

TRAIT EMOTIONAL INTELLIGENCE: FOUNDATIONS, ASSESSMENT, AND EDUCATION

EDITED BY: Juan-Carlos Pérez-González, Donald H. Saklofske and
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TRAIT EMOTIONAL INTELLIGENCE: FOUNDATIONS, ASSESSMENT, AND EDUCATION

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Editorial: Trait Emotional Intelligence: Foundations, Assessment, and Education

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Editorial on the Research Topic

Trait Emotional Intelligence: Foundations, Assessment, and Education

INTRODUCTION

Trait Emotional Intelligence (Trait EI) theory was introduced by Petrides in 2001 and “describes our perceptions of our emotional world: what our emotional dispositions are and how good we believe we are in terms of perceiving, understanding, managing, and utilizing our own and other people’s emotions” (Petrides et al., 2018, p. 50). Although there are still different conceptualizations, models, and measures (self-reports or other-reports) of EI, so far only the Trait EI theory (see Petrides et al., 2007a,b; Mavroveli et al., 2009; Petrides D. et al., 2016; Petrides K. V. et al., 2016) offers a comprehensive scientific framework in which to interpret the diverse results of independent empirical research in a way consistent with the longstanding study of individual differences in personality and emotion throughout the lifespan (e.g., Revelle and Scherer, 2009).

The present Research Topic consists of 28 accepted articles on various aspects of Trait EI that stemmed from the collaboration of 97 authors. Each paper reflects rigorous scientific methods to bring together empirical and theoretical research on the construct validity of Trait EI, and to document the most recent advances across the life span. This collection of articles covers a broad scope of subjects, contributed by world-renowned experts in the neurosciences, personality psychology, clinical psychology, developmental psychology, emotions psychology, and education.

CONCEPTUAL CLARIFICATION

We agree with Ross Buck that the eventual outcome of emotional education is a greater or lesser degree of Emotional Competence. He defined Emotional Competence for the first time in a scientific paper as “the ability to deal effectively with emotional information -that is, with one’s feelings and desires” (Buck, 1990, p. 30, see also Buck, 2014). That same year, Emotional Intelligence (EI) was also presented as a new construct and meticulously analyzed for the first time in a journal article, where it was defined as “the subset of social intelligence that involves 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” (Salovey and Mayer, 1990, p. 189). As it happens, 2020 marks 30 years since the beginnings of both the concepts of Emotional Competence and EI in psychological science.

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Emotional Competence has been used as an umbrella term and as a multifaceted construct encompassing a collection of emotion-related skills (e.g., emotion knowledge, emotion perception emotion regulation), abilities, and dispositional qualities (e.g., emotional self-efficacy), that enable an individual to function effectively in emotion-laden situations (Davis and Qualter, 2020). While the concept, or at least the general idea, of Emotional Competence has occasionally been used in literature that is lacking a comprehensive theory or model, EI has attracted unprecedented scientific attention and publications over the last 30 years, and it has become the unifying framework for describing and assessing multiple components of Emotional Competence.

The EI literature has progressively led to “two primary research streams” (Barchard et al., 2016, p. 289), according to which EI can be conceptualized and measured in two distinct, albeit, complementary constructs (Petrides, 2001; Pérez et al., 2005; Stough et al., 2009; Keefer et al., 2018); (1) as a typical performance tested personality trait (Trait EI), representing behavioral dispositions and perceptions of emotion-related competencies (Pérez-González and Sanchez-Ruiz, 2014; Petrides K. V. et al., 2016); or (2) as a maximum performance construct, comprising a set of intellectual abilities for reasoning about emotion (Ability EI; Mayer et al., 2016). Taken together, these two approaches to EI correspond conceptually and operationally with many aspects of Emotional Competence (Davis and Qualter, 2020). Given that Trait EI is conceived as a personality trait and Ability EI as a type of intelligence, Alba-Juez and Pérez-González (2019) suggested that the former might be reinterpreted as the non-cognitive/automatic (temperamental) component of Emotional Competence while the latter might be interpreted as the cognitive/conscious component.

