mood Scale.

*Emotional intelligence and mood states values' comparisons within grappling combat sports group and according to gender*

For grappling sport modality, judo athletes reported no significant difference for EI values in all subscales and total score, as well as mood states values compared to wrestlers (Table 3). However, female grappling sports group showed higher values for anger (U= 630.5; p= 0.011; r= 0.27), and tension (U= 686.5; p= 0.038; r= 0.22) compared to males (Table 3).

**Table 3.** Emotional intelligence (EI) and mood states (ARAMS) values' comparison between judo and wrestling, between male and female within grappling combat sports athletes (n= 90)

Subscales	Within grappling comparison		Gender comparison		
	Judo (n=35)	Wrestling (n=55)	Male (n=32)	Female (n=58)	
EI	AOT	09 (05)	09 (05)	10 (06.50)	09 (05)
	AOW	09 (06)	09 (06)	09 (05.50)	08.50 (06)
	RE	06 (05)	04 (04)	05.50 (04.75)	04 (05)
	SK	08 (07)	08 (04)	08 (06)	07 (05)
	UE	10 (07)	10 (07)	10.50 (08.75)	09.50 (06.25)
	TT.EI	42 (14)	39 (20)	42 (12.50)	37.50 (22.75)
ARAMS	Anger	02 (06)	02 (05)	01 (04.25)*	04 (07)
	Confusion	01 (07)	01 (05)	00 (04)	01 (06)
	Depression	01 (05)	03 (08)	00 (05.75)	03.50 (08)
	Fatigue	04 (06)	05 (07)	04 (04)	04.50 (07)
	Tension	02 (07)	01 (04)	0.50 (04.50)*	02 (05.25)
	Vigor	09 (09)	08 (06)	08 (07.75)	09 (06)

Note. Values are expressed as Median (Interquartile range); \* p< 0.05, \*\* p< 0.01; EI: emotional intelligence, AOT: appraisal of others' emotions, AOW: appraisal of own emotions, RE: regulation of emotions, SK: social skills, UE: utilization of emotions, TT.EI: overall score of EI, ARAMS: Arabic Mood Scale.

*Emotional intelligence and mood states values' comparisons between different sports in the striking combat sports group and according to gender*

Results showed a significant difference between striking combat sports groups on depression subscale (H= 06.355; p= 0.042). Karate presented lower scores compared to boxing athletes (p= 0.035; r= 0.25) (Table 4).

Results also showed that male striking combat sports athletes showed higher values of appraisal of others' emotions (U= 1312; p< 0.0001; r= 0.34), appraisal of own emotions (U= 1519; p= 0.003; r= 0.26), and overall, EI overall score (U= 1628; p= 0.013; r= 0.21) values compared to females. However, female athletes showed higher values for depression (U= 1707; p= 0.023; r= 0.20) compared to males (Table 4).

**Table 4.** Emotional intelligence (EI) and mood states (ARAMS) values' comparison between taekwondo, karate, and boxing, between male and female within striking combat sports athletes (n= 136)

Subscales	Within striking comparison			Gender comparison		
	Taekwondo (n=38)	Karate (n=64)	Boxing (n=34)	Male (n=84)	Female (n=52)	
EI	AOT	10 (07.25)	13 (06)	10.50 (07.25)	13 (05.75) <sup>††</sup>	09 (06.75)
	AOW	10 (07)	10 (06)	10 (05.25)	10.50 (04.75) <sup>††</sup>	09 (07)
	RE	03 (05)	04.50 (05)	05 (04)	05 (05)	03 (04)
	SK	07.50 (07)	08 (06)	08 (06)	08 (07)	08 (05.75)
	UE	09.50 (08)	08.50 (09)	10 (07)	09 (08)	09.50 (07)
	TT.EI	42 (28)	46 (27.50)	42 (21.25)	47 (21) <sup>†</sup>	37 (25)
ARAMS	Anger	02 (06)	01 (06.75)	01 (07)	01 (06)	04 (06)
	Confusion	01 (04)	00 (03)	01 (03.25)	00 (04)	01 (03.75)
	Depression	01 (04)	00 (03.75)*	03.50 (08.25)	00 (04) <sup>†</sup>	02 (05)
	Fatigue	05 (05)	03.50 (07.75)	05 (08)	04 (06.75)	05 (07)
	Tension	01 (02)	00 (04.75)	00 (02.25)	00 (03)	01 (03)
	Vigor	11 (04)	12 (06.50)	10 (07)	12 (05)	10 (04.75)

