

# EMOTIONAL INTELLIGENCE, BODY IMAGE AND DISORDERED EATING ATTITUDES IN COMBAT SPORT ATHLETES

Vassiliki Costarelli, Dimitra Stamou

*Human Ecology Laboratory, Department of Home Economics and Ecology, Harokopio University, Athens, GREECE*

The purpose of this study was to explore the possible differences in body image, emotional intelligence, anxiety levels and disordered eating attitudes in a group of Taekwondo (TKD) and Judo athletes and non-athletes. The interrelationships of the above parameters were also examined. A total of 60 subjects were recruited: 20 were national and international TKD and Judo athletes and 40 were non-athletes. Subjects completed the following questionnaires: the Eating Attitudes Test (EAT-26), the Multidimensional Body-Self Relations Questionnaire (MBSRQ), the State-Trait Anxiety Inventory (STAI) and the BarOn Emotional Intelligence Questionnaire (BarOn EQ-I). Athletes had higher levels of emotional intelligence compared to the control group, particularly in factors such as *assertiveness* ( $p < 0.01$ ) and *flexibility* ( $p < 0.01$ ). The differences were more pronounced in the female athletes compared with the non-athletes, with statistically significant differences in most of the intrapersonal factors ( $p < 0.01$ ), including *self-regard* and *self-actualization*, in the adaptability factors and in most of the mood factors. There were no significant differences in terms of disordered eating attitudes (EAT-26) between the two groups. Regression analysis revealed that disordered eating attitudes were significantly positively correlated with anxiety levels ( $p < 0.001$ ) and with self-classified weight ( $p < 0.001$ ). Athletes had higher levels of emotional intelligence and a healthier body image compared to non-athletes, but there were no significant differences in terms of disordered eating attitudes. [*J Exerc Sci Fit* • Vol 7 • No 2 • 104–111 • 2009]

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## Introduction

Athletes in endurance, aesthetic and weight class sports, where leanness or a specific weight are believed to favor sports performance, are at greater risk of developing eating disorders than the general

population (Sundgot-Borgen & Torstveit 2004; Smolak et al. 2000).

Taekwondo (TKD) and Judo are weight-classified combat sports where athletes often have to make weight in order to compete in their chosen weight division. It is reported that judoists, boxers and wrestlers often compete in weight categories 5–10% below their natural body weight (Filaire et al. 2001). The weight management strategies employed are frequently at the expense of nutritional health and sport performance (Fleming & Costarelli 2009; Umeda et al. 2004a, 2004b). A recent study in male TKD athletes showed that they were consuming a suboptimal diet both habitually and pre-competition, which may compromise their performance and short- and long-term health (Fleming & Costarelli 2007).



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Corresponding Author  
Vassiliki Costarelli, Department of Home  
Economics and Ecology, Harokopio University of  
Athens, 70 El. Venizelou Avenue, 17671 Kallithea,  
Athens, GREECE.  
Tel: +30 210 9549368  
Fax: +30 210 9577050  
E-mail: costarv@hua.gr

Psychological factors such as perfectionism, anxiety, mood, emotion dysregulation, disturbed body image and self-esteem are implicated in the multifactorial etiology of eating disorders (Markey & Vander Wal 2007; Sassaroli & Ruggiero 2005; Hewitt & Flett 1991). The association between mood and abnormal eating attitudes has rarely been investigated in sport populations. A study in rowers found that depressed mood scores predicted 9% of the variance in Eating Attitudes Test (EAT) scores, whereby high scores on EAT were associated with depressed mood (Terry et al. 1999). Self-esteem also appears to be an important risk factor for body dissatisfaction and eating disturbance (Fairburn et al. 2003). A recent study in judoists highlighted the relevance of body esteem to eating disorder symptoms in this group (Rouveix et al. 2007).

Emotional intelligence (EI) involves the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought (Mayer et al. 2008). More specifically, Mayer and Salovey (1997) defined EI as "The ability to perceive accurately, appraise and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth". In addition, there is evidence that increased EI leads to more positive attitudes, improved relationships, higher orientation towards positive values and greater adaptability (Akerjordet & Severinsson 2007). Recently, lower levels of EI have been reported in subjects with disordered eating attitudes (Costarelli et al. 2009).