Trait EI is the construct that empirical and meta-analytical evidence has consistently demonstrated to have greater criterion validity (for a summary, see Pérez-González and Qualter, 2018). In fact, Trait EI is consistently positively and significantly related to the most relevant areas of interest for prosperity and happiness in life across the life span, such as well-being, health, romantic and social relationships, leadership, psychosocial adjustment, academic performance, or job performance, and job satisfaction (e.g., Andrei et al., 2016; Keefer et al., 2018; Lea et al., 2018; Di Fabio and Saklofske, 2019; Sarrionandia and Mikolajczak, 2019; Piqueras et al., 2020).

The collection of the papers that constitute this Research Topic clearly support and extend the criterion validity of Trait EI.

FOUNDATIONS

A collection of 13 articles expand the nomological network of Trait EI and explore current and new interpretations of the construct or its facets, together constituting a contribution to the foundations of Trait EI theory.

Three papers present new integrative models of EI: Vesely-Maillefer et al. introduce and test a theoretical framework explaining how Trait EI, Ability EI and emotion information processing are related to each other and jointly predict

performance in a Theory of Mind task in university students. Agnoli et al. test a model of the combined explanatory role of both Trait EI and fluid non-verbal intelligence in emotional awareness in children, adding to an under-investigated area. Hughes and Evans discuss the Integrated Model of Affect-related Individual Differences (IMAID) as an integrated mediation model in which emotion regulation mediates the effects of ability EI and affect-related personality traits upon outcomes thereby opening a new line of research for future studies focused on testing the validity of this model.

Szczygiel and Mikolajczak (a) show how extraversion predicts greater likeability among adolescents who score high on the interpersonal dimension of Trait EI in contrast to adolescents who score low on this dimension. This demonstrates the moderating role of interpersonal Trait EI in the relationship between extraversion and peer-rated likeability. In a different study, Szczygiel and Mikolajczak (b) demonstrate how Trait EI buffers the deleterious effects of anger and sadness on burnout in a sample of female nurses.

With regard to the importance of Trait EI for health and well-being: Aslanidou et al. examine the Trait EI and general health profiles of parents with and without drug addiction, and also explore the existence of group differences in Trait EI between the offspring of the two groups of parents. Espinosa and Kadić-Maglajlić report a negative relationship between Trait EI and unhealthy behaviors relative to health-promoting ones in a university sample, observing that health consciousness mediated that relationship. Gómez-Baya and Mendoza's study focuses on how trait meta-mood dimensions function as predictors of adaptive response styles to negative affect (i.e., depressive rumination and distraction) and to positive affect (i.e., emotion-focused and self-focused positive rumination and dampening) in adolescents. Sarrionandia et al. present cross-cultural research examining the role of Trait EI as a negative predictor of perceived stress among university students from the United States and Spain through resilience as a mediating variable. Merchán-Clavellino et al. explore the mediating role of trait meta-mood dimensions in the relationship between the motivational BIS/BAS systems (i.e., Behavioral Activation/Approach System and the Behavioral Inhibition System) and affective states of positive and negative affect in university students.

Concerning the relationships between Trait EI and personality, Alegre et al. present a replication study of the Pérez-González and Sanchez-Ruiz's (2014) findings on the inter-relation between Trait EI and personality (i.e., the big five, the two super-factors, and the general factor of personality), using a different trait EI instrument with university students. In a detailed analysis, Fernández-Abascal and Martín-Díaz contribute two studies where they explore the relationships between Trait EI (global and factors scores) and trait meta-mood dimensions with both empathy and non-verbal sensitivity (i.e., people's ability to recognize the communication of feelings, attitudes, and intentions from non-verbal expressions in faces, voice, gestures, and body postures) in university students.

Finally, Smith et al., inspired by computational cognitive neuroscience (CCN), present a novel narrative review of a set

of parameters that can be considered candidates for biological markers of different facets of Trait EI. This research has implications for expanding the neural basis of the construct as well as opening a new complementary assessment method to estimate Trait EI through objective measurements.

ASSESSMENT

Since the measurement of EI is a matter of traditional interest in the field, this Research Topic includes four articles focused on instruments for the assessment of the construct or certain of its facets. Austin et al. present two studies on the development and validation of two short forms of the Managing the Emotions of Others (MEOS) Scale, which provides an assessment of the interpersonal emotion regulation facet of Trait EI. Its relationship with global Trait EI, the Big Five, and the dark triad is subsequently explored. Additionally, two articles present the psychometric properties of the Chinese short form (i.e.,) (Feher et al.) and Italian full form (i.e.,) (Chirumbolo et al.) of the Trait Emotional Intelligence Questionnaire (TEIQue) with samples of university students. O'Connor et al. present a comprehensive narrative review of the six major measures of EI in terms of factor structure, reliability, and validity, providing a practical guide with recommendations focused primarily on how to choose between EI constructs (e.g., Ability EI, Trait EI) as well as how to select and use different assessment instruments.