Note. Values are expressed as Median (Interquartile range); EI: emotional intelligence, AOT: appraisal of others' emotions, AOW: appraisal of own emotions, RE: regulation of emotions, SK: social skills, UE: utilization of emotions, TT.EI: overall score of EI, ARAMS: Arabic Mood Scale, \* p< 0.05 between karate and boxing group, <sup>††</sup> p< 0.01 between gender, <sup>†</sup> p< 0.05 between gender.

*Emotional intelligence and mood states values' comparisons according to training experience*

Significant differences were observed across training experience groups in several EI subscales and mood states. Athletes with 5-10 years of experience and those with more than 10 years scored higher on appraisal of others' emotions ( $H= 12.59$ ;  $p= 0.002$ ) and appraisal of own emotions ( $H= 9.01$ ;  $p= 0.011$ ) compared to athletes with less than 5 years of experience. Total EI scores also differed significantly across groups ( $H= 7.10$ ;  $p= 0.029$ ), with higher scores in the 5-10 years group relative to the less experienced athletes ( $p= 0.038$ ;  $r= 0.18$ ). Furthermore, training experience had a strong effect on vigor ( $H= 26.00$ ,  $p< 0.001$ ), with both 5-10 year ( $r= 0.33$ ) and  $> 10$  year groups ( $r= 0.48$ ) showing substantially greater vigor compared to those with less than 5 years of experience.

**Table 5.** Emotional intelligence (EI) and mood states (ARAMS) values' comparisons according to training experience (n=226)

	Subscales	Less than 5 years (n=50)	5-10 years (n=143)	Greater than 10 years (n=33)
EI	AOT	08 (05.25)	10 (06) <sup>††</sup>	13 (07) <sup>**</sup>
	AOW	09 (05.25)	10 (05) <sup>†</sup>	11 (07.50) <sup>**</sup>
	RE	03.50 (04)	04 (05)	06 (05)
	SK	07.50 (07)	08 (06)	06 (05.50)
	UE	08 (05.25)	10 (08)	09 (10.50)
	TT.EI	37.50 (21.25)	43 (22) <sup>†</sup>	46 (17.50)
ARAMS	Anger	04 (05)	01 (07)	03 (07)
	Confusion	01 (04)	00 (04)	00 (05)
	Depression	02 (05)	01 (05)	00 (02.50)
	Fatigue	03 (08)	05 (06)	04 (06.50)
	Tension	01 (03)	01 (04)	00 (09)
	Vigor	06 (07.25)	11 (04) <sup>††</sup>	12 (09) <sup>**</sup>

*Note.* Values are expressed as Median (Interquartile range); EI: emotional intelligence, AOT: appraisal of others' emotions, AOW: appraisal of own emotions, RE: regulation of emotions, SK: social skills, UE: utilization of emotions, TT.EI: overall score of EI, ARAMS: Arabic Mood Scale, <sup>††</sup> $p< 0.01$  between less than 5 years group and 5-10 years training experience group, <sup>†</sup> $p< 0.05$  between less than 5 years group and 5-10 years training experience group, <sup>\*\*</sup> $p< 0.01$  between less than 5 years group and greater than 10 years training experience group.

