

DO COMBAT SPORTS DEVELOP EMOTIONAL INTELLIGENCE?

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Abstract:

Emotional intelligence, neuroticism, and extroversion were studied in boxers, judokas, and non-athlete controls. The results based on the *Wong and Law Emotional Intelligence Scale* and *Eysenck Personality Inventory* showed that in understanding their own emotions boxers scored higher than judokas and controls (effect sizes $d=.72$, and $.47$). In appraising others' emotions boxers and judokas did not differ from each other but both scored higher than non-athletes ($d=.56$ and $d=.54$). In using and controlling emotions boxers scored higher than judokas ($d=1.3$ and $d=.68$, respectively) who scored higher than non-athletes ($d=1.0$ and $d=.55$, respectively). In the current study the boxers have exhibited the lowest neuroticism ($d=1.6$ vs. judokas and $d=2.0$ vs. controls). The two groups of combat athletes have reported higher extroversion than controls ($d=1.2$, boxers, and $d=1.3$, judokas). Since in the current study the ability-linked emotional intelligence was studied, it may be concluded that boxing, and combat sports in general, may foster its development.

Key words: *athlete, boxing, combat sport, extroversion, judo, neuroticism*

Introduction

Salovey and Mayer (1990) have defined emotional intelligence (EI – also known in the literature as “EQ” for Emotional Quotient) as “the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them and to use this information to guide one’s thinking and actions” (p. 189). More recently Mayer, Salovey, and Caruso (2008) have re-defined EI as: “the ability to engage in sophisticated information processing about one’s own and others’ emotions and the ability to use this information as a guide to thinking and behaviour.” This latter definition links EI to sporting performances where numerous and complex information needs to be processed to generate fast and adequate responses. An ability-based model considers emotions as complex information sources that help one to make sense of the social environment.

From a social perspective, combat sports, and especially boxing, are generally considered aggressive (Bosson, Vandello, Burnaford, Weaver, & Wasti, 2009; Haglund & Eriksson, 1993; Wann & Branscombe, 1990). Combat sports are officially defined as “... any of the following or a combination of any of the following: (a) boxing (or fist fighting) in any of its styles, (b) kick boxing in any of its styles, (c) any sport, martial art or activity in which each contestant in a contest, display or exhibition of that sport, art or activity is required to strike, kick, hit, grapple with, throw or punch one or more

other contestants and that is prescribed by the regulations, (d) sparring in any category covered in paragraph (a)–(c), except to the extent prescribed by the regulations.” (New South Wales Legislation Act, Combat Sports Act 2008 No. 116, p. 2). Some combat sports (e.g. boxing) may be more aggressive than others (e.g. judo) due to the rules and the philosophical orientation associated with their aims (Mroczkowska, Kownacka, & Obmiński, 2008; Wlazło, Szuszkiewicz, & Wlazło, 2007). In spite of the “aggressive” stigma attached to these sports, research has shown that in the long term, or at higher level of expertise, they may decrease athletes’ level of aggression (Graczyk, Hucinski, Norkowski, Pęczak-Graczyk, & Rożanowska, 2010). However, research has highlighted that in sports aggression may be confused with *sporting combativeness* (Szepesi, Nagykalai, & Bogner, 2002). This is an attitude that may involve sport-related competitive anger or a “fighting spirit” that has been shown to facilitate performance (Robazza, Bertollo, & Bortoli, 2006). However, it also involves a high level of attention and impulse control that differ among various forms of martial arts, to optimize performance (Sánchez-López, Fernández, Silva-Pereyra, & Mesa, 2013), as well as mood regulation (Stevens, Lane, & Terry, 2006). Two classes of aggression have been identified in humans: 1) controlled–instrumental, and 2) reactive–impulsive (Vitiello & Stoff, 1997). In sports the former is

linked to assertiveness, while reactive aggression involves fierce emotions that may skyrocket one's arousal. In all sports, especially in relatively dangerous combat sports, arousal must be kept at an optimal level (Jokela & Hanin, 1999) to allow the athletes to react to suddenly arising opportunities in attack, as well as to avoid or block dangerous opponent's attacks (Devonport, 2006). To maintain optimal level of arousal, the control of emotions is crucial. Therefore, the continuous monitoring and controlling one's emotions, appraising correctly the opponent's emotions, and combining emotions with adequate techniques that trigger false anticipation in the opponent's reactions are important aspects of combat sports that require high level of EI (for a detailed description of EI refer to Goleman, 1998, 2006, and to Mayer & Salovey, 1997).