EDUCATION

Finally, 11 articles present direct implications of Trait EI for child and youth development as well as applications in educational settings.

Concerning the role of Trait EI as a predictor of educational and vocational outcomes in youth, three papers make a novel and valuable contribution. From Canada, in a longitudinal investigation, Dave et al. studied a cohort of 1,400 youths at three time points, at age 20–21 years, at age 22–23, and at age 24–25. At each time, they assessed the participants' self-reported educational status, while in the first and third periods they also assessed Trait EI. Their results constitute strong support that higher Trait EI is associated with greater likelihood of pursuit of post-secondary education. From Lebanon, Sanchez-Ruiz and Khouri explore the validity of a model of prediction of academic performance in university students using a novel combination of competing predictors, among which conscientiousness and motivational variables are confirmed as direct predictors, while Trait EI exerts various indirect effects. Farnia et al., using a university sample from United States, investigate the criterion and incremental validity of Trait EI over the Big Five personality traits in career indecisiveness, as well as the role of positive and negative affect mediating this relationship.

Five papers examined how Trait EI contribute to affective processes and mental health. Piqueras et al. test the criterion and incremental validity of Trait EI in the prediction of child psychosocial adjustment, over and above anxiety, depression

and sociometric profiles, with particular attention to the role of gender moderating this relationship. In a 1-year longitudinal study, Davis et al. analyze both the separate and combined predictive validity of Ability EI and Trait EI on the maintenance of depressive symptoms and loneliness in middle childhood, also considering the effect of gender. Mestre et al. examine how gender mediates the relationship between emotional states and both dispositional mindfulness and Trait EI in children and adolescents. Foster et al. explored the relationship between dispositional mindfulness, Trait EI, anxiety and depression in adolescents, focusing on how different facets of Trait EI moderate the relation between mindfulness and anxiety and the relation between mindfulness and depression. Using a sample of young adults (i.e., university students), Guil et al. investigate the mediating role of trait meta-mood dimensions in the relationship between self-esteem and trait and state anxiety.

Finally, three papers focused on Trait EI at school. Li et al. study the direct and indirect effects of teachers' Trait EI on self-rated job performance, using a multilevel model where the mediating role of job satisfaction is examined. Two papers test the efficacy of two emotional education programs for adolescents. Rodríguez-Ledo et al., explore the correlations between mindfulness and two questionnaires of Trait EI, an empathy scale, and psychosocial adjustment. They also tested the effectiveness of an emotional education program on some facets of mindfulness. Filella et al. analyze the effectiveness of a gamified emotional education software on Trait EI facets, state anxiety, and academic performance.

SUMMARY

The collection of articles that comprise this monograph are a testament to the diversity and scientific rigor that is currently characterizing research activity in the study of Emotional Intelligence. At a theoretical level, this special issue demonstrates: (a) the need to integrate and unify emotional intelligence models; (b) the recognition of the prominent place of Trait EI theory in that pursuit; and (c) the promise of elucidating the neuroscientific bases of the construct. On a methodological level, the frequent use of the statistical techniques of moderation/mediation (i.e., 10 out of 26 empirical studies) is a welcome development in order to understand better the mechanisms via which Trait EI relates to other constructs. Regarding measurement, the pre-eminence of the TEIQue is verified as the gold standard for the comprehensive assessment of Trait EI and the operationalization of EI. Finally, on a practical level, it is evident, on the one hand, of the usefulness of considering Trait EI as a key explanatory variable in personal, social, educational and vocational development, and, on the other, the growing diversity of educational approaches for the improvement of Trait EI.

We thank all of the authors who contributed their research to this special issue. The quality and diversity of these research investigations have added significantly to our theoretical and

empirical descriptions of EI but have also provided direction for the continuing development of the huge potential that EI has to offer. In this regard, we hope that this special edition of research papers will inspire and provide the basis for future studies that will push forward the frontiers of our knowledge on how to be more emotionally competent. Such contributions can help us move closer to the global goals for sustainable development championed by the United Nations, such as good health and well-being, quality education, decent work and economic growth, and peace, justice and strong institutions.

