

# Influence of emotional intelligence on sport performance in elite canoeist

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## ABSTRACT

Several studies support the hypothesis that emotions are linked with sport performance. However, only a few studies have addressed the direct relationship between emotional intelligence (EI) and sport performance. In order to address this question, emotional intelligence was assessed in 50 elite male canoeists from a total of fourteen countries. The sample was divided into two groups based on the number of medals achieved at world championships [Expert level Group 1, had won 1 - 3 medals ( $n = 33$ ), and Expert level Group 2 had won more than 3 medals ( $n = 17$ )]. As a secondary goal, the influence of years of practice on sport performance was examined. Results indicate that the Level 2 expert athletes scored higher in empathy ( $p < .05$ ), emotional recognition ( $p < .05$ ), emotional control and regulation ( $p < .001$ ) and years of practice invested in their preparation ( $p < .01$ ) than the Level 1 expert athletes. These findings make a valuable contribution to answering some key questions regarding high performance sport and the role of EI in elite sport performance.

**Keywords:** Sport psychology; Psychological skills; Empathy; Coach; Competition.

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## INTRODUCTION

It is well established that emotions influence sport performance in a decisive way (Beedie, Terry, & Lane, 2000; Cecchini, González, Carmona, Arruza, Escartí, & Balagué, 2001; Laborde, Brüll, Weber, & Anders, 2011; Lane, Thelwell, Lowther, & Devonport, 2009; Laborde, Dosseville & Allen, 2015; Laborde, Guillén & Mosley, 2016; Laborde, Guillén & Watson, 2017; Robazza, Pellizzari, Bertollo, & Hanin, 2008; Uphill, Groom, & Jones, 2014; Petrides, 2016; Petrides, Gómez & Pérez-González, 2017). Furthermore, it has also been ascertained in this context that emotional intelligence (EI) has a positive effect on the regulation of emotions (Kotsou, Nelis, Grégoire, & Mikolajczak, 2011; Mikolajczak, Roy, Luminet, Fillée, & de Timary, 2007). Lane et al. (2009) observed that self-reported beliefs of EI are associated with optimum mood states in sport competition.

Nowadays, a lot of research studies the relationship between the brain and intelligent behaviours (Ferguson, Anderson and Spreng, 2017; Hearne, Mattingley and Cocchi, 2016, Shearer and Karanian, 2017). Currently the cognitive and emotional aspects are considered to be complementary systems instead of antagonistic processes. In the same way that emotions influence thought processes, they also mediate between emotional states (Mayer, Salovey, Caruso, & Cherkasskiy, 2011). Mayer, Caruso and Salovey (1999) propose that emotional intelligence (EI) is a capacity or ability that, due to an appropriate process of sensory information, allows individuals a better adaptation to their environment. Therefore, in the context of research it should be evaluated with performance measurements (Petrides, 2011). On the contrary, Schutte, Malouff and Bhullar (2009) define EI as a compound of self-perceptions, dispositions and motivations that share some elements with the main characteristics of personality (Petrides, Pita, & Kokkinaki, 2007; Petrides, Pérez-González, & Furnham, 2007; Petrides, 2016; Petrides, Gómez & Pérez-González, 2017). On the other hand, the train processing of emotions differs between men and women (Crombie, Lombard, & Noakes, 2009; Reber & Tranel, 2017).

Unlike the model of capacity, the EI trait model includes mental skills as well as stable traits of behaviour and personality, social skills and adjustment indicators (Fernández-Berrocal, & Extremera, 2008; Mayer, Salovey, & Caruso, 2008). It also incorporates the inherent subjectivity that relates to personal emotional experience, which means that for its study it should be evaluated through measurements of self-report (Bar-On, 2006). According to Petrides and Fuhman (2001) the first compound places EI in the field of intelligence and the other in the sphere of personality. In the first case, EI is a skill sensitive to being improved, whilst personality traits are characteristics that are more stable and long-lasting throughout life (Kotsou et al., 2011).