#### 4. Discussion

The present study provides evidence that emotional intelligence and mood states in combat sports athletes are significantly influenced by sport modality, gender, and training experience. Confirming our hypotheses, higher EI and more positive mood profiles were generally observed among striking athletes, males, and those with greater training experience. This study showed that athletes specializing in striking sports exhibited higher EI scores, especially in attention to their own and others' emotions (AOT and AOW), higher vigor, and lower tension (negative mood dimensions) compared to those in grappling disciplines. These findings are supported by previous research showing that practitioners in boxing, karate, and taekwondo report higher EI values relative to grappling athletes in judo, Brazilian jiu-jitsu, and wrestling (Fernández et al., 2023; Rani et al., 2023; Szabo & Urbán, 2014). However, some studies found no significant EI differences across modalities (Fernández et al., 2019, 2020), suggesting that other factors such as technical-tactical approaches, training philosophy, and environmental context may underlie these inconsistencies (Fernández et al., 2023).

Grappling modalities involve sustained physical control, submission holds, and positional dominance, which require continuous problem-solving under intense physical pressure (James et al., 2016). This environment may heighten cognitive and interpersonal anxieties, as grapplers must manage both their own emotions and their opponent's reactions in real time (Fernández et al., 2023; Bello et al., 2019). In contrast, striking sports emphasize distance management, precision, and rapid decision-making, allowing athletes to disengage and reset, potentially fostering better emotional clarity and regulation (Fernández et al., 2022; James et al., 2016). Such contrasts in technical demands and emotional contexts may differentially shape EI development across these modalities. Consequently, the observed variations in EI between striking and grappling athletes may reflect these distinctive training and psychological demands. Hence, these findings highlight the importance of considering sport modality when aiming to enhance EI in combat sport athletes and provide a

foundation for future research (Rutkowska & Gierczuk, 2020). Furthermore, athletes practicing striking combat sports exhibited higher vigor scores, whereas grappling athletes demonstrated higher tension levels, reflecting distinct mood profiles across combat sport modalities.

Previous research has shown that higher levels of EI are positively associated with the experience of pleasant emotions (Lane & Wilson, 2011). In addition, increased EI has been linked to more positive attitudes such as greater vigor, improved interpersonal relationships, stronger focus on traits, and enhanced adaptability (Akerjordet & Severinsson, 2007). Contrary to our results, however, da Silva Duarte et al. (2022) found no significant differences in mood state variables (i.e., tension-anxiety, depression-despondency, hostility-anger, fatigue-inertia, confusion-bewilderment, and vigor-activity) between male jiu-jitsu and kickboxing athletes. These discrepancies may be explained by differences in athletes' experience levels or by the specific demands of each combat sport modality.

Grappling athletes continuously seek to grasp, control, and counter their opponent's movements throughout training and competition, a strategy commonly observed in judo (Barreto et al., 2019; Miarka et al., 2017) and wrestling (López-González & Miarka, 2013). This sustained physical engagement tends to increase fatigue and tension compared to striking sports, where contact is either limited (e.g., karate) or, in cases of harder-contact disciplines such as kickboxing and taekwondo, regulated through distance management and controlled striking. In these striking modalities, effective use of footwork and scoring techniques characterized by full range of motion allows athletes to maintain safety while optimizing performance. Moreover, the positive effects of regular combat sports practice on mood regulation have also been documented in previous studies. Yang et al. (2018) reported that regular practitioners of combat sports exhibited better overall mood states compared to irregular practitioners, further highlighting the beneficial role of consistent training in emotional and psychological adaptation.

In the other hand, within striking sports modality, our results are contradictory to those reported by Kuśnierz et al. (2023). In fact, while karate kyokushin (KK) (defined a style of full-contact karate which emphasizes rigorous physical conditioning, powerful striking techniques, and practical self-defense), and Shotokan karate (SK) (a form of Karate characterized by the use of controlled techniques in training and competition), are two styles of karate with distinct rules and principles (Bajkowski & Cynarski, 2023; Lawton & Nauright, 2019), KK group resulted in higher EI values than KS group. This difference in EI among these practitioners may be explained by the specific characteristics and training priorities of each style. The KK, which emphasizes full-contact combat, endurance, and pain tolerance, may foster greater resilience and more effective emotional regulation under stress. In contrast, KS, which prioritizes precision, control, and technical discipline, may nurture emotional skills such as self-control and concentration. However, the existing literature on EI in martial disciplines often overlooks the contextual and cultural dimensions of training that can shape these emotional capacities. These findings align with the phenomenological perspectives suggesting that the embodied and interpersonal nature of combat sports shapes emotional experiences and self-regulatory demands, rather than directly determining emotional outcomes (Barreira, 2017). This result can be explained by the fact that karate is a sport of limited contact in which winning a match is decided based on the number of points scored and that knock-out regulation is not permitted, so athletes must score points and avoid excessive contact compared to taekwondo and other striking combat sports where victory is determined by scored points or knockout and that techniques are delivered with force and power when achieving targets (Boostani & Boostani, 2012; Diniz et al., 2021).