Two popular combat sports, distinguished in the literature as a harder and a softer sport, respectively (Rodriguez, Vitali, & Nobili, 1998), are boxing and judo. To date the study of EI in combat sports is virtually lacking. The single relevant study that could be located in the literature has contrasted judo and taekwondo athletes with non-athletes and has shown that both groups of athletes scored higher on EI than the control group (Costarelli & Stamou, 2009). One's EI is also linked to personality traits like neuroticism and extroversion. These characteristics appear to moderate one's EI (Othman, Daud, & Kassim, 2011; Salami, 2011). Petrides et al. (2010) have shown that neuroticism is the strongest correlate of EI among several other personality variables. Therefore, it may be useful to examine these traits in conjunction with EI. However, the literature linking personality and EI is rather controversial at this time. For example, some regard EI as an ability involving the cognitive processing of emotional information (Goleman, 2006), while the others believe that EI is a trait (e.g. Austin, Saklofske, & Egan, 2005). The distinction between the two is that the former can be developed or changed, while the other is relatively stable. Some researchers in the field (Goleman, 2006; Hillis, 2012) present models for the dynamic aspect of the EI, while the others present support for the trait aspect of the EI as well (Petrides, Pita, & Kokkinaki, 2007).

It is generally agreed in the literature that athletes exhibit higher extroversion and lower neuroticism than non-athletes (e.g. Bäckmand, Kaprio, Kujala, & Sarna, 2001; McKelvie, Lemieux, & Stout, 2003). A few studies have looked at this issue in combat sports. Bäckmand et al. (2001) studied retired athletes from Finland and contrasted them to non-athletes. The athletes in combat sports and team sports were more extroverted than non-athletes. In another inquiry, Sule (1987) found that psychiatric patients suffering from anxiety and pathological inhibition, after receiving a defence-oriented combat training for one month, exhibited

lower anxiety and higher extroversion. Finally, an earlier study found that amateur-boxers exhibited personalities with depressive symptoms and aggressive inhibitions (Rauchfleisch & Radü, 1983). These findings led the authors to suggest that for boxers the sport may be a means of coping with adversity. In the same study, however, only a few boxers have exhibited neurotic symptoms. Those who did, also suffered from depressive and aggressive conflicts. Therefore, neuroticism, in spite of a few notorious cases in professional boxing, could not be linked to this sport.

Past research shows that athletes exhibit higher extroversion than non-athletes, probably because the participation in intensive athletic activities increases the cortical arousal (McKelvie, et al., 2003). Further, since neurotic manifestations interfere with control over the fast-changing scenarios in combat sports and the competitors' optimal level of arousal (Hanin, 2000), it may be expected that combat sport athletes would demonstrate lower neuroticism than non-athletes. Last, higher than average EI is needed for staying in control during competitions in all combat sports. In light of the ability-based theory of EI (Mayer, et al., 2008), the four aspects of EI relate to combat sports in the following ways: the *appraisal of self-emotion* is crucial in regulating one's level of arousal; *understanding others' emotions* is necessary in predicting the opponents' planned actions and reactions; the *use of emotions* is adaptive in masking and faking self-emotions to one's advantage in combat or during competition; and the *self-regulation of emotions* is at the core of maintaining appropriate level of arousal (Hanin, 2000) and control over the situation.