Studies investigating EI in athletes are limited (Meyer & Fletcher 2007; Meyer & Zizzi 2007; Saklofske et al. 2007; Petrides et al. 2006). It was found that in ballet dancers, moderate to high levels of convergence existed between self and other ratings of trait EI and a positive relationship between trait EI scores and ballet dancing ability ratings (Petrides et al. 2006). In another quantitative study, Zizzi et al. (2003) examined the relationship between EI and sport performance among Division I college baseball players and found that certain aspects of EI were moderately related to pitching performance but not hitting performance (Zizzi et al. 2003). To the best of our knowledge, EI has not been thoroughly investigated in combat sport athletes.

The purpose of the current study was to explore the possible differences in disordered eating attitudes, body image, EI and anxiety levels in a group of TKD and Judo athletes and non-athletes. The interrelationships of the above parameters were also examined.

## Methods

### Subjects

A total of 60 subjects over the age of 16 years were recruited: 20 were national and international TKD and Judo athletes (14 females, 6 males) and 40 were non-athletes (32 females, 8 males). The characteristics of the subjects are shown in Table 1. The athletes were recruited from four known World Taekwondo Federation (WTF) clubs and one Judo club in Athens, Greece (Panionios Nea Smurni, Byrona, Moschato, Nea Philadelphia, and Kallithea). The non-athletes were recruited from the student population of Harokopio University and the Technological Institution of Athens; they did not engage in any competitive sports or trained for one type of sport in particular. The mean ages were  $18.7 \pm 2.54$  years and  $20.3 \pm 1.87$  years for the athletes and non-athletes respectively. All participants signed informed consent forms and received full verbal and written explanations of the purpose of the study. It was also explained to subjects that they could withdraw from the study at any time.

### Study design

Subjects completed the following questionnaires: the Eating Attitudes Test (EAT-26), the Multidimensional Body-Self Relations Questionnaire (MBSRQ), the State-Trait Anxiety Inventory (STAI) and the BarOn Emotional Intelligence Questionnaire (BarOn EQ-I). In addition, all subjects completed a specially designed General Background and Lifestyle Questionnaire. All the questionnaires have previously been translated, validated and successfully used in the Greek language (Costarelli et al. 2009; Fountoulakis et al. 2006; Maridaki-Kassotaki & Koumoundourou 2005; Yannakoulia et al. 2004). Prior to conducting the current study, a pilot study was performed to improve the design and identify possible ambiguous questions. Six volunteers (university students, 3 men and 3 women, 18–23 years old) answered all the questionnaires. The average completion time of the questionnaires was 35 minutes.

The questionnaires were given to the subjects in the form of a single booklet together with specific completion instructions, and the subjects were given a week to complete and return them to the investigator. A total of 50 questionnaires were distributed to the control group and 40 to the athletes, but only 40 and 20 were returned, respectively, properly completed and on time. The main reason for the poor compliance of the athletes, based on the subjects' feedback, was the length of the questionnaires and the very heavy training program.

**Table 1.** Age and anthropometric characteristics of the participants\*

	Athletes (n = 20)			Non-athletes (n = 40)			Total (n = 60)	
	Men (n = 6)	Women (n = 14)	Total	Men (n = 8)	Women (n = 32)	Total	Men (n = 14)	Women (n = 46)
Age (yr)	18.66 ± 2.88	18.71 ± 2.53	18.70 ± 2.54	21.12 ± 1.35	20.09 ± 1.94	20.30 ± 1.87	20.07 ± 2.89	19.67 ± 2.57
Weight (kg)	75.00 ± 17.96	54.50 ± 6.30	60.65 ± 14.32	79.68 ± 14.01	63.15 ± 9.63	66.46 ± 12.40	77.68 ± 15.35	60.52 ± 9.57
Height (cm)	1.78 ± 0.10	1.63 ± 0.05	1.68 ± 0.10	1.79 ± 0.06	1.67 ± 0.06	1.69 ± 0.08	1.79 ± 0.08	1.66 ± 0.06
BMI (kg · m <sup>-2</sup> )	23.13 ± 3.13	20.27 ± 1.71	21.13 ± 2.52	24.68 ± 3.57	22.44 ± 2.50	22.89 ± 2.86	24.01 ± 3.35	21.06 ± 4.05

\*Data presented as mean ± standard deviation. BMI = body mass index.

