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Validity of the trait emotional intelligence questionnaire in sports and its links with performance satisfaction

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ABSTRACT

Objective: This research project consisted of two studies aimed at validating the trait emotional intelligence questionnaire (TEIQue) in a sports sample.
Design: Study 1 used a confirmatory factor analysis (CFA) to investigate if the original 4-factor structure of the TEIQue could be replicated in a sample of athletes. In addition, we explored the relationship between trait emotional intelligence (trait EI) and the demographic variables age, sex, type of sport (individual vs. team), expertise, and years of training. Study 2 used a path analysis approach to explore if trait EI is related to performance satisfaction through stress appraisal and coping behaviors.
Method: In Study 1, 973 athletes completed the TEIQue and a demographic questionnaire. In Study 2, 291 athletes completed the TEIQue. Moreover, with a recent competition in mind, they completed the Coping Inventory for Competitive Sports, as well as items on perceived intensity of stress, perceived controllability of stress, challenge and threat appraisals, coping effectiveness, and performance satisfaction.
Results: Study 1 showed with a CFA that the original 4-factor structure of the TEIQue could be replicated in a sports sample. Of the demographic variables, only age showed a significant positive relationship with trait EI. Study 2 showed that trait EI was related to performance satisfaction through stress appraisal and coping variables.
Conclusions: This research showed that the TEIQue can be used with athletes and that trait EI is useful for understanding certain aspects of sports performance satisfaction.

Emotions have been found to influence sports performance in a general way (Hanin, 2007) but also in more specific ways, affecting such components as attention (Nieuwenhuys, Pijpers, Oudejans, & Bakker, 2008) and decision making (Laborde, Dosseville, & Raab, 2013; Laborde & Raab, 2013). However, these studies considered emotions only as states. To better understand the influence of emotions on sports performance, they should also be considered at the trait level, as argued by Lazarus (2000). If emotional states reflect a transient influence, emotions at the trait level reflect stable dispositions of the individual that might influence the individual's behavior. One conceptualization of emotions at the trait level is emotional intelligence (EI), which is thought to reflect the way people usually deal with their own and others' emotions (Mayer, Caruso, & Salovey, 1999; Petrides, 2009b). EI has been conceptualized both as an ability (Mayer et al., 1999), measured by performance tests, and as a trait, measured by self-report questionnaires (Petrides, 2009b). This paper focuses on the validity of the latter conceptualization in the sports domain.

Over the last decade, increasing empirical evidence has been collected regarding the role in sports of EI viewed as a trait, hereafter referred to as trait-based EI. Trait-based EI has been linked to several factors associated with sports performance in athletes, such as adaptive psychological states (Lane & Wilson, 2011), adaptive coping strategies (Laborde, You, Dosseville, & Salinas, 2012), and maximal voluntary contraction (Tok, Binboğa, Guven, Çatıkkas, & Dane, 2013), and is thought to have a protective influence on the physiological reaction to stress (Laborde, Brüll, Weber, & Anders, 2011; Laborde, Lautenbach, Allen, Herbert, & Achtzehn, 2014). Athletes are not the only actors concerned, given that trait EI has also been related to coaching efficacy (Chan & Mallett, 2011). However, despite this growing body of empirical evidence, the

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validity of trait EI has never been demonstrated in sports. This is an important issue (a) at the theoretical level, because it is still not known if a general model of EI can be applied to sports or if EI is domain specific, and (b) at the applied level, because it must be determined if the original EI questionnaires can be applied to athletes or if a sports-specific measure of EI is needed.

Different scales can measure trait-based EI. Those most frequently used in the literature are the Bar-On Emotional Quotient Inventory (Bar-On, 2004), the Schutte EI Scale (Schutte et al., 1998), and the Trait Emotional Intelligence Questionnaire (TEIQue, Petrides, 2009a). Attempts were made to validate the Schutte EI Scale (Lane, Meyer, et al., 2009) and the Bar-On Emotional Quotient Inventory (Stanimirovic & Hanrahan, 2012) in a sports sample. They both failed to support the hypothesized theoretical factor structure. Moreover, Petrides (2009a) argued that both scales were more limited regarding their predictive validity concerning behaviors in comparison to the TEIQue. The TEIQue is based on the trait EI theory (Petrides, 2009b) and has received empirical support in sports (Laborde et al., 2011; Laborde, Dosseville, & Scelles, 2010; Laborde et al., 2014, 2012). However, of these three scales, the TEIQue remains untested in terms of its validity in a sports sample. To remedy this was the aim of Study 1.

In addition to validity, a precise understanding of how EI influences sports performance and emotion-related variables such as stress appraisal, coping behaviors, and coping effectiveness is still lacking. A conceptual model detailing how EI might influence sports performance was proposed by Meyer and Zizzi (2007). However, this conceptual model, based on the ability view of EI, rejects the usefulness of EI as a trait in sports and suffers from ambiguities in its predictions (e.g., this model assumes that a higher EI would predict "rational cognitive appraisals," without clarifying what is meant by this term). In addition, to the best of our knowledge, this model has never been tested empirically. Therefore, a comprehensive model of EI in sports that allows clear predictions to be made based on established theories would be a useful tool for future research. Although studies have separately tested the influence of trait EI on stress appraisal (Mikolajczak & Luminet, 2008), coping strategies (Laborde et al., 2012), and performance (Laborde et al., 2010; Perlini & Halverson, 2006), no study has yet proposed an integrated view of how trait EI is related to these variables. Therefore, in Study 2 we took a path analysis approach to see how trait EI, stress appraisal, coping strategies, and performance relate to each other.

In summary, this research project aimed to fill two major gaps in the literature concerning EI in sports. In Study 1, we sought to establish the validity of a self-report EI instrument (i.e., the TEIQue) in a sports sample. In Study 2, because the existing knowledge about the relationship of trait EI and stress appraisal, coping strategies, and sports performance is currently a collection of disparate findings, we used path analysis to explain the relationship between these variables.