There is limited evidence that combat sports are linked to EI. Further, no studies were conducted to date, which simultaneously examined personality correlates of EI, such as neuroticism and extroversion. The aim of the current study was to further examine EI in combat sports and to compare a "hard" combat sport, such as boxing, with a "softer" combat sport, such as judo, and with a non-athlete control group. The rationale of the inquiry was based on the connection between arousal and emotions and the inherent technical features of boxing begging for controlled emotions during combat (Devonport, 2006). It was hypothesized that boxers and judokas will exhibit higher EI than non-athletes. Therefore, it was surmised that combat sports may foster ability-based emotional intelligence. Based on the past research evidence with athletes, in general, it was also hypothesized that combat sport athletes will score higher on extroversion and lower on neuroticism than non-athletes. Last, based on a recent report (Petrides, et al., 2010), the connection between EI, extroversion, and neuroticism was also measured in light of the surmise that these variables may share a significant portion of their variances.

Method

Participants

Athletes were recruited from a large Hungarian government-financed elite sports centre, the Central School of Sports in Budapest, caring for boxing and judo athletes among its many sporting profiles. All athletes were of Hungarian origin and spoke Hungarian as their mother tongue. They competed at least at national level. Age-matched non-athlete controls were recruited from among psychology students studying at a large urban university. To ensure sufficient power for the statistical analyses (i.e. a moderate effect size (Cohen's $f^2=0.15$), at 95% level of confidence, the total sample size had to be 93, as calculated with the *G* power* (version 3.1.3) software (Buchner, Erdfelder, & Faul, 1997). The recruitment continued until 40 participants volunteered from both sports. Simultaneously, 40 non-athlete volunteers (defined as not participating or only occasionally participating in physical activity) were also recruited in the study. In this way a total sample size of 120 subjects was obtained. This figure was greater than the calculated minimum sample size (93). The participants' age was $M=22.2$ ($SD=6.2$) years, their body height was $M=174.0$ ($SD=10.0$) cm, and their body weight was $M=70.8$ ($SD=16.0$) kg; 73% were men and 27% women (only two boxers were females, six judokas were females, and 25 controls were females). While there were no statistical differences in the age of the participants, the athletes were taller and heavier (<10%) than the non-athletes ($p<.05$). Combat sport athletes were elite boxers and judokas competing at either national or international level. Written consent for participation in the study was obtained from the volunteers. In addition to ethical clearance from the local Research Ethics Board, the "Code of Human Research Ethics" (The British Psychological Society, 2010) was also fully respected in the course of the work.

Materials

Two instruments were used in the study. For gauging neuroticism and extroversion the very short form of the *Eysenck Personality Inventory* (EPI) was adopted (Eysenck & Eysenck, 1964). This scale correlates with the long version of the instrument ($r=.79$ for neuroticism and $r=.82$ for extroversion). It is convenient to use due to its brevity and "Yes" or "No" rating of the 12 statements; six measuring neuroticism and the other six gauging extroversion. *Yes*-ratings are coded as +1 and *No*-ratings are coded as -1. A high "minus" score is associated with low neuroticism, while a high "plus" score reflects a high level of extroversion, and vice versa for both. The originally reported correlation between the two subscales (neuroticism and extroversion) is low $r=-0.05$ (Eysenck & Eysenck, 1964). In the current

study, a back-and-forth translated Hungarian version of the tool was used. The subscales' internal reliability (Cronbach's α) was .65 for neuroticism and .60 for extroversion.

The *Wong and Law Emotional Intelligence Scale* (WLEIS; Wong & Law, 2002) is a 16-item questionnaire, which is rated on a five-point Likert scale. A larger score on each subscale represents a higher level of emotional intelligence. This tool was adopted for two reasons: (1) its simplicity and good psychometric properties (Wong & Law, 2002), and (2) it measures four dimensions of emotions directly relevant to combat sports, as noted previously: *self-emotional appraisal*, *others' emotional appraisal*, *use of emotions*, and *regulation of emotions* (Meyer et al., 2008). In the current study, the psychometrically validated 14-item Hungarian version of the scale was used (Szabó, Kun, Urbán, & Demetrovics, 2011). The psychometric properties of the Hungarian version are very good. The internal reliability of the four subscales ranges from (Cronbach's α) .69 to .84 (Szabó, et al., 2011).

Procedure

Athletes completed the two questionnaires in the presence of one experimenter and a coach at their usual training venues. Control participants completed the questionnaires in their classroom in the presence of an experimenter. In all circumstances talking and any other form of interaction between the participants was prohibited. The completion of both questionnaires took less than five minutes. The participants were reminded to check whether they have answered to all the questions before handing in their completed questionnaires. The obtained data were recorded in a spreadsheet and subsequently the statistical analyses were performed with the SPSS (original version 17) software.