In the area of sport, Lane et al. (2009) analysed the factorial validity of the Emotional Intelligence Scale (EIS: Schutte et al., 1998) to be used with athletes for the first time. Based on the initial contributions of Mayer and Salovey (1997), Arruza, González-Rodríguez, Palacios-Moreno, Arribas-Galarraga and Telletxea-Artzamendi (2013) constructed a scale of self-report to measure specifically EI in sport competition or the perceived emotional intelligence in sport (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). In the first case these perceptions are indicators for predispositions or individual traits (e.g. "I have control over my emotions"), while in the second they measure specific behaviours in sport competition (e.g. "when I face a competition I control my emotions"). In either case, we believe that this does not modify the fact that they still measure relatively stable individual traits. Apart from these subtle but important differences, the scales evaluate distinct dimensions.

In studies with biological markers, EI has been related to a lower baseline in response to cortisol before a stressful event (Mikolajczak et al., 2007) and also with a lower increase of the ratio of low/high cardiac

frequency (LF/HF) during a stressful event (Laborde et al., 2011; Chakervati & Lal, 2016). There is also evidence that high cortisol levels are linked to poor performance in sports (Doan, Newton, Kraemer, Kwon, & Scheet, 2007). Some investigations have addressed the relationship between EI and stress when athletes feel under pressure. It seems that before a competition EI is associated positively with emotions that may improve performance (Lane, Devonport, Soos, Karsai, Leibinger, & Hamar, 2010) and also with lower pre-competitive anxiety (Lu, Li, Hsu, & Williams, 2010). Laborde, Lautenbach, Allen, Herbert and Achtzehn (2012) explored the role of trait EI in emotion regulation and performance under pressure in twenty-eight tennis players and results showed that trait EI and cortisol secretion are important in athletes' responses to pressure situations. As a result of the aforementioned knowledge, our hypothesis is that EI is a key factor in sport performance because of athletes' experiences of stress and anxiety when they compete at a high level (Mellalieu, Neil, Hanton, & Fletcher, 2009). In fact, emotional intelligence also has been related to the use of confrontation strategies in stressful sport situations (Laborde, You, Dosseville, & Salinas, 2012).

Although there is a lot of evidence that supports the belief that emotions are related to sport performance, few studies have addressed the direct relationship between EI and sport performance. Perlinni and Halverson (2006) examined the influence of EI on sport performance of players from the U.S. National Ice Hockey League (NHL). Results showed that EI explained a significant amount of variance in the explanation of the number of goals achieved in the NHL. Crombie, Lombard and Noakes (2009) also investigated the relationship between team EI and sport performance in six cricket teams from the South African national league during two consecutive seasons. Results showed that team EI was positively associated with sport performance. These findings suggest that EI can contribute to the success of teams that take part in complex sports such as cricket. Zizzi, Deaner and Hirschhorn (2003) explored the relationship between EI and athletic performance in a sample of baseball players and found modest support to the link between emotional skills and sport performance. Their data suggests that components of EI seem to be moderately linked to the performance of the pitcher, but not to the performance of the batter. Lane et al. (2009) found that self-talk, imagery, and activation in both practice and competition were associated with perceptions of the appraisal of others' emotions and the ability to regulate emotions.

Beedie et al. (2000) conducted a meta-analysis of 29 published studies and found a relationship between mood and performance outcome. Robazza et al. (2008) examined the impact of emotions on athletic performance in 56 high-level Italian swimmers and track and field athletes and found that athletes tended to perceive emotional levels approximating an individual's optimal zone as facilitative-pleasant.

Laborde et al. (2011) studied the influence of trait EI in thirty male handball players when they have to face the stress of competition and found that high trait EI athletes experienced a lower increase of stress compared to their low trait EI counterparts and concluded that EI may help athletes cope better with stress. Lane and Wilson (2011) investigated the relationships between trait EI and emotional state changes in thirty-four runners over the course of an ultra-endurance foot race covering a route of approximately 175 miles (282 km) and held in set stages over six days. These authors showed that trait EI associates with adaptive psychological states and suggested that it may be a key individual difference that explains why some athletes respond to repeated bouts of hard exercise better than others.