Study 1

In addition to investigating the validity of the TEIQue, in Study 1 we also explored the relationships between trait EI and the demographic variables age, sex, type of sport (individual vs. team), expertise level, and years of training, given that these relationships have so far been unclear. The existing findings linking trait EI and these variables are now reviewed.

Trait EI is usually found to be weakly positively correlated with age (Mikolajczak, Luminet, Leroy, & Roy, 2007). It seems that age is positively correlated with the experience of positive emotions and more adaptive emotion regulation strategies (Yeung, Wong, & Lok, 2011), two characteristics of trait EI that probably improve through life experiences.

Regarding sex, findings with the TEIQue consistently show that men achieve higher global scores than women (Mikolajczak, Luminet, et al., 2007), which goes against findings obtained with other EI scales (e.g., the Schutte EI scale): found no differences between men and women and (Chan, 2003; Schutte et al., 1998) found women scored higher. It is of interest to know if male athletes score differently from female athletes, for example, when establishing norms.

Concerning the type of sport (i.e., individual vs. team), emotion-related variables might differ according to the type of sport considered. For example, the specificity of emotion-related variables in team contact sports has been described by Campo, Mellalieu, Ferrand, Martinent, and Rosnet (2012). However, because previous research showed no differences in EI between athletes from individual and team sports when using the Bar-On Emotional Quotient Inventory (Kajbafnezhad, Ahadi, Heidarie, Askari, & Enayati, 2011), we did not expect to find a relationship between trait EI and the type of sport.

Concerning expertise, to the best of our knowledge the link between trait EI and expertise has not yet been tested. Studies in sports showed that the use of successful coping strategies is necessary to achieve a high level of expertise (Johnson, Tenenbaum, & Edmonds, 2006), and experts were found to cope better with stress than near-experts and nonexperts, as indicated by physiological variables (i.e., heart rate variability, Laborde & Raab, 2013). Thus, we expected that trait EI would be positively linked with expertise.

Finally, no direct link has been established so far between trait EI and the years of training. Training, and more specifically aerobic training, was found to influence heart rate variability, increasing the activity of the parasympathetic system (Hedelin, Wiklund, Bjerle, & Henriksson-Larsen, 2000). Parasympathetic activity is known to index effective emotion regulation (Fenton-O'Creevy & Lins, 2012) and was previously positively linked to trait EI (Laborde et al., 2011). Therefore we expected a positive relationship between trait EI and years of training.

The aim of Study 1 was to examine if the original four-factor structure of the TEIQue could be replicated within a sports sample. Given the empirical evidence of trait EI being linked to several aspects of sports performance, found with both subjective (Laborde et al., 2012) and objective (Laborde et al., 2011, 2014) measures, we hypothesized that the original factor structure of the TEIQue would be replicated within a sports sample. In addition, we hypothesized the following relationships with demographic variables: There would be a positive relationship with age (Mikolajczak, Luminet, et al., 2007; Yeung et al., 2011); male athletes would score higher than female athletes (Mikolajczak, Luminet, et al., 2007); there would be no relationship with type of sport (Kajbafnezhad et al., 2011); and finally, there would be a positive relationship with expertise level (Johnson et al., 2006; Laborde & Raab, 2013) and years of training (Hedelin et al., 2000; Laborde et al., 2011).

Method

Participants

In total, 973 athletes (519 men, 454 women, $M_{age} = 21.4$ years, $SD = 3.9$, age range: 17–56 years) were involved in this study. Four hundred and twenty-eight practiced an individual sport and 545 practiced a team sport. Participants involved in individual sports were not involved at the same time in team sports, and vice versa. Thirty-two different sports were represented. We assessed expertise level by self-report, on a Likert scale from 1 [*lowest expertise*

level (e.g., district level)] to 5 [*highest expertise level* (e.g., international level)]. We used this procedure because it was hard to find a common expertise indicator across sports. In summary, we had the following participant distribution across levels: Level 1: $n = 86$; Level 2: $n = 255$; Level 3: $n = 323$; Level 4: $n = 202$; Level 5: $n = 107$. Participants trained in their sport for a mean of 6.3 years ($SD = 2.7$, range: 1–16 years). The study received the approval of the ethics committee of the local university.

Questionnaire

Trait EI was assessed using the French version of the TEIQue (Mikolajczak, Luminet, et al., 2007). The long version of the TEIQue used in this study contained 153 items, 15 subscales, and four factors: well-being ("Most days, I feel great to be alive"); self-control ("I can handle most difficulties in my life in a cool and composed manner"); emotionality ("Generally, I know exactly why I feel the way I do"); and sociability ("I would describe myself as a good negotiator"). The participants had to rate these items on a scale of 1 (*completely disagree*) to 7 (*completely agree*).

Procedure

Data were collected between April 2008 and September 2012 in the west of France. Participants were recruited through lectures and flyers distributed in the university's sports sciences department and through contact with sports clubs. Participants who agreed to participate in the study signed an informed consent form. Participants always filled out the questionnaire anonymously in the presence of a research assistant, either during a lecture if it was at the university campus or during training if it was in a sports club. Data collection for each participant did not exceed 30 min.

Data analysis

Data were first checked for normality and outliers. It is recommended for samples larger than 300 to judge normality based on the skewness and kurtosis values (Kim, 2013). We used as cutoff values 2.0 for skewness and 7.0 for kurtosis (Curran, West, & Finch, 1996). All dependent variables (15 subscales, four factors, and global trait EI score) fell within the cutoff values, meaning that our data were normally distributed. Moreover, a visual inspection of the data showed that all dependent variables were displayed as a bell curve. For outliers, we checked for univariate outliers on dependent variables, and no participants fell outside ±3.29 *SD* (Tabachnick & Fidell, 2006). Moreover, we checked for multivariate outliers with the Mahalanobis distance. None were found.