**Table 2.** BarOn EQ-I total, scale and subscale scores\*\*

	Athletes (n = 20)			Non-athletes (n = 40)			Total (n = 60)	
	Men (n = 6)	Women (n = 14)	Total	Men (n = 8)	Women (n = 32)	Total	Men (n = 14)	Women (n = 46)
BarOn total score	427.67 ± 47.6	462.8 ± 50.9	452.3 ± 51.4	472.5 ± 64.8	429 ± 35.4	458.2 ± 45.3	453.3 ± 60.5	439.7 ± 43.04
Intrapersonal	149 ± 17.64	161.86 ± 18 <sup>†</sup>	158 ± 18.4	163.1 ± 26.02	144.53 ± 21.5 <sup>†</sup>	148.2 ± 23.4	157.07 ± 23.17	149.8 ± 21.85
Assertiveness	28.33 ± 3.27	27.71 ± 4.3 <sup>†</sup>	27.9 ± 3.99 <sup>†</sup>	27.75 ± 5.6	24.09 ± 4.24 <sup>†</sup>	24.83 ± 4.7 <sup>†</sup>	28 ± 4.59 <sup>†</sup>	25.2 ± 4.55 <sup>†</sup>
Self-regard	33.17 ± 3.49	37.43 ± 4.4 <sup>†</sup>	36.15 ± 4.56	36.38 ± 8.53	33.41 ± 5.28 <sup>†</sup>	34 ± 60.06	35 ± 6.83	34.63 ± 5.33
Independence	26.33 ± 4.55	27.64 ± 5.61	27.25 ± 5.23	29.38 ± 2.07	24.63 ± 3.85	25.58 ± 4.03	28.07 ± 3.56 <sup>†</sup>	25.54 ± 4.61 <sup>†</sup>
Self-actualization	34.17 ± 6.62	39.43 ± 4.67 <sup>†</sup>	37.85 ± 5.71	39.13 ± 7.18	35.34 ± 4.53 <sup>†</sup>	36.1 ± 5.28	37 ± 7.15	36.59 ± 4.9
Interpersonal	108.83 ± 9.3	121.57 ± 15.31	117.75 ± 14.8	113.5 ± 21.33	117.06 ± 10.66	116.35 ± 13.2	111.5 ± 16.86	118.43 ± 12.26
Social responsibility	36.5 ± 3.08	42.93 ± 5.65	41 ± 5.79	38.63 ± 6.44	41.59 ± 4.26	41 ± 4.83	37.71 ± 5.2 <sup>§</sup>	42 ± 4.7 <sup>§</sup>
Stress management	57.83 ± 6.27 <sup>§</sup>	62 ± 10.21	60.75 ± 9.24	71.63 ± 5.85 <sup>§</sup>	57.25 ± 7.4	60.13 ± 9.14	65.71 ± 9.15 <sup>†</sup>	58.7 ± 8.53 <sup>†</sup>
Stress tolerance	31.17 ± 5.64 <sup>†</sup>	31.29 ± 5.46	31.25 ± 5.36	37.5 ± 5.98 <sup>†</sup>	28.22 ± 4.73	30.08 ± 6.19	34.79 ± 6.5 <sup>§</sup>	29.15 ± 5.1 <sup>§</sup>
Impulse control	26.67 ± 1.86 <sup>§</sup>	30.71 ± 5.66	29.50 ± 5.15	34.13 ± 2.64 <sup>§</sup>	29.03 ± 4.33	30.05 ± 4.52	30.93 ± 4.45	29.54 ± 4.77
Adaptability	93 ± 13.07	99.43 ± 12.18 <sup>†</sup>	97.50 ± 12.48	101.88 ± 14.28	92.03 ± 10.31 <sup>†</sup>	94 ± 11.70	98.07 ± 14.01	94.28 ± 11.31
Flexibility	28.33 ± 4.23	29.36 ± 5.23 <sup>†</sup>	29.05 ± 4.86 <sup>†</sup>	28.88 ± 6.06	25.63 ± 3.91 <sup>†</sup>	26.28 ± 4.52 <sup>†</sup>	28.64 ± 5.17	26.76 ± 4.63
General mood	67.50 ± 11.54	71.14 ± 9.07	70.05 ± 9.71	73.13 ± 12.52	66.53 ± 7.47	67.85 ± 8.92	70.71 ± 12.00	67.93 ± 8.17
Optimism	33.17 ± 6.34	31.86 ± 4.90	32.25 ± 5.23	33.75 ± 6.07	30.13 ± 4.47	30.85 ± 4.96	33.50 ± 5.95 <sup>†</sup>	30.65 ± 4.62 <sup>†</sup>

\*\*Data presented as mean ± standard deviation, and comparisons between male and female athletes and male and female non-athletes using Mann-Whitney U test; <sup>†</sup>p < 0.01; <sup>§</sup>p < 0.001.