Saies, Arribas-Galarraga, Cecchini, Luis-de-Cos and Otaegi (2014) examined the emotional intelligence of 214 expert and novice canoeing paddlers from 20 different countries and found that the expert athletes showed higher levels of EI, motivation, satisfaction and goal orientations. In another research with 386 canoeists from 35 different countries (Arribas-Galarraga, Saies, Cecchini, Arruza & Luis-de Cos, 2017) the authors found that the time invested in the practice of canoeing does not predict EI.

The main goal of the present study is to address the impact of EI on the sport results of canoeists of the highest international competitive level. For this purpose, Mayer and Salovey's (1997) initial model was taken as a starting point. They established that EI reflects the ability to recognize the significance of emotions and their relationships, as well as the ability to reason and to resolve problems based on them. According to these authors, EI has different ramifications and a hierarchical structure that includes the capacities for the: 1) perception of the emotions; 2) use of emotions to facilitate thinking; 3) understanding of emotions and 4) management of emotions. On the basis of this model, Arruza et al. (2013) designed a measurement scale of perceived emotional intelligence in sport/competition contexts. According to these authors, the core of what we could call EI consists of three factors: The first factor being emotional recognition, which includes the ability to distinguish and recognize the emotions that are generated in competition. The second component being empathy or the ability to understand emotions in others and to imagine that one is in another person's situation (partners and/or opponents). The third factor consists of emotional control and regulation, which includes the ability to intervene in emotions, control their imbalances, use emotional stimuli and transform them into positive impulses, and in doing so confront the competitive experience with the highest probability of success. A secondary objective of the present study was to analyse the link between years of practice and performance. In the sport context, There are research in which it is suggested that the frequent use of psychological skills enhances the strong relationship has been found between the time dedicated to practice and the objective results obtained in competition (Collins, Macnamara, & McCarthy, 2016; Davids, & Baker, 2007). The theory of the deliberate practice (Ericsson, Krampe, & Tesch-Römer, 1993; Ericsson, 2016)) establishes that expert performance is closely related to the accumulated quantity of deliberate practice in a specific domain during an athlete's career (Bloom, 1985; Chang, Chen, Mellers, & Tetlock, 2016; De Bruin, Rikers, & Schmidt, 2007; Ericsson, 2016; Gonçalves, Figueiredo, & Coelho-Silva, 2009; Moran, 2016; Swaminathan, Schellenberg, & Khalil, 2017; Ullén, Hambrick, & Mosing, 2016; Ward, Hodges, Williams, & Starkes, 2004). To become an elite athlete, it seems to be necessary to have invested about 10,000 hours over more or less 10 years on athletic specialization (Balyi, & Williams 2009; Ericsson, Prietula, & Cokely, 2007).

On the basis of these findings we formulated the hypothesis that EI influences high level athletes' performances and that it may provide an explanation regarding excellence in sport. We also expected to find a relationship between years of practice and levels of excellence.

## **MATERIAL AND METHODS**

### ***Participants***

The participants were 50 male canoeists from 14 different countries. The sample was chosen from the lists of official results from the International Canoeing Federation. The participants were contacted directly via e-mail after verification of their international sport results and were informed about the questionnaire, which was approved by the Ethics Committee of the University of the Basque Country (EHU/UPV) according to the standards set by the Declaration of Helsinki. The selection criteria were to be a male paddler, still active and competing at the time of the data collection, and to have won at least one medal at the world championships. Subsequently, the participants were classified into one of two groups: Expert Level 1 consisted of those athletes who had won one to three medals ( $n = 33$ ), and Expert Level 2 was comprised of those athletes who had won more than three medals ( $n = 17$ ). The participants' age ranged from 20 and 37 years ( $M = 28.7$ ;  $DT = 4.53$ ).

### ***Measures***

Years of practice. It was confirmed by a single question where participants were asked to point out the years

that they had been paddling for. Afterwards the answers were re-codified: 1 = 1-4 years; 2 = 5-9 years; 3 = 10-14 years; 4 = 15-19 years; 5 = 20 years or more.