As the main objective of Study 1 was to validate the TEIQue in a sports sample, we planned to verify the theoretical four-factor structure of the TEIQue through a confirmatory factor analysis (CFA) with the software Amos 17 (PASW Statistics, Chicago). We used the CFA model presented in Freudenthaler, Neubauer, Gabler, Scherl, and Rindermann (2008), where 13 of 15 subscales are implemented. Two subscales (i.e., self-motivation and adaptability) are not integrated into any of the four factors but are directly integrated into the final TEIQue score. Goodness of fit was assessed with the χ^2 index, the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). Following Hu and Bentler (1999), values below .08 for the SRMR and below .06 for the RMSEA show an acceptable fit. Regarding CFI and TLI, according to Hu and Bentler values higher than .95 indicate an acceptable model fit. We calculated reliability of scales and factors using Cronbach's α. Descriptive statistics are presented according to sex. Finally, we provide a correlation matrix of trait EI together with the other demographic variables, age, expertise level, type of sport, and years of training.

Results

CFA of the TEIQue with a sports sample

The CFA revealed that the theoretically expected four factors of the TEIQue provided an appropriate data fit, $\chi^2(59) = 291.6$, $p < .001$, SRMR = .09, RMSEA = .06, TLI = .95, CFI = .96. Standardized factor loadings, obtained through standardized regression weights, were found to be included between .44 and .89 (see Fig. 1). Cronbach's α for the subscales fell between .64 and .85 (see Table 1) with two subscales showing a low Cronbach's α: motivation ($\alpha = .54$) and adaptability (.58). Reliability at the factor level was found to be acceptable (from $\alpha = .77$ to $\alpha = .83$) and excellent regarding the global score ($\alpha = .90$).

Sex differences

Descriptive statistics related to sex are presented in Table 1.

Correlations between the TEIQue and demographic variables

The correlation matrix is presented in Table 2. Trait EI score was significantly correlated with age ($r = .14$, $p < .001$). No significant correlations were found with type of sport (i.e., individual vs. team), expertise level, or years of training.

Discussion

The aim of Study 1 was to investigate the factor structure of the TEIQue in a sports sample, using a CFA. The rationale for doing so was the emotional peculiarities of the sports context (Johnson et al., 2006), in which athletes regularly face the pressure of training and competitions. This environment thus differs greatly from the participants' environments in the original validation studies performed in the general population (Mikolajczak, Luminet, et al., 2007; Petrides, 2009b).

The four-factor theoretical structure of the TEIQue was found to provide an appropriate fit to the data in this sports sample. Standardized factor loadings were higher than .40, as recommended by Tabachnick and Fidell (2006). Therefore, this study supports the use of the TEIQue to assess EI in athletes over other EI scales that failed to replicate the factor structure of the original instrument in a sports sample, that is, the Bar-On Emotional Quotient Inventory (Stanimirovic & Hanrahan, 2012) and the Schutte EI Scale (Lane, Meyer, et al., 2009). Two subscales showed a low Cronbach's α: motivation ($\alpha = .54$) and adaptability ($\alpha = .58$). In the French validation, the Cronbach's αs of those subscales were also among the lowest: for motivation $\alpha = .66$ for men, and for adaptability $\alpha = .69$ for men and $\alpha = .67$ for women. We might have obtained the even lower value in our sports sample because these constructs have a specific meaning in sports. For example, motivation in sports is best assessed with the recently revised Sport Motivation Scale (Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013). Regarding adaptability, sports require adaptation to a specific competitive environment (Johnson et al., 2006), which differs from the environment of the general population regarding the pressure and challenges it offers.

The findings with demographic variables are now discussed. A positive relationship was found between trait EI and age, as in the validation study of the French version of the TEIQue (Mikolajczak, Luminet, et al., 2007). This illustrates that more life experience is linked with the use of more adaptive emotion regulation strategies (Yeung et al., 2011).

Regarding sex differences, men were found to score significantly higher than women on two factors, namely, self-control and sociability. This is in line with the empirical results of Mikolajczak, Luminet, et al. (2007). However, no significant difference was found regarding the global trait EI score (Cohen's $d = .11$). Findings

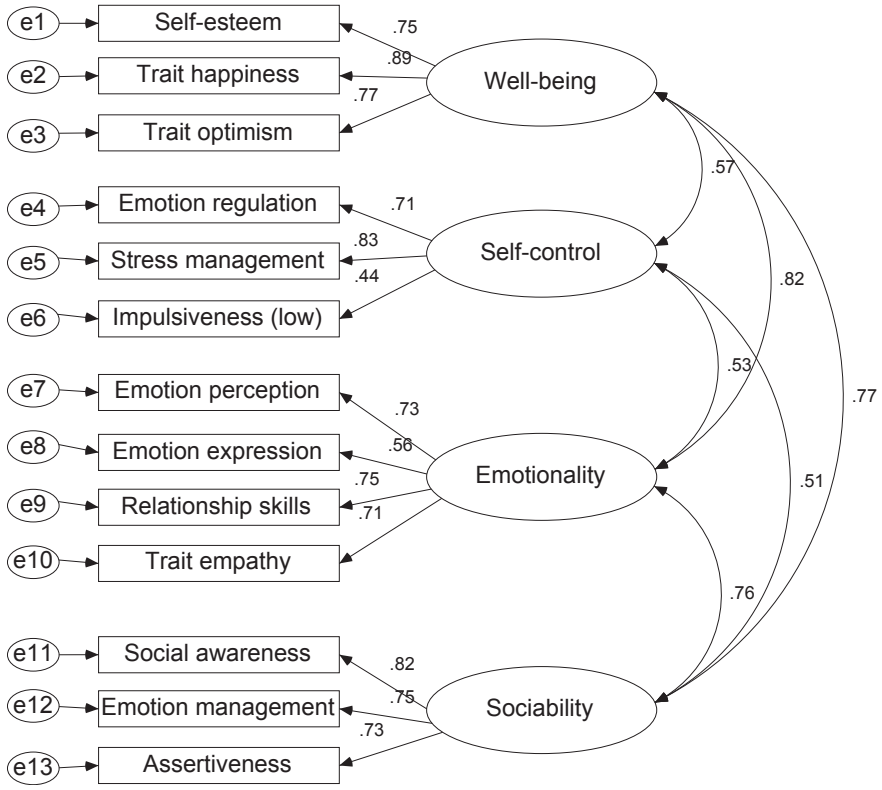

Fig. 1. Standardized factor loadings for the trait emotional intelligence questionnaire in a sports sample.