### **General Background and Lifestyle Questionnaire**

A specially designed self-administered two-part questionnaire was used. All subjects completed the first part of the questionnaire (Part A) in order to collect background information on age, weight, height, ethnicity, education, general nutritional habits, weight loss diets, physical activity involvement and frequency of measuring body weight. Part B was designed to collect information on the nature and extent of athletic involvement, training regimen, weight history, making weight and weight loss methods used and was completed only by the athletes.

### **EAT-26**

The EAT-26 is a 26-item questionnaire that is widely used, which was designed and validated to identify eating habits and concerns about weight (Garner & Garfinkel 1979). To complete the EAT-26, participants rate their agreement with statements about weight and food. Total score  $\geq 20$  in the questionnaire indicates abnormal eating behavior.

### **MBSRQ**

The MBSRQ is an instrument for evaluating self-attitude aspects of body image and is determined from the 69-item self-evaluation tool comprised of 10 subscales (Cash 2000; Cash & Henry 1995): Appearance Evaluation, Appearance Orientation, Fitness Evaluation, Fitness Orientation, Health Evaluation, Health Orientation, Illness Orientation, Body Areas Satisfaction, Overweight Preoccupation, and Self-Classified Weight. The MBSRQ uses a 5-point, Likert-type scale (1 = definitely disagree; 2 = mostly disagree; 3 = neither agree nor disagree; 4 = mostly agree; 5 = definitely agree). High scores indicate positive feelings and satisfaction, while low scores reflect a general dissatisfaction.

### **STAI**

Various reliability and validity tests have been conducted on the STAI and have provided sufficient evidence that the STAI is an appropriate and adequate measure for studying anxiety. It has been translated into 66 languages, including Greek (Spielberger 1983). The 40 items are divided into two groups: 20 items are formed to record current anxiety symptoms (state anxiety) and the other 20 items are scored to record usual anxiety symptoms (trait anxiety). The STAI scale is scored on four levels of anxiety intensity from 1—“not at all” to 4—“very much” for the first 20 items, and from 1—“nearly always” to 4—“nearly never” for the remaining 20 items. The higher score indicates higher levels of anxiety.

### **BarOn EQ-I**

EI can be summarized as the ability to understand and recognize emotional states and to use that understanding to manage one's self and other individuals or teams (Fernandez-Berrocal & Extremera 2006).

The EQ-I is a 133-item self-assessment instrument that uses a 5-point Likert scale (ranging from “Not True of Me” to “True of Me”) to measure EI on five composite scales and 15 content subscales: Intrapersonal (*self-regard, emotional self-awareness, assertiveness, independence, and self-actualization*), Interpersonal (*empathy, social responsibility, and interpersonal relationship*), Stress Management (*stress tolerance and impulse control*), Adaptability (*reality testing, flexibility, and problem-solving*), and General Mood (*optimism and happiness*) (Bar-On 2006, 1997).

Data from each of these scales are used to create one overall composite EQ-I score together with other aggregate group scores for composite scales and content subscales. Higher scores signify higher levels of EI.

### **Statistical analysis**

Comparisons between the two groups were made using the Mann-Whitney *U* test. Spearman's rank order correlation coefficient was used to test for possible correlations among the different variables. Finally, regression analyses were conducted to examine major determining factors that affect disordered eating attitudes, EI, weight preoccupation and anxiety levels. All statistical analyses were performed using SPSS version 10.0 (SPSS Inc., Chicago, IL, USA).

## **Results**

The BarOn EQ-I results indicated that athletes had higher levels of EI compared to the control group, particularly for *assertiveness* ( $p < 0.01$ ) and *flexibility* ( $p < 0.01$ ) (Table 2). Female athletes had significant differences in most of the factors in the Intrapersonal scale ( $p < 0.01$ ), including *self-regard* and *self-actualization*, and in the Adaptability and General Mood scales, compared to female non-athletes. Male athletes scored lower in the Stress Management factors *stress tolerance* ( $p < 0.01$ ) and *impulse control* ( $p < 0.01$ ) compared to non-athletes. However, no firm conclusions can be drawn due to the small number of male subjects in the study. Overall, male subjects scored significantly higher in *assertiveness* ( $p < 0.05$ ), Stress Management scale ( $p < 0.01$ ), *stress tolerance* ( $p < 0.01$ ) and *optimism*,

whereas women scored significantly higher in *social responsibility* ( $p < 0.001$ ) (Table 2).