Differences in mood and emotional regulation across combat sports may also reflect cultural norms, early specialization pathways, and pedagogical traditions specific to each discipline. As noted by Vertonghen et al. (2014), training environments and value systems embedded within combat sports can influence emotional expression, stress perception, and coping strategies. These contextual factors may partially explain variability in mood states observed across sport modalities (Vertonghen et al., 2014).

Regarding gender comparison, findings demonstrated that male athletes in general as well as within each sport modality particularly showed higher EI compared to females. Our results are contradictory to those reported by previous reports (Costarelli & Stamou, 2009; Fernández et al.,



2020) which showed that female combat sports athletes showed higher values of EI (i.e., emotions attention subscale) than males. Supporting our results, Rutkowska & Gierczuk (2017, 2020) showed that male wrestlers exhibited higher EI values compared to females. Literature indicates that males are more likely to effectively convert one emotion into another, use emotion management techniques to control annoyance and anger, and tend to report fewer negative emotions than women do (Simon & Nath, 2004). This difference can be explained by the fact that EI between male and female combat sports athletes may stem from socio-cultural aspects, sport-specific socialization, and biological factors (Brody, 2000). Additionally, cultural expectations within male-dominated combat sports may discourage emotional expression in men, while female athletes navigate dual pressures to balance assertiveness with socially prescribed emotional sensitivity (Lane, Thelwell, et al., 2009).

Moreover, the present study showed that male combat sports athletes have higher vigor values and lower scores in negative mood states dimensions compared to females. Brandt et al. (2021) indicated that male judo and Brazilian jiu-jitsu athletes showed more vigor and less fatigue than their female counterparts. This distinction can be attributed to an influence of biological (e.g., hormonal variations, such as higher testosterone levels in males, may enhance traits like vigor and aggression, while estrogen and progesterone fluctuations in females could influence mood stability and emotional responses), psychological (e.g., female often reporting higher stress or anxiety due to the male-dominated nature of combat sports, where they may face pressure to conform to traditional norms or prove competency, and socio-cultural factors, cultural stigmas surrounding female participation in aggressive sports can exacerbate stress, impacting mood profiles like tension or depression) (Schaal et al., 2011; Terry & Slade, 1995). Moreover, studies using the POMS questionnaire highlighted that female athletes may exhibit elevated negative moods, potentially linked to unequal access to resources or support systems compared to males (de Miranda Rohlfs et al., 2024). However, many studies neglect how gender norms and social expectations within combat sports influence emotional expression and self-reporting, possibly distorting the measurement of EI and mood states.