concerning self-control are explained in terms of social emotion differences for men and women, namely, that men should not display emotions, and by the fact that men usually cope better with stress than women, as was shown in previous research (e.g., Ben-Zur & Zeidner, 2011). The fact that no differences were found between male and female athletes on the main score differs from the results of the French validation study (Mikolajczak, Luminet, et al., 2007), and further research should investigate if sex differences can be expected in sports. Yet, sex differences observed on two of the four main factors would argue for the establishment of separate norms for men and women in sports.

No relationship was found with the type of sport considered, which is in line with the findings of Kajbafnezhad et al. (2011). This can be interpreted as trait EI being equally important in individual and team sports.

No relationship was found between EI and expertise or years of training. This is contrary to what we expected, based on the findings that experts usually cope better with stress (Johnson et al., 2006; Laborde & Raab, 2013) and that training, acting on the parasympathetic system (Hedelin et al., 2000), should also have a positive effect on emotion regulation (Fenton-O'Creevy & Lins, 2012; Laborde et al., 2011). However, trait EI is not only a matter of stress management but consists of many other aspects, such as emotion perception and social awareness. In addition, our hypothesis regarding training was based on aerobic training, which is not the main aspect of many sports we considered in this study. These results show that EI is not a privilege of expert athletes and does not depend mainly on the level of training.

Table 1
Study 1: Trait Emotional Intelligence Questionnaire descriptive statistics according to sex.

	Men		Women		Cronbach's α	d
	M	*SD*	*M*	*SD*		
Self-esteem	4.76	.78	4.69	.84	.74	.10
Emotion expression	4.18	1.01	4.19	1.11	.81	.00
Self-motivation	4.57	.69	4.48	.73	.54	.13*
Emotion regulation	4.45	.74	4.26	.76	.70	.25**
Trait happiness	5.31	1.12	5.37	1.22	.85	−.05
Trait empathy	4.58	.82	4.73	.85	.67	−.18**
Social awareness	4.71	.77	4.59	.76	.70	.16*
Impulsiveness (low)	4.40	.78	4.30	.79	.68	.12
Emotion perception	4.51	.78	4.47	.83	.67	.05
Stress management	4.54	.87	4.28	.82	.69	.31**
Emotion management	4.52	.88	4.38	.89	.73	.16*
Trait optimism	4.66	.87	4.67	.93	.64	−.02
Relationship skills	5.10	1.03	5.14	.96	.74	−.04
Adaptability	4.36	.66	4.30	.70	.58	.09
Assertiveness	4.53	.79	4.40	.85	.64	.17*
Well-being	4.91	.80	4.91	.88	.83	.00
Self-control	4.46	.63	4.28	.61	.78	.29**
Emotionality	4.59	.70	4.63	.72	.77	−.05
Sociability	4.59	.69	4.46	.72	.81	.19**
Trait EI score	4.61	.54	4.55	.57	.90	.11

*$p < .05$. **$p < .01$.
Note. EI: emotional intelligence.

Table 2
Study 1: Correlation matrix showing relationship between trait emotional intelligence and demographic variables.

	Age	Type of sport	Expertise level	Sport participation (years)	Trait EI score
Age	–				
Type of sport	−.30**	–			
Expertise level	.04	−.02	–		
Sport participation (years)	.07*	−.0	−.01	–	
Trait EI score	.14**	−.05	.05	.01	–

Note. EI: emotional intelligence; Coding: Type of sport (individual: 1; team: 2).
*$p < .05$. **$p < .01$.

A limitation of Study 1 is that we used a classic factor analysis approach (i.e., CFA), as was done in previous TEIQue validation studies (e.g., Freudenthaler et al., 2008), but the use of more modern analyses such as item response theory (for an example, see Cooper & Petrides, 2010) or Rasch modeling (e.g., Strauss, Büsch, & Tenenbaum, 2012; Yan & Ching Mok, 2011) could have provided more details for the validation. Therefore, future studies are warranted to investigate the TEIQue psychometric properties in sports samples using those advanced analyses to obtain more information about measurement precision across the range of latent factors of the TEIQue. Another limitation is that we had athletes from 32 different sports, which forced us to find a way to standardize the assessment of expertise with a Likert scale, as the labeling of competitive levels differs very much from one sport to the next. This issue could be addressed by focusing on the assessment of trait EI in specific sports to obtain a clearer measure of expertise level. Finally, the way we assessed training as the number of years of practice constitutes a limitation, because there can be important differences in the number of hours of training, the type of training, and the frequency of exposure to competition settings among individuals.

In summary, Study 1 showed that the original four-factor structure of the TEIQue could be replicated in a sports sample. Relationships with demographic variables were explored, showing mainly a relationship of trait EI with age. Knowing that the structure can be replicated in a sports sample is a first step, but an integrative view of how trait EI might influence sports performance is still lacking. We used a path analysis approach in Study 2 to better understand the influence of trait EI on sports performance.