The STAI results showed no significant differences between athletes and non-athletes, but anxiety levels (STAI) were significantly correlated with over 15 different constituents of EI (BarOn EQ-I), such as *emotional self-awareness*, *self-actualization*, *reality testing* and *impulse control* among others (Table 3).

It is important to note that 67% of all the subjects (athletes and non-athletes) are currently trying to lose weight either through diet or exercise, which is worrying given the fact that none of them were obese. In spite of the fact that in the General Background and Lifestyle Questionnaire, the athletes reported that they

were making weight regularly to compete in their chosen weight category, with 25% of the athletes reporting that they had lost weight and 10% had gained weight over the last 12 months (Table 4), there were no significant differences between the two groups in terms of disordered eating attitudes (EAT-26 total score; Table 5).

The data also suggest that athletes have a healthier body image than non-athletes. Results of the MBSRQ analysis showed that athletes scored significantly higher than non-athletes in most of the variables tested, such as Fitness Evaluation ( $p < 0.001$ ), Fitness Orientation ( $p < 0.001$ ), Health Evaluation ( $p < 0.01$ ), Health Orientation ( $p < 0.05$ ), and Body Areas Satisfaction ( $p < 0.01$ ). The above differences were more pronounced in females.

Regression analysis revealed that disordered eating attitudes were significantly positively correlated with anxiety levels ( $p < 0.001$ ) and Self-Classified Weight ( $p < 0.001$ ). In addition, subjects with higher levels of anxiety tended to have lower levels of EI ( $p < 0.001$ ). The data also suggest that Overweight Preoccupation was positively influenced by disordered eating attitudes, frequency of measuring body weight and Self-Classified Weight ( $p < 0.001$ ; Table 6).

## Discussion

The purpose of this study was to explore the possible differences in body image, EI, anxiety levels and disordered eating attitudes in a group of TKD and Judo athletes and non-athletes.

The results indicated that the athletes had higher levels of EI compared to the non-athletes, particularly

**Table 3.** Spearman rank order correlation coefficients between anxiety levels (STAI) and different psychometric parameters of emotional intelligence (BarOn EQ-I) in the 60 study subjects

	Spearman's rho
Emotional self-awareness	-0.347*
Assertiveness	-0.480*
Self-regard	-0.587*
Self-actualization	-0.660*
Independence	-0.438*
Empathy	-0.275†
Interpersonal relationship	-0.353†
Social responsibility	-0.349†
Problem-solving	-0.342*
Reality testing	-0.561*
Flexibility	-0.562*
Stress tolerance	-0.618*
Impulse control	-0.406*
Happiness	-0.603*
Optimism	-0.540*

\* $p < 0.001$ ; † $p < 0.05$ ; ‡ $p < 0.01$ .

**Table 4.** Selected answers from the General Background and Lifestyle Questionnaire in the 20 athletes

Question	Answers						
How many years have you been involved with the sport?	< 1 yr 5%	1–3 yr 10%	3–6 yr 5%	> 6 yr 65%	Other 15%		
Training/wk	8 hr 15%	10 hr 30%	15 hr 10%	> 15 hr 20%	Other 25%		
Did you have to change your weight to compete in your chosen weight category in the past year?	No 65%	Yes, I've increased in weight 10%	Yes, I've lost weight 25%				
Maximum amount of weight loss till today	Stable weight 25%	0.5–1 kg 5.0%	2 kg 15%	3 kg 30%	4 kg 10%	5 kg 5.0%	7 kg 10%
Days before competition you started losing weight	1 wk 25%	2 wk 15%	3 wk 25%	1 mo 25%	Other 10%		

**Table 5.** Results from the Eating Attitudes Test (EAT-26), State-Trait Anxiety Inventory (STAI), and Multidimensional Body-Self Relations Questionnaire (MBSRQ)\*