Results

The data were analysed with a 3 (groups) by 6 (dependent measures) multivariate analysis of variance (MANOVA), which was statistically significant (Wilks' Lambda=.359, $F=12.5$, $p<.001$). Follow-up univariate tests (ANOVAs) yielded group main effects that were statistically significant for all the six dependent measures (see Table 1). *Post-hoc* tests, using Tukey's HSD, have revealed that the boxers scored lowest on neuroticism in contrast to the judokas and the control group ($p<.001$, effect sizes: Cohen's $d=1.6$ and $d=2.0$, respectively). The latter two groups did not differ significantly from each other. Both the boxers and judokas exhibited higher scores of extroversion than the control group ($p<.001$, $d=1.2$ and $d=1.3$, respectively), but they did not differ from each other. On *self-emotional appraisal* the boxers scored higher than the judokas ($p<.004$, $d=.72$) and higher than the controls, but the difference did not reach the conservative

Table 1. Means and standard deviations (SD) and results of the univariate analyses of variance for the group differences (main effects) in the six outcome measures of the study (n=40 in each group)

	Boxers	Judokas	Controls	F	p
Neuroticism	-4.2 (2.3)*	-0.1 (2.9)	0.9 (2.8)	41.5	.001
Extroversion	4.1 (2.4)*	4.2 (2.2)*	0.9 (2.9)	22.5	.001
Self-emotional appraisal	17.7 (1.8)*	16.4 (1.8)	16.8 (2.0)	5.5	.005
Others' emotional appraisal	15.5 (2.0)*	15.4 (1.7)*	14.3 (2.3)	4.6	.01
Use of emotions	18.9 (1.3)*	16.6 (2.1)**	14.0 (3.0)	47.9	.001
Regulation of emotions	16.4 (2.3)*	14.7 (2.7)**	12.8 (3.1)	17.3	.001

Note: *Statistically significant from the unmarked and **group(s), $p < .05$; **Statistically significant from the unmarked and *group(s), $p < .05$

level of statistical significance ($p < .06$, $d = .47$). On *others' emotional appraisal* the boxers and the judokas did not differ from each other, but both scored statistically significantly higher than the control group ($p < .02$ and $p < .03$, $d = .56$ and $d = .54$, respectively). On *use of emotions* and *regulation of emotions* subscales of the WLEIS the boxers scored higher than the judokas ($p < .001$ and $p < .01$, $d = 1.3$ and $d = .68$, respectively) who, in turn, scored higher than the non-athletes ($p < .001$ and $p < .007$, $d = 1.0$ and $d = .55$, respectively).

To explore the link between EI and personality traits, correlations were calculated. The tests revealed that neuroticism was statistically significantly and negatively correlated with *self-emotional appraisal* ($r = -.36$, $r^2 = 13$, $p < .001$), *use of emotions* ($r = -.66$, $r^2 = 44$, $p < .001$), and *regulation of emotions* ($r = -.53$, $r^2 = 28$, $p < .001$). Extroversion emerged to be statistically significantly and positively correlated only with the *use of emotions* dimension of EI ($r = .56$, $r^2 = 31$, $p < .001$).

Due to an imbalance in gender distribution within and between the three groups, the set of analyses were repeated for the data obtained from males only (n=38 boxers, n=34 judokas, and n=15 controls). These results were identical to those obtained with the full sample including females, with the exception of *others' emotional appraisal* in which the differences between the combat athletes and control participants did not emerge.