Study 2

The aim of Study 2 was to test a model of how trait EI might influence sports performance through stress appraisal and coping behaviors, that is, how an emotion-related trait is linked to emotion-related state variables. Sports performance is here operationalized as sports performance satisfaction, this variable providing a reliable and meaningful way to assess athletes' performance across individuals and different sports (Nicholls, Polman, & Levy, 2012). Performance satisfaction was deemed an appropriate measure of performance because of the subjective nature of performance and the fact that environmental factors (e.g., opponent, weather) can influence objective performance measures (Males & Kerr, 1996; Nicholls et al., 2012; Terry, 1995). Finally, assessing performance satisfaction makes it possible to compare performance among athletes competing in a variety of different sports, at different expertise levels, and playing at different positions (Nicholls et al., 2012). We based our approach on previous work establishing the relationship between stress appraisal, coping strategies, coping effectiveness, and performance satisfaction (Haney & Long, 1995; Nicholls et al., 2012). These studies used a path analysis approach to explain how emotion-related constructs such as stress appraisal, emotion valence, and coping behaviors are related to performance satisfaction. However, these studies considered only state aspects of emotions, and in our approach we additionally wanted to take into account more stable characteristics linked to emotions through trait EI.

The above-mentioned path analyses (Haney & Long, 1995; Nicholls et al., 2012) were based on the conceptualization of Lazarus (1999), for whom appraisal was a central construct in the relationship between stress, coping, and emotions. Appraisal reflects the evaluation made by an individual about the environment in relation to personal goals, beliefs, or values (Lazarus, 1999). In stress appraisal, perceived intensity, perceived controllability, and relational meaning (i.e., whether a stressor is viewed as a challenge or a threat) all play a role. Perceived intensity refers to the intensity of the feelings that the appraisal of a stressor generates (Lazarus, 1999; Nicholls, Levy, Grice, & Polman, 2009). Perceived controllability refers to a person's sense of control during a stressful encounter and reflects the potential effectiveness of a coping strategy for managing stress (Lazarus, 1999; Nicholls et al., 2009). Relational meaning comes into play when the individual evaluates a situation based on its importance and potential outcome (Lazarus, 1999). Perceiving a future gain and an attractive struggle results in a challenge appraisal, and perceiving a future harm results in a threat appraisal.

After stress appraisal the individual chooses a strategy for coping with the stressful event (Lazarus, 2000). Coping reflects "a constantly changing cognitive and behavioral effort to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). In this paper we use the conceptualization of coping that has received the most support in sports recently (Gaudreau & Blondin, 2002), identifying three higher order dimensions: task-oriented coping, disengagement-oriented coping, and distraction-oriented coping. Coping effectiveness has been defined as "the degree in which a coping strategy or combination of strategies is or are successful in alleviating the negative emotions caused by stress" (Nicholls & Polman, 2007). Performance satisfaction reflects the athlete's own athletic performance perception (Nicholls et al., 2012). The links between these variables are expected to be similar to those found in the previously mentioned path analyses (Haney & Long, 1995; Nicholls et al., 2012) and are depicted in Fig. 2.

We now clarify the expected relationships between these emotion-related state variables and trait EI (see also Fig. 2). Regarding stress appraisal, trait EI is expected to be positively related to perceived controllability, given that perceiving a stressor as controllable appears to be linked to a better coping output (Diener, Kuehner, Brusniak, Struve, & Flor, 2009) and negatively related to perceived intensity, given the negative relationship between trait EI and the intensity of negative affect when facing a stressful event (Laborde et al., 2010; Mikolajczak, Roy, Luminet, Fillée, & de Timary, 2007). Regarding relational meaning (i.e., challenge vs. threat), a direct link with trait EI is expected. More specifically, people with high trait EI are expected to view stressors more as a challenge (positive relationship with trait EI) than a threat (negative relationship with trait EI), according to Mikolajczak and Luminet (2008). Regarding the use of coping strategies, trait EI is expected to be positively related to the use of task-oriented coping and negatively related to the use of distraction-oriented and disengagement-oriented coping (Laborde et al., 2012). This relationship is thought to occur indirectly through stress appraisal and relational meaning, as depicted in Nicholls et al. (2012). Trait EI is expected to be connected indirectly to coping effectiveness through stress appraisal and coping strategies, based on Nicholls et al. (2012). Finally, trait EI is expected to be connected indirectly to performance satisfaction through stress appraisal, coping strategies, and coping effectiveness, based on Nicholls et al. (2012).

The aim of Study 2 was to understand how trait EI is related to sports performance satisfaction. We used a path analysis approach, completing previous research that considered only the influence of emotion-related state variables on performance satisfaction, here integrating an emotion-related trait variable with trait EI. The hypothesized model is depicted in Fig. 2.

Method

Participants

Two samples of sports science students training for sports competitions were taken, one from Ecuador (n = 128, 95 men, 33 women, M_{age} = 22.40 years, SD = 4.41, age range: 17–40 years,