	Athletes (n = 20)				Non-athletes (n = 40)				Total (n = 60)		
	Men (n = 6)		Women (n = 14)		Men (n = 8)		Women (n = 32)		Total	Men (n = 14)	Women (n = 46)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
EAT-26	14.50 ± 5.89	15.50 ± 7.17	15.20 ± 6.67	13.87 ± 8.09	14.50 ± 7.40	14.37 ± 7.44	14.14 ± 6.98	14.80 ± 7.26	14.37 ± 7.44	14.14 ± 6.98	14.80 ± 7.26
STAI	77.50 ± 11.64	71.71 ± 17.53	73.45 ± 15.91	67.62 ± 23.04	77.21 ± 13.80	75.30 ± 16.18	71.85 ± 19.07	75.54 ± 15.05	75.30 ± 16.18	71.85 ± 19.07	75.54 ± 15.05
MBSRQ											
Appearance Evaluation	3.06 ± 0.35	3.00 ± 0.46	3.02 ± 0.42	2.72 ± 0.55	2.86 ± 0.23	2.83 ± 0.31	2.87 ± 0.49	2.90 ± 0.32	2.83 ± 0.31	2.87 ± 0.49	2.90 ± 0.32
Appearance Orientation	3.50 ± 0.39†	3.46 ± 0.33	3.47 ± 0.34	3.10 ± 0.21†	3.42 ± 0.26	3.36 ± 0.28	3.27 ± 0.35	3.43 ± 0.28	3.36 ± 0.28	3.27 ± 0.35	3.43 ± 0.28
Fitness Evaluation	3.43 ± 0.32†	3.27 ± 0.40†	3.32 ± 0.38†	3.00 ± 0.45†	2.88 ± 0.39†	2.91 ± 0.39†	3.18 ± 0.44	3.00 ± 0.42	2.91 ± 0.39†	3.18 ± 0.44	3.00 ± 0.42
Fitness Orientation	3.09 ± 0.14	3.09 ± 0.22§	3.09 ± 0.19†	2.85 ± 0.42	2.86 ± 0.28§	2.86 ± 0.31†	2.95 ± 0.34	2.93 ± 0.28	2.86 ± 0.31†	2.95 ± 0.34	2.93 ± 0.28
Health Evaluation	3.35 ± 0.19	3.46 ± 0.26§	3.43 ± 0.24§	3.26 ± 0.36	3.17 ± 0.38§	3.18 ± 0.37§	3.30 ± 0.30	3.25 ± 0.37	3.18 ± 0.37§	3.30 ± 0.30	3.25 ± 0.37
Health Orientation	3.63 ± 0.23	3.77 ± 0.45	3.73 ± 0.40†	3.42 ± 0.28	3.56 ± 0.33	3.53 ± 0.32†	3.51 ± 0.27	3.62 ± 0.37	3.53 ± 0.32†	3.51 ± 0.27	3.62 ± 0.37
Illness Orientation	3.37 ± 0.64†	2.87 ± 0.45	3.02 ± 0.55	2.31 ± 0.39†	2.90 ± 0.51	2.78 ± 0.54	2.76 ± 0.73	2.89 ± 0.49	2.78 ± 0.54	2.76 ± 0.73	2.89 ± 0.49
Body Areas Satisfaction	4.05 ± 0.57	4.19 ± 0.60†	4.15 ± 0.58§	4.02 ± 0.69	3.63 ± 0.64†	3.71 ± 0.66§	4.04 ± 0.61	3.80 ± 0.68	3.71 ± 0.66§	4.04 ± 0.61	3.80 ± 0.68
Overweight Preoccupation	2.95 ± 1.02	2.75 ± 0.89	2.81 ± 0.91	2.21 ± 1.37	2.67 ± 0.81	2.58 ± 0.94	2.53 ± 1.25	2.70 ± 0.82	2.58 ± 0.94	2.53 ± 1.25	2.70 ± 0.82
Self-Classified Weight	2.58 ± 0.49	2.64 ± 0.63†	2.62 ± 0.58†	3.06 ± 1.05	3.23 ± 0.69†	3.20 ± 0.76†	2.85 ± 0.86	3.05 ± 0.72	3.20 ± 0.76†	2.85 ± 0.86	3.05 ± 0.72

\*Data presented as mean ± standard deviation, and comparisons between male and female athletes and male and female non-athletes using Mann-Whitney U test; †p < 0.05; ‡p < 0.001; §p < 0.01.