Concerning training experience, our results demonstrated that athletes with more than 10 years of experience have higher appraisal of others' emotions and appraisal of own emotions values compared to less than 5 years of training experience. Additionally, athletes with training experience of 5-10 years presented higher AOT, AOW, and EI total scores compared to less than 5 years group. In this consideration, Fernández et al. (2022) compared two groups of fighters from different combat sports athletes modalities (i.e., jiu-jitsu, judo, karate, kendo, taekwondo, and wrestling) with different time of practice, and showed that ranked group (i.e., with time of practice:  $15 \pm 7.3$  years) resulted in higher EI values (self-regulation) compared to non-ranked group (i.e., time of practice:  $1.3 \pm 6.6$  years). One potential explanation is that EI level increased with the number of years of experience and the number of matches won (Gatsis et al., 2021), and higher levels of EI are positively associated with sports participation in terms of success (Laborde et al., 2016). Moreover, this difference may be attributed to the fact that athletes with more extensive training experience often exhibit higher EI due to prolonged exposure to high-pressure situations, self-regulation practices, and interpersonal interactions inherent in combat sports (Fernández et al., 2020). These experiences help develop key EI components such as self-awareness, empathy, emotional regulation, and social skills (Mayer et al., 2004). Likewise, experienced athletes are more likely to have developed these skills over time, enabling them to remain calm under pressure, make strategic decisions, and effectively manage interactions with coaches, team-mates, and opponents (Fernández et al., 2022).

Additionally, the present study indicated that athletes with training experience more than 10 years resulted in higher vigor values compared to less than 5 years of training experience, and athletes with training experience of 5-10 years presented higher vigor values compared to less than 5 years group. However, Karninčić et al. (2018) reported that the less experienced wrestlers scored significantly higher on vigor compared to more experienced adolescent wrestlers while those latter tended to score higher in negative mood dimensions but no statistical differences were recorded. These results suggest that experienced athletes, who have been exposed to competitive environments for an extended period, are likely to develop better adaptive and self-regulatory abilities through repeated high-pressure situations, enabling them to maintain a more positive mood state and emotional balance during training and competition. Indeed, this difference in training experience among combat sports athletes can significantly influence their mood states due to

variations in psychological adaptation, physical conditioning, and coping mechanisms developed over time. Experienced athletes often possess enhanced emotional regulation, resilience, and familiarity with the physical and mental demands of training, leading to more stable mood profiles than less experienced athletes (Fernández et al., 2022). In contrast, novice athletes may experience greater mood disturbances such as anxiety, fatigue, and confusion due to unfamiliarity with training stressors and lower psychological preparedness (Lane & Terry, 2000).

While training experience is generally linked to higher EI and positive mood states, most existing studies rely on cross-sectional data. Also, the definitions of “experience” also vary widely across studies, often conflating years of practice with competitive status, thus complicating direct comparisons and weakening theoretical conclusions.

Finally, we acknowledge some limitations of the present study. In fact, while the cross-sectional design used in the present study offers efficient snapshots of combat sports populations, its use presents several limitations, which can affect the validity and applicability of findings. Indeed, these studies capture data at a single point of time, making it impossible to determine the temporal relationships between variables. Likewise, the data were collected simultaneously, without considering the different periods of seasonal competition or the time of year. Additionally, the combination of self-report measures and a cross-sectional design may add bias and complicate the estimation of causal inferences. Another limitation is the relatively small sample size which may reduce the statistical power and limit the generalizability of the findings.

## 5. Conclusions

The findings of the present study demonstrated that higher EI and more positive mood states were observed among striking athletes, males, and more experienced participants. These differences in EI and mood state results are explained by the specificity of each sport modality in terms of both rules and intensity of play. Similarly, the gender difference found can be explained by the influence of socio-cultural factors, social pressure, and biological factors. Concerning the experience variable, combat sport athletes with more training experience often develop a higher level of emotional intelligence and mood state than those with less experience, due to repeated exposure to stressful and demanding situations, where they learn to manage and control their emotions. Consequently, coaches and sport psychologists should place greater emphasis on fostering EI and managing athletes' mood states through targeted preparation sessions that consider the specific demands of the sport discipline. Such interventions should be sensitive to sociocultural pressures and aim to create psychologically supportive environments, particularly for female athletes, in order to cultivate EI and promote positive mood states. Furthermore, less experienced combat sport athletes may benefit from structured exposure to controlled stress situations, combined with reflective emotional processing techniques, to develop adaptive EI skills. Considering the findings of this research, professionals can design modality, gender, and experience-specific psychological training programs that enhance emotional regulation, reduce maladaptive mood states, and ultimately optimize competitive performance in combat sport athletes.

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