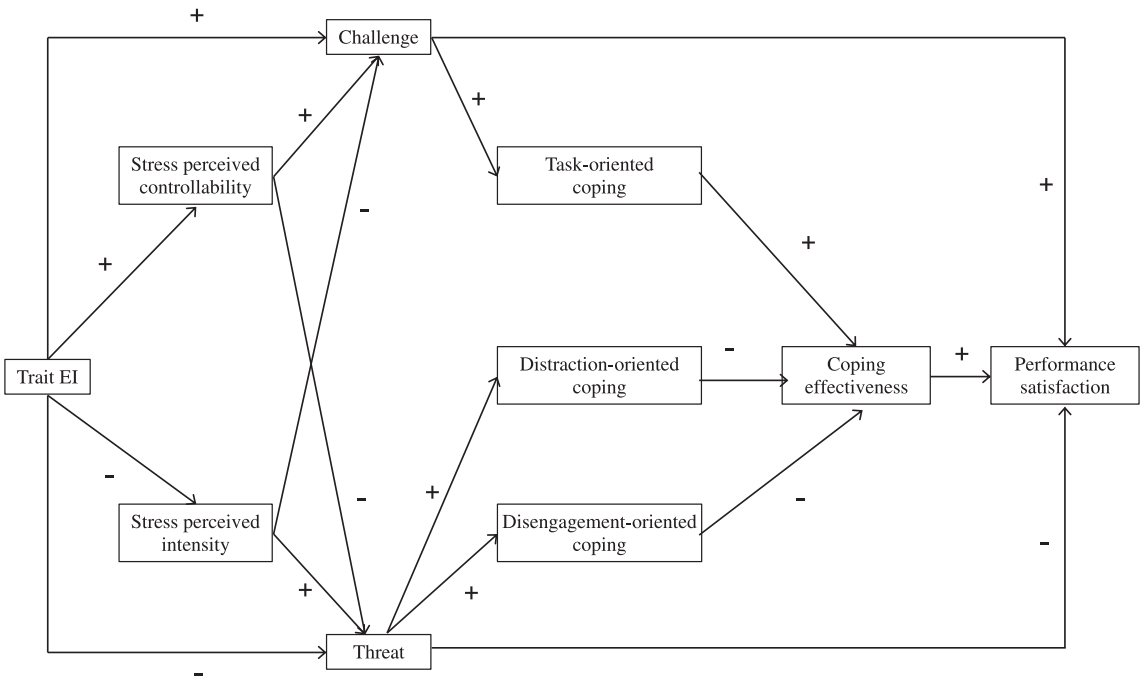

Fig. 2. Hypothesized model concerning the relationship between trait emotional intelligence (EI), stress appraisal, coping, coping effectiveness, and performance satisfaction.

$M_{\text{number of hours per week}} = 5.77$ h, $SD = 3.96$ h), and one from Spain ($n = 163$, 97 men, 66 women, $M_{\text{age}} = 22.68$ years, $SD = 4.74$, age range: 18–39 years, $M_{\text{number of hours per week}} = 5.57$ h, $SD = 3.66$ h). The study was approved by the ethics committee of each university.

Instruments

Trait Emotional Intelligence Questionnaire. Participants filled out the Spanish version of the TEIQue (Petrides, 2009b) described in Study 1.

Stress appraisal. For stress appraisal, we asked for perceived intensity and perceived controllability, based on Nicholls et al. (2009). Regarding perceived intensity, participants answered the question, "How intense was the stress you encountered?" on a Likert scale from 1 (*not intense*) to 5 (*extremely intense*). As a measure of the perceived controllability of the stress encountered, participants answered the question, "How much control did you have over your stress?" on a Likert scale from 1 (*no control*) to 5 (*total control*).

Challenge and threat appraisals (relational meaning). For challenge and threat appraisals, based on Cerin (2003), we used the following items: "I felt like the competition was a threat" and "I felt like the competition was a challenge." Participants were asked to rate how much they agreed with the statements on a Likert scale from 1 (*not at all*) to 5 (*extremely*).

Coping effectiveness. For coping effectiveness we asked participants, based on Nicholls et al. (2009), to "rate the degree to which the coping strategies used were effective in reducing the stress [they] experienced" on a Likert scale from 1 (*not effective*) to 5 (*very effective*).

Performance satisfaction. Participants rated their satisfaction with their athletic performance in the competition by responding to the question, "How satisfied were you with your performance?" on a Likert scale from 1 (*totally dissatisfied*) to 10 (*totally satisfied*), based on Nicholls, Polman, and Levy (2010).

Coping Inventory for Competitive Sports. Coping strategies were assessed using the Coping Inventory for Competitive Sport (CICS, Gaudreau & Blondin, 2002). The Spanish version (Molinero, Salguero, & Márquez, 2010) comprises 31 items and three dimensions: task-oriented coping ("I replaced my negative thoughts with positive ones"), distraction-oriented coping ("I occupied my mind in order to think about other things than the competition"), and disengagement-oriented coping ("I used swear words loudly or in my head in order to vent"). In the validated Spanish version, internal consistency of the subscales ranged from .70 to .82. In this sample they ranged from .67 to .79.

Procedure

Some of the data were collected in Ecuador and the rest in Spain. Data collection was realized during lectures, in the presence of the first author. Participants were all athletes and students in a sports science program. They were informed about the purpose of the study and were given the choice to participate. Participants first filled out the TEIQue and then the CICS with the items concerning stress appraisal, challenge and threat appraisals, coping effectiveness, and performance satisfaction. For the CICS, they were asked to recall the most stressful competition in which they had taken part over the last 6 months and to answer all items in relation to this competition. This retrospective methodology for studying coping behaviors has been used successfully in previous studies (e.g., Laborde et al., 2012). Total duration of the study was 45 min.

Data analysis

Data were first checked for normality and multivariate outliers with the Mahalanobis distance. No multivariate outliers were found. Second, we checked for differences between our two samples from Ecuador and Spain with a multivariate analysis of variance, taking the sample as independent variable and as dependent variables all the variables of interest for Study 2, as described in Table 3. No main effect of sample was found, $F(14, 276) = 1.388$, Wilks's lambda $= .934$, $p > .05$, so we decided to merge our two samples, making a total sample of $N = 291$. Third, to test how well

Table 3
Study 2: Correlation matrix of all variables.

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Stress perceived intensity	3.74	.92	–													
2 Stress perceived controllability	2.93	.99	−.23**	–												
3 Challenge	3.87	1.04	−.08	.31**	–											
4 Threat	2.79	1.31	.35**	−.36**	−.30**	–										
5 Coping effectiveness	3.32	.99	−.20**	.37**	.24**	−.18*	–									
6 Performance satisfaction	6.60	1.65	−.18*	.31**	.42**	−.34**	.59**	–								
7 Task-oriented coping	3.34	.57	0	.18*	.18*	−.09*	.29**	.25**	–							
8 Distraction-oriented coping	2.71	.72	.13*	−.14*	−.15*	.21**	−.19**	−.26**	.10	–						
9 Disengagement-oriented coping	2.52	.78	.18*	−.14*	−.19**	.26**	−.31**	−.38**	−.33**	.37**	–					
10 Trait EI: well-being	5.46	.70	−.05	.09*	.09	0	.10**	.06	.14*	−.08	−.17*	–				
11 Trait EI: self-control	4.52	.71	−.11	.19**	.13*	−.14*	.20**	.13*	.15*	−.08	−.26**	.50**	–			
12 Trait EI: emotionality	4.77	.62	−.01	.27**	.30**	−.18*	.14*	.24**	.23**	−.07	−.19*	.49**	.39**	–		
13 Trait EI: sociability	4.73	.68	.02	.17**	.11	−.12*	.09	.09	.15*	−.10	−.15*	.61**	.41**	.65**	–	
14 Trait EI: global score	4.84	.54	−.05	.23**	.20**	−.13*	.16*	.16*	.22**	−.11	−.25**	.80**	.73**	.80**	.82**	–