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Is It Enough to Be an Extrovert to Be Liked? Emotional Competence Moderates the Relationship Between Extraversion and Peer-Rated Likeability

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Likeability represents one of the aspects of social status in a peer group and refers to the extent to which one is accepted, preferred by others, and perceived as a likeable companion. Previous research has demonstrated that likeability is partly determined by dispositional factors. One body of research shows that variance in likeability across individuals can be traced to personality traits, mainly extraversion and agreeableness. Another expanding body of research demonstrates that success in achieving peer acceptance is determined, in some part, by the emotional competencies (ECs) of an individual. In an attempt to combine these two approaches and to clarify some inconsistencies in the results concerning the personality-likeability relationships, this study was designed to examine the interactive effect of adolescents' personality traits (i.e., extraversion and agreeableness) and ECs on peer-rated likeability in adolescence. A sample of 230 adolescents (47% female) from two comprehensive secondary schools in Poland completed measures of personality traits and ECs, as well as a sociometric assessment of likeability in their classrooms. The results demonstrated that interpersonal EC acts as a moderator in the relationship between extraversion and peer-rated likeability. Specifically, extraversion predicted greater likeability among adolescents with high interpersonal EC but not among adolescents with low interpersonal EC. The study yielded new insights into the determinants of likeability, as it demonstrates that adolescents need to be both extrovert and possess high interpersonal EC in order to be judged highly likeable by their peers. It also bears practical implications for the improvement of adolescents' position and acceptance within their peer group. The results suggest that encouraging "rejected" adolescents to reach out to others in an extrovert fashion is necessary but insufficient to increase their likeability. Improving their interpersonal EC is also necessary. The observation that higher levels of interpersonal EC helps adolescents to achieve higher acceptance in their peer group suggests the need to implement school training programs aimed at improving the core ECs (identification, understanding, expression, regulation and use of emotions).

Keywords: personality, trait emotional intelligence, emotional competence, adolescents, peer relations, social status, peer acceptance

INTRODUCTION

Much of human behavior is directed toward creating and maintaining social relationships with other people (Baumeister and Leary, 1995). The importance of belonging to a meaningful group is especially pronounced during adolescence (Steinberg, 2002; LaFontana and Cillessen, 2010). As adolescents begin to demand more autonomy, the influence of parents decreases at the expense of peer influence. The peer group becomes the psychosocial context within which adolescents experience social acceptance and rejection for the first time (Bukowski et al., 1993). For many adolescents, achieving high status in their peer group may be more important than achieving academic goals (Eccles and Roeser, 2011).

Indeed, attaining high status in and being accepted by the peer group serves important functions: the social status of adolescents increases their well-being (Newcomb et al., 1993), social (Meuwese et al., 2017) and emotional (Brendgen et al., 2005) functioning, as well as successful adaptation into school (Wentzel, 2003). It also increases access to potential mates and social support amidst adversity (Cillessen and Rose, 2005). Finally, it predicts future adjustment (Sandstrom and Cillessen, 2006) and better social functioning during adult life (Ostberg, 2003).

The social status of adolescents encompasses two categories: likeability and popularity (Cillessen and Rose, 2005). Likeability refers to the extent to which one is accepted, preferred by others and viewed as a likeable mate, whereas popularity refers to visibility, prestige and being central in the peer group (Cillessen and Rose, 2005). Likeable individuals are considered as friendly, prosocial, cooperative and exhibiting low levels of aggressive behaviors, whereas popular individuals are considered as friendly and attractive, but also dominant and occasionally aggressive (Engels et al., 2017; Lansu and Troop-Gordon, 2017). The correlations between likeability and popularity are modest (e.g., van der Linden et al., 2010), meaning that being popular does not necessarily translate into being liked, and being liked does not necessarily translate into being popular (Sandstrom and Cillessen, 2006; Boor-Klip et al., 2017).

This study focused on likeability and the effects of an individual's dispositions on peer-rated likeability in adolescence. The following sections review previous research focusing on the two relationships: personality and likeability, and emotional competencies (ECs) and likeability. In an attempt to bridge these two lines of research, this study was designed to examine the interactive effect of adolescents' personality traits (i.e., extraversion and agreeableness) and ECs on peer-rated likeability.