in factors such as *assertiveness*, *coping with stress* and *flexibility*. The differences were more pronounced in the female athletes compared with the non-athletes, with statistically significant differences in most factors of the Intrapersonal scale, including *self-regard*, *self-actualization*, *adjustability* and most of the General Mood scale factors. The above findings are important, given the fact that in sport, negative emotions such as depression, anxiety and anger, can disrupt optimal performance. In combat sports in particular, research has identified a number of psychological variables that are linked with enhanced performance, such as concentration, relaxation, controlling anxiety, goal setting, confidence and motivation (Devonport 2006; Stevens et al. 2006; Wong et al. 2006). Chapman et al. (1997) found that winning male college TKD athletes showed higher self-confidence and lower cognitive and somatic anxiety than their losing counterparts (Chapman et al. 1997). It is of great importance to stress that athletes must learn to identify their own ideal performance states, and develop the skills to manage their emotions.

Thirty-five percent of the athletes surveyed reported that they had either lost or gained body weight in order to make classification in the past year, which was anticipated given the importance of competing at the upper limit of a lower weight category in combat sports (Hall & Lane 2001). However, the current study did not demonstrate any significant difference in terms of disordered eating attitudes (EAT-26) between athletes and non-athletes, which is encouraging, given the fact that studies have generally suggested a higher frequency of disordered eating among combat sport athletes (Rouveix et al. 2007).

The STAI also showed no significant differences between athletes and non-athletes, but regression analysis revealed that disordered eating attitudes were significantly positively correlated with anxiety levels. Anxiety and stress are very important in sport since, under stressful conditions, athletes need to be able to control their level of energy to achieve optimal performance.

An extensive number of longitudinal studies have shown that body image dissatisfaction has consistently been identified as one of the most robust risk factors for eating disturbances (Abraham 2003; Stice 2002). In the present study, athletes, particularly female athletes, seem to have a healthier body image than non-athletes (MBSRQ), which suggests that involvement in sport encourages a healthier body-self relationship and, as a result, should be encouraged. The above

**Table 6.** Regression analysis investigating possible predictors of Eating Attitudes Test (EAT-26) score, BarOn Emotional Intelligence Questionnaire (BarOn EQ-I) score, Overweight Preoccupation (Multidimensional Body-Self Relations Questionnaire [MBSRQ]) and State-Trait Anxiety Inventory (STAI) score in the 60 study subjects

Emotional intelligence (BarOn EQ-I)			Eating attitudes (EAT-26)		
	<i>t</i>	<i>p</i>		<i>t</i>	<i>p</i>
Frequency of exercise	1.924	0.060	Frequency of exercise	1.932	0.059
Anxiety score	-6.224	0.000*	Anxiety score	2.986	0.004*
Eating attitudes score	0.310	0.758	Self-Classified Weight	4.055	0.000*
Self-Classified Weight	1.772	0.082	Appearance Orientation	0.354	0.725
Body Areas Satisfaction	2.592	0.012*			
Overweight Preoccupation (MBSRQ)			Anxiety (STAI)		
	<i>t</i>	<i>p</i>		<i>t</i>	<i>p</i>
Being on a weight-reducing diet	-2.314	0.0024*	Being on a weight-reducing diet	2.583	0.013*
Frequency of measuring body weight	3.685	0.001*	Eating attitudes score	3.064	0.003*
Eating attitudes score	3.751	0.000*	Self-regard	-5.754	0.000*
Self-Classified Weight	3.661	0.001*	Self-Classified Weight	-1.441	0.155
Anxiety score	1.556	0.126	Body Areas Satisfaction	0.637	0.527

\* $p < 0.05$ .

finding is in accordance with a meta-analytic review, where athletes reported a more positive body image than the control groups (Hausenblas & Symons Downs 2001). Most importantly, in a recent review, it was concluded that exercise may improve a range of biopsychosocial outcomes, including disturbed body image, in patients with eating disorders (Hausenblas et al. 2008).

The present study has certain limitations that need to be acknowledged. The number of athletes surveyed was relatively small and, in particular, the number of male subjects was too small for firm conclusions to be drawn with regard to possible sex differences. Further studies are needed with a larger sample size and better representation of both sexes.

Nevertheless, this study showed that combat sport athletes seem to have higher levels of EI and a healthier body image than non-athletes. Due to the reported susceptibility of athletes to develop eating disorders, the investigation of the possible role of EI, anxiety levels and disturbed body image as well as their interrelationships in the etiology of disordered eating warrants further investigation.

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