*$p < .05$. **$p < .01$.
Note. EI: emotional intelligence.

the hypothesized model fit our data we performed a path analysis using AMOS 17. As indicators of fit we report the χ^2 statistic, CFI, RMSEA, and SRMR.

Results

Descriptive statistics and the correlation matrix can be found in Table 3. We first examined the overall fit of the hypothesized model (see Fig. 2). Due to interdependence on some of the constructs, note that we allowed intercorrelation of (1) the two dimensions of stress appraisal (perceived intensity and perceived controllability), (2) the two relational meanings (challenge and threat appraisal), and (3) the three coping dimensions (task oriented, distraction oriented, and disengagement oriented), respectively. This first model fit test showed an unacceptable fit to the data: χ^2 (24) = 96.537, $p < .001$; CFI: .87; RMSEA: .10; SRMR: .11.

To improve model fit, we made modifications to our hypothesized model (Fig. 3), based on the theory and modification indices provided by AMOS (Byrne, 2009). The following expected paths were found to be not significant and were therefore deleted from our model: between trait EI and perceived intensity of stress; trait EI and threat; and perceived intensity of stress and challenge. Moreover, a direct link was added from perceived controllability of stress to task-oriented coping, in addition to the indirect link through challenge appraisal; and from perceived controllability of stress to coping effectiveness, in addition to the indirect link through challenge appraisal and task-oriented coping. The final indices of the model fit are χ^2 (24): 47.479, $p < .001$; CFI: .96; RMSEA: .059; SRMR: .063.

Discussion

The aim of this study was to test a path analysis model in order to understand how trait EI might influence sports performance satisfaction. A final model showed good fit indices after the hypothesized model underwent a couple of modifications. This final model helps explain how an emotion-related trait variable, trait EI, can influence sports performance satisfaction through a path that integrates emotion-related state variables, namely, stress appraisal, coping strategies, and coping effectiveness.

An acceptable model fit was obtained by deleting several links from our hypothesized model. The first was between trait EI and perceived intensity of stress. Contrary to what we hypothesized based on previous research (Laborde et al., 2010; Mikolajczak, Roy, et al., 2007), athletes with a higher trait EI did not appraise stressful situations as being so stressful. Our results suggest that regarding stress appraisal, the action of trait EI might happen more at the level of perceived controllability of stress, due to the importance of perceived controllability in effective emotion regulation (Diener et al., 2009). Second, it appears that trait EI has no direct link with threat appraisal, whereas it does have one with challenge appraisal. Past findings showed that low trait EI individuals appraise events more as a threat than high trait EI individuals (Mikolajczak & Luminet, 2008), which was also confirmed in our correlation matrix ($r = -.13$, $p = .024$), but this direct link did not appear in our model. However, we found that trait EI was connected to threat appraisal indirectly, through perceived controllability of stress. Perceived controllability is associated negatively with a threat appraisal of stress, which is in line with the adaptive role of perceiving and focusing on the controllable aspects of the stressor (Diener et al., 2009). Third, perceived intensity of stress has no link with challenge appraisal, but it is linked with threat appraisal, which is partially in line with the empirical findings of Nicholls et al. (2012) and the theoretical perspective of Lazarus (1999). More specifically, Lazarus (1999) argued that both challenge and threat relational meanings indicate that an individual is experiencing stress, and they should consequently be related to perceived intensity of stress. When taking the direct bivariate correlations, Nicholls et al. (2012) found a higher correlation between perceived intensity of stress ("stressfulness" in their paper) and threat appraisal ($r = .66$, $p < .01$) than between perceived intensity of stress and challenge appraisal ($r = .32$, $p < .01$). In our case, the direct bivariate correlation between perceived intensity of stress and challenge appraisal was not significant ($p > .05$), while the correlation between perceived intensity of stress and threat appraisal was significant ($r = .35$, $p < .01$). This discrepancy can be explained by the different ways used to assess the constructs in the two studies. Nicholls et al. (2012) used the stress appraisal measure (Peacock & Wong, 1990). We used single items used in previous research (Cerin, 2003; Nicholls et al., 2009, 2010), because the stress appraisal measure was not available in Spanish. Finally, of interest is the fact that like in our path analysis, the path analysis of Nicholls et al. (2012) revealed a significant link between perceived intensity of stress and threat appraisal. However in our study, contrarily to Nicholls et al., the link between perceived intensity of stress and challenge appraisal was not significant. This suggests that when the relationships of all variables are modeled together, perceived intensity of stress is exclusively linked to threat appraisal and no longer to challenge appraisal. This finding has important practical implications, as an intervention targeting the way athletes perceive stress intensity might decrease their tendency to appraise the related events as threats.