Finally, a total EI score was derived from adding the scores on the four subscales of the EI and analysed for the three groups using analysis of variance (ANOVA). This test was performed twice, once with the entire sample and once for males only

Table 2. Means and standard deviations of total Emotional Intelligence (EI) scores in the three groups studied, for the whole sample and males only

	Boxers	Judokas	Controls
Whole Sample (n=120)	68.5 (4.6)*	63.1 (5.8)**	57.8 (7.8)
Males only (n=87)	68.5 (4.7)*	63.3 (5.1)**	58.7 (7.3)

Note: *Statistically significant from the unmarked and **group(s), $p < .05$; **Statistically significant from the unmarked and *group(s), $p < .05$

who comprised the majority of the participants in the study. The ANOVA was statistically significant in both cases ($F(2,117) = 29.52$, $p < .001$, and $F(2,84) = 19.99$, $p < .001$; Table 2). In both instances the boxers expressed higher EI than the judokas, who in turn manifested higher EI than the controls.

Discussion and conclusions

The current results may be somewhat surprising in that the aggressive nature of combat sports (Mroczkowska, et al., 2008) is supposedly inversely related to EI. While at the age at which youngsters have chosen to be involved in combat sports this conjecture could be valid (a hypothesis that should be tested empirically), for one to climb to elite level of the sport, the development of emotional control is indispensable (Lane, 2002; Devonport, 2006). Therefore, the current findings fit the emotional aspects of combat sports, and unless one assumes that boxers may possess higher EI *before their involvement in sport*, the only remaining explanation is that boxing may foster the development of EI in the long term. While it is regrettable that no data on the number of years of sport practice were gathered in the present inquiry, the length of the road to elite level may differ among the athletes. If the current literature is considered, which segregates EI into two different constructs, an ability and a trait (Austin, et al., 2005), the current results refer and are limited to the ability-linked EI in accord with Goleman's (2006) work, as well as in accord with Wong and Law's conceptualization in the development of their EI questionnaire.

The judokas also differed from the non-athletes in three out of the four measures of EI, which then suggests that judo may also foster the development of EI. However, the differences in EI *vis-a-vis* the non-athlete group were similar to the differences seen between the boxers and judokas. In the current study EI of the judokas was between that of the boxers and non-athletes. In a recent study Costarelli and Stamou (2009) showed that elite taekwondo and judo athletes had higher levels of EI in contrast to a non-athlete control group. Therefore, the current findings agree with the only study (to the best of

the authors' knowledge) examining EI in combat sports. Further, the current work expands the previous result by showing that boxing, a combat sport with a significant social stigma, may facilitate the development of EI even more than judo or taekwondo. A note of caution should be added here. This explanation is hypothetical because the current work is not longitudinal and, therefore, the observed cross-sectional differences have a hypothetical explanation power in the current context. In fact it is possible that most sports or physical activities contribute to some extent to the development of athletes' EI. There is an additional evidence for this conjecture that connects high levels of physical activity and sport participation to greater levels of EI (Li, Wang, & Liao, 2009).

Based on the reported relationship between neuroticism and EI (Petrides, et al., 2010), it was not surprising that the boxers scored lowest on neuroticism in the current inquiry. Apart from *others' emotional appraisal*, neuroticism was strongly and inversely related to the other three dimensions of EI. While the judokas did not manifest lower scores than the non-athletes on neuroticism, the two combat sport athletes scored equally high and significantly higher on extroversion – which is also associated with EI (Othman, et al., 2011; Salami, 2011) – than the non-athlete controls. Further, in the current inquiry extroversion was strongly correlated with the use of emotions. The findings that athletes scored higher on extroversion than non-athletes are not new and they agree with past literature reports (e.g. Bäckmand, et al., 2001; McKelvie, et al., 2003).

Considering the variables measured and profile of the boxers, judokas, and controls, it is argued that in spite of the aggressive label, social stigma, and medical reports of some incidences of brain damage (Haglund, & Eriksson 1993; Moseley, 2000) in boxing, this sport may foster a personally and socially desirable effect through the development of EI. However, in spite of the possibly controversial or surprising nature of the current findings, the study should be replicated at different levels of the sport. In spite of the relatively preliminary nature of the current findings, they should stimulate research interest in the area of sport and physical activity and EI.