Emotional intelligence. EI was measured using the "Questionnaire of perceived emotional intelligence in sport/competition contexts" created by Arruza et al. (2013). It consists of 39 items distributed in 5 sub-scales that evaluate: empathy (7 items, e.g. "During the competition, I understand easily how my teammates and/or opponents feel"), emotional control and regulation (7 items, e.g. "I am good at controlling my level of pressure before competing"), management of negative emotions (6 items, e.g. "I often struggle understanding my teammates' emotions"), refereed reactivity (3 items, e.g. "I stay calm when a referee error happens") and emotional recognition (8 items, e.g. "I am aware of my emotions when I compete"). For this study, empathy, emotional control and regulation and emotional recognition factors were used. Cronbach alphas were: .86 (Spanish version) and .81 (English version) for empathy, .88 and .80 for emotional control and regulation, and .91 and .89 for emotional recognition, respectively.

### Procedures

All participants completed the on-line forms voluntarily and anonymously after an informed consent was obtained. Quality standards for on-line questionnaires have been followed (Arruza et al., 2013). All questionnaires were available in two languages: English (n = 89; 41.6 %) and Spanish (n = 125; 58.4 %). The approximate duration for completing the questionnaires was estimated to be 20 minutes.

### Analysis

Exploratory factor analysis and descriptive analysis was carried out for all variables to verify the fit of the data to a probabilistic distribution. The results of the Kolmogorov-Smirnov test suggested using distribution-free analysis or non-parametric analysis.

## RESULTS

### Descriptive analysis

Means, effect size and standard deviations of the analysed variables are presented in table 1. In both groups, the emotional intelligence variable that scored higher was the one that measures self-recognition of emotions in competition, whilst the one that scored the lowest was the one that determines the degree of empathy towards teammates and opponents.

Statistically significant differences were observed in all of the analysed variables between the groups of Expert 1 and 2 (Figure 1): Empathy ( $Z = -2.27$ ,  $p < .05$ ), Emotional control and regulation ( $Z = -3.27$ ,  $p < .001$ ), Emotional recognition ( $Z = -2.05$ ,  $p < .05$ ), and years of practice ( $Z = -3.23$ ,  $p < .001$ ).

Table 1. Means, standard deviations and effect sizes for the Expert 1 and 2 groups.

	Expert 1	Expert 2	ES
	M (SD)	M (SD)	
Empathy	3.41 (0.67)	3.92 (0.62)	.77
Emotional control and regulation	3.34 (0.84)	4.04 (0.37)	.93
Emotional recognition	3.96 (0.60)	4.36 (0.45)	.70
Years of practice	3.64 (1.11)	4.65 (0.70)	.99

Note: ES = Effect Size.