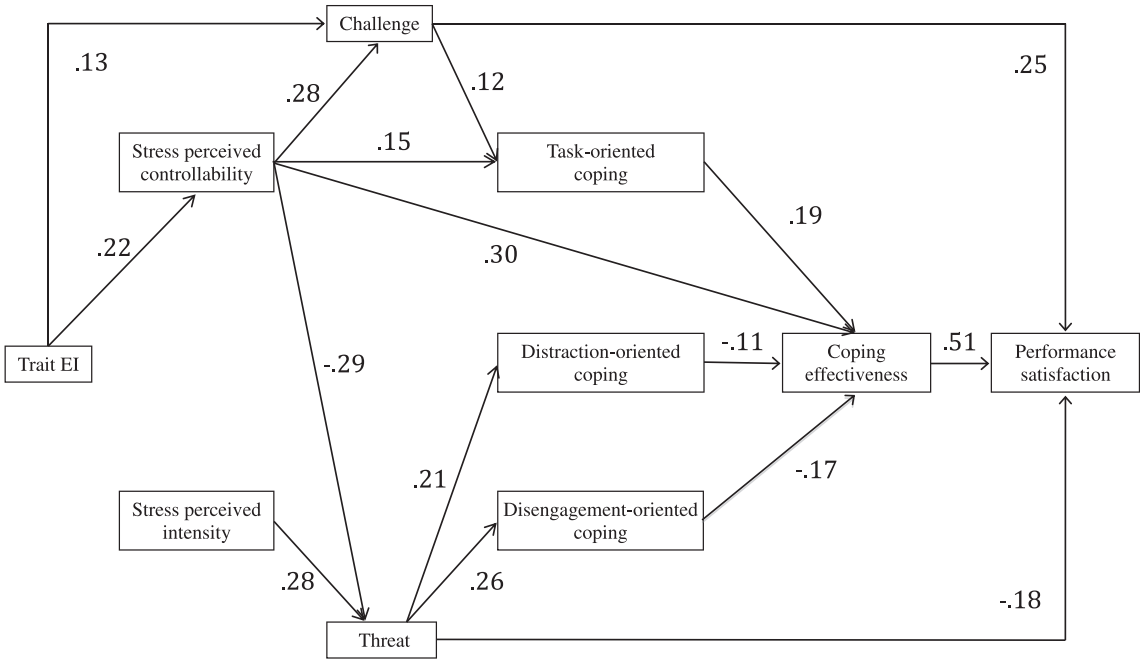

Fig. 3. Final model of the relationship between trait emotional intelligence (EI), stress appraisal, coping, coping effectiveness, and performance satisfaction. Standardized regression weights are indicated. All paths displayed are significant ($p < .05$).

Regarding the additions to the hypothesized model, a direct link was added between perceived controllability of stress and task-oriented coping. This shows that perceived controllability has not only an indirect effect on task-oriented coping through challenge appraisal, but also a direct effect on adopting strategies directed toward the stressor, as suggested by Lazarus (1999). Lazarus specifically mentioned that when people feel potential control over the stressor, they are more likely to use a problem-focused coping strategy, which can be linked to task-oriented coping with our classification. These findings complete previous research that found that trait EI is related to task-oriented coping (Laborde et al., 2012), via indirect paths through perceived controllability of stress and challenge appraisals.

A direct link was also found between perceived controllability of stress and coping effectiveness, in addition to the indirect link through challenge appraisal and task-oriented coping. This is in line with the fact that the more athletes perceive their stress to be controllable, the greater the chance they will cope effectively with the stressor (Diener et al., 2009). This again strengthens the importance of having the perception that one's stress is controllable. This last observation reveals the key role perceived controllability of stress plays, as a mediator of trait EI, in reaching high sports performance satisfaction, through its direct connection to coping effectiveness and indirect connection to challenge appraisal and task-oriented coping.

Our study has some limitations. First, we used a retrospective design to assess the emotion-related state variables, whereas they would be best captured by assessing them as near as possible to the competition (Nicholls et al., 2012). Second, among the emotion-related variables, emotions per se were not considered in our study and therefore require further attention, as trait-based EI has been related to the experience of positive emotional states (Lane & Wilson, 2011). Third, several observed variables in our model represent single-item variables (e.g., challenge and threat, coping effectiveness). To improve final model reliability, future research using a path analysis approach on related topics should aim to include whenever possible scales instead of single items, such as the stress appraisal measure (Peacock & Wong, 1990) used by Nicholls et al. (2012). Finally, this path analysis used only self-report measures, and it would be useful to introduce objective measures of stress that have been linked to trait EI, such as cortisol (Laborde et al., 2014; Mikolajczak, Roy, et al., 2007) and heart rate variability (Laborde et al., 2011), to bring earlier findings together and to reach a more comprehensive understanding of the influence of trait EI in sports.

General discussion

This research project aimed to investigate the validity of trait EI in sports, first examining the replication of its factorial structure in a sports sample and then exploring its relationship with stress appraisal, coping behaviors, and performance satisfaction. Study 1 showed that the original four-factor structure of the TEIQue could be replicated in a sports sample, making the TEIQue a reliable instrument to assess EI in sports, in contrast to other self-report inventories whose factor structures have been shown to be problematic in sports samples, such as the Bar-On Emotional Quotient Inventory (Stanimirovic & Hanrahan, 2012) and the Schutte EI Scale (Lane, Thelwell, Lowther, & Devonport, 2009). A theoretical consequence is that the TEIQue can be applied to sports, going against the claims that there should be a sports-specific EI measure. In Study 2 we presented a path that illustrates the way trait EI could influence sports performance satisfaction through emotion-related state variables. Perceived controllability of stress appeared to be a key mediator of trait EI in this path analysis, showing the importance of focusing on the controllable vs. the noncontrollable aspects of one's stress. The implementation of trait EI screening in sports seems a promising avenue, because of its potential to enhance sports performance satisfaction. EI training in sports could also be warranted, in particular to increase the perceived control over stressful events athletes might encounter in competitive situations. Finally, using the TEIQue with athletes may help them take a step toward psychological support. Athletes are used to things that are quantifiable, measurable (e.g., a score, a time, a record) and are sometimes

reticent to talk about what they feel, so sports psychologists have to find other ways to make them express what they feel, such as writing (Mankad, Gordon, & Wallman, 2009). The TEIQue could thus be used as a mediator, because athletes can obtain something measurable from it, a score on the different subscales and factors, that the sports psychologist could then use as a basis for discussion, when comparing those results to a norm.

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