There are a few shortcomings in the study that ought to be weighed in conjunction with the interpretation of the results. First, the elite nature of the combat sport athletes in the current study (as well as in Costarelli and Stamou, 2009) limits the generalizability of these findings, and raises the speculative question that these athletes, reaching a peak level in their sport, may indeed have higher EI from the beginning in contrast to the general population. Perhaps the answer to the question is linked to the two aspects of EI, ability and trait (Austin, et al., 2005), that should be studied simultaneously in future inquiries. Second, in the

current inquiry social status was not determined. It is known that EI is linked to the education level and household income (Harrod, & Scheer, 2005; Margavio, Margavio, Hignite, & Moses, 2011) and boxers, in general, appear to emerge from lower income working class families (Gems, 2004; Velenczei, Kovács, Szabo, & Szabó, 2009; Woodward, 2004). Therefore, the three groups examined in the current study could have been members of different social classes, which in itself is linked to the EI, but perhaps to the trait EI, rather than to ability EI. Consequently, if boxers have come from a lower social class and at the elite level they show the highest EI, then the sport could be even more beneficial to this group than to the other athletes or non-athletes. Third, an issue to be noted is that only 27% of the participants in the current study were women with few in the boxing group. Therefore, gender differences could not be examined. To partially overcome this problem, the data were analysed without the inclusion of the women and yielded the same results. Gender issues may be important, because in the only comparable study Costarelli and Stamou (2009) have found that differences in EI were more pronounced in female athletes in contrast to non-athletes. Fourth, results concerning neuroticism and extroversion emerge from a back-and-forth translated 12-item questionnaire that in spite of the fact that it is scored on a simple "yes" or "no" categorical scale with acceptable internal reliability, the full psychometric validation of the scale was not performed, which could influence the results. Finally, the controversial finding that (university) psychology students showed lower EI than combat sports athletes may be linked to the dualistic nature of EI (ability and trait). It should be emphasized that in the current study inference to trait EI cannot be made since both the rationale and assessment were based on the ability-linked EI. Future longitudinal studies using both the ability and trait EI measures are necessary for the better understanding of EI in sport and the possible sport-facilitated development of EI.

The current study reveals that elite boxers show the most positive psychological profile in contrast to a similar-level of athletes in judo, as well as in contrast to an age-matched non-athlete control group. The inquiry also corroborated previous findings from the literature that judokas possess higher EI than non-athletes. Furthermore, as known for a while, the study adds to the bulk of evidence consistently demonstrating that athletes exhibit greater extroversion than non-athletes. Finally, the findings lend support to recent reports that EI, neuroticism, and extroversion share a significant proportion of their variances. The take-home message of the study is that boxers and judokas have higher EI than non-athletes, which may be linked to sport participation, but the causal connection should be investigated via longitudinal research.

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RAZVIJAJU LI BORILAČKI SPORTOVI EMOCIONALNU INTELIGENCIJU?

Emocionalna inteligencija, neuroticizam i ekstroverzija istražene su u grupama boksača, judaša i kontrolnoj grupi nesportaša. Rezultati, dobiveni pomoću testova *Wong and Law Emotional Intelligence Scale* i *Eysenck Personality Inventory*, pokazali su da su boksači postigli bolje rezultate u shvaćanju svojih emocija u odnosu na judaše i nesportaše (veličine učinka (d)=0,72, i 0,47). U procjeni emocija drugih, boksači i judaši se nisu međusobno razlikovali, ali su obje grupe postigle više vrijednosti u odnosu na nesportaše (d =0,56 i d =0,54). U varijabli korištenja i kontrole emocija boksači su zabilježili bolje rezultate od judaša (d =1,3 i d =0,68), koji su

pak postigli bolje rezultate od nesportaša (d =1,0 i d =0,55). Boksači su u ovom istraživanju pokazali najnižu razinu neuroticizma (d =1,6 nasuprot judašima i d =2,0 nasuprot kontrolnoj grupi nesportaša). Dvije grupe sportaša zabilježile su višu razinu ekstroverzije u odnosu na kontrolnu grupu (d =1,2, boksači, i d =1,3, judaši). Budući da je u ovoj studiji istraživana emocionalna inteligencija povezana sa sposobnošću, može se zaključiti da boks, i borilački sportovi općenito, mogu pridonijeti njezinu razvoju.

Ključne riječi: sportaš, borba, ekstroverzija, judo, neuroticizam, boks