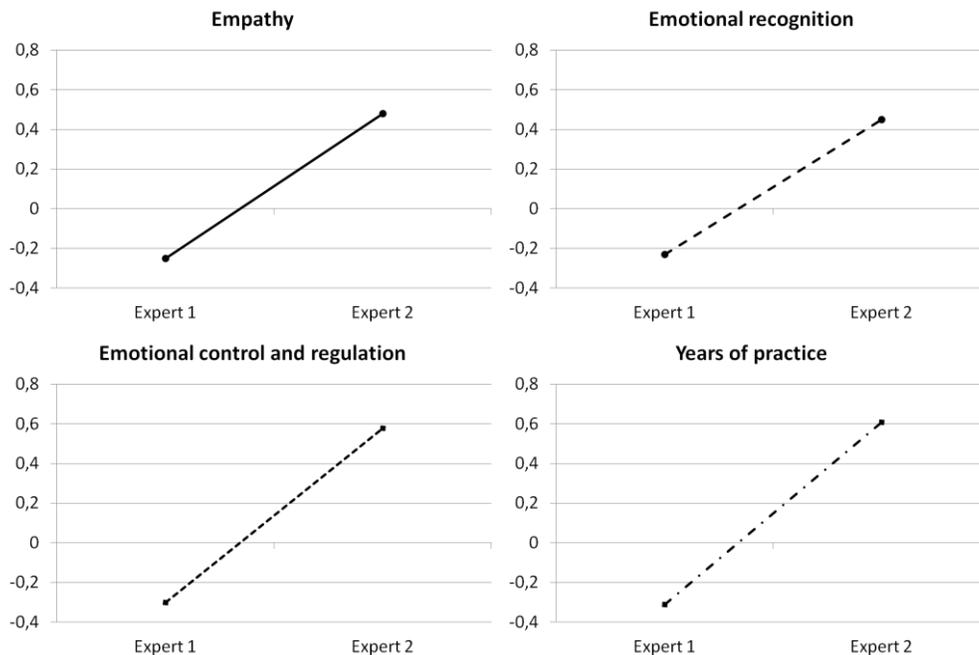


Figure 1. Graphs showing the differences between emotional intelligence and years of practice between the groups: Expert 1 and 2.

## DISCUSSION AND CONCLUSIONS

In the present study the hypothesis that EI influences the performance of athletes at the highest international competitive level was formulated. The results that were obtained from this investigation confirm this expectation. These results are consistent with the findings obtained in previous studies on cricket, ice-hockey, baseball and canoeing (Crombie et al., 2009; Perlinni, & Halverson, 2006; Saies et al., 2014; Zizzi et al., 2003). The athletes that reached excellence (more than three medals at world championships) showed higher levels of empathy, emotional recognition and emotional control and regulation than those placed in a lower level (canoeists that won one to three medals at world championships). This study addresses one of the key questions in sport relative to the unique qualities that separate elite and nearly elite athletes. These results suggest that EI may be important in differentiating among athletes at the highest levels. In fact, inter-group differences were observed in emotional recognition, or the ability to distinguish and recognize the emotions that are generated during a competition. In addition, there is some evidence that confirms that emotions influence sport performance (Beedie et al., 2000; Laborde et al., 2011; Laborde et al., 2016; Laborde et al., 2017; Lane et al., 2009; Robazza et al., 2008). It is therefore necessary to recognise them in the first place in order to manage them correctly. (Mayer et al., 1999). Differences were detected in empathy, or the ability to organize and interpret what another athlete may be feeling during a competition.

These results may be surprising to some extent as many canoeing events are raced individually. Nonetheless, there are also team or crew competitions where it is necessary to interact with teammates and understand their emotions. Finally, it was observed that canoeists of the highest level show an ability to regulate and control emotions in competition better than those of a lower level. These results are also consistent with the findings obtained in previous studies (Chakarvati & Lal, 2016; Laborde et al., 2011; Laborde et al., 2012; Lane et al., 2009; Mikolajczak et al., 2007). In order to reach a high level of performance in sport it is very important to: control stress before and during a competition, maintain a correct level of

concentration, turn negative thoughts into positive ones and prevent emotions from interfering with performance. Psychological skills are a key element in athletes' performance, and consequently they should be trained in a systematic manner. Even if athletes report a frequent use of psychological skills (Collins, MacNamara & McCarthy, 2016; Thomas, Murphy, & Hardy, 1999) those abilities should be enhanced by deliberate practice (Ericsson, 2016).

In this study it was also found that the personal time commitment to the sport influences sport performance. Both groups exceeded the limit of 10 years of practice (Expert 1 = 12.1; Expert 2 = 17.4). These results are also consistent with the predictions of the deliberate practice theory (Ericsson et al., 1993), which establishes that performance is directly linked to the quantity of practice in a specific domain (Bloom, 1985; Chang et al., 2016; Ericsson, 2003; Moran, 2016; Swaminathan et al, 2017; Ullén et al, 2016).

The present study included a few limitations. The first limitation is related to the size of the sample and the fit of the variables studied which did not suggest the use of other statistical analysis that could enrich the study. Another limitation is that it only addresses the study of EI in a male sample. Further research needs to be conducted to establish whether there are any gender differences between athletes of the same level as this has been shown in other contexts. For instance, the brain processing of emotions differs between men and women (Craig et al., 2009; Jaušovec, & Jaušovec, 2005; Reber & Tranel, 2017; Zimmermann & Iwanski, 2014).

Future investigations should also analyse the effects of specific training programs in order to enhance this competence in elite athletes.

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