THE BIG FIVE PERSONALITY TRAITS AND LIKEABILITY

In the Big Five model of personality (McCrae and John, 1992), extraversion and agreeableness are considered to capture the social aspects of personality (Jensen-Campbell et al., 2002; Ozer and Benet-Martinez, 2006). *Extraversion* refers to the extent to which people are assertive, active, cheerful, talkative and energetic

(Costa and McCrae, 1992). Individuals high on extraversion are predisposed to experience positive emotions (Watson and Clark, 1997) and have a preference for seeking, engaging in and enjoying social interactions, whereas individuals low in extraversion prefer to spend more time alone and tend to be reserved, withdrawn and quiet in social settings (Costa and McCrae, 1992). *Agreeableness* refers to the extent to which people are motivated to achieve interpersonal intimacy (Costa and McCrae, 1992). People who score high on agreeableness are characterized by being caring, altruistic, tender-minded (Costa and McCrae, 1992) and responsive to the needs of others (Tov et al., 2016), whereas people who score low on agreeableness are characterized by being manipulative, self-centered and occasionally ruthless (Digman, 1990). Furthermore, highly agreeable individuals, compared to their less agreeable counterparts, tend to engage in more prosocial behaviors, respond more constructively to interpersonal conflicts, cooperate more during group tasks, and expend more effort to suppressing negative emotions in social situations (Tobin et al., 2000; Jensen-Campbell and Graziano, 2001).

There is evidence that extraversion and agreeableness play an important role in predicting peer acceptance in adolescence. Jensen-Campbell et al. (2002) reported positive correlations between both personality factors and peer acceptance in early adolescence. These results were corroborated by Lubbers et al. (2006), who demonstrated a positive relationship between extraversion and peer acceptance for boys and girls, and a positive relationship between agreeableness and peer acceptance for girls, but not for boys. Wolters et al. (2014) observed that peer acceptance correlated significantly more strongly with extraversion than with agreeableness. Likewise, van der Linden et al. (2010) reported positive correlations between both extraversion and agreeableness, and classroom ratings of likeability, but agreeableness lost its significance in predicting peer-rated likeability when other personality Big Five dimensions were examined simultaneously. Among college students, extraversion, but not agreeableness, correlated positively with peer reports on the quality of interpersonal relationships, that is, received social support (Lopes et al., 2004). In another study, Lopes et al. (2005) reported a significant and positive correlation between agreeableness and peer nominations of liking, but the correlation between extraversion and peer nominations was insignificant.

Overall, despite some inconsistencies in the results of the above-mentioned studies, it appears that the more extroverted and agreeable adolescents are, the more they are accepted by their peers. The inconsistency of the results, however, suggests that the relationship between personality and peer-rated likeability is more complex, and that the presence of moderators in this relationship may need to be taken into consideration. This study will look more closely at this issue by analyzing whether combinations of personality traits with other individual dispositions have unique effects on the prediction of likeability. We believe that individual differences in ECs constitute a particularly fruitful direction: an expanding body of research (presented in the following section) demonstrates that success in achieving peer acceptance is, in part, determined by the ECs of an individual.

EMOTIONAL COMPETENCE AND LIKEABILITY

Emotional competence (EC) – also labeled as “emotional intelligence” (EI) or “emotional skills” (ES) – refers to the extent to which people functionally identify, express, understand, regulate and use their own and others’ emotions (Saarni, 1990; Mayer and Salovey, 1997; Petrides and Furnham, 2003; Brasseur et al., 2013; Petrides et al., 2016). The term EI is more common to designate these individual differences, but the term EC seems more consistent with recent results showing that, unlike intelligence, these competences can be lastingly improved via relatively short trainings (Kotsou et al., 2011; Nelis et al., 2011). For this reason, and because in this study we operationalised EC through the Profile of Emotional Competence (PEC), the term “emotional competence” will be used hereafter. The reason why we used the PEC is twofold: first and foremost, it is the only EC measure that distinguishes clearly between the intrapersonal and interpersonal facets of each dimension. Second, it does not contain subscales that would correlate too much with extraversion and agreeableness, thereby decreasing the risk of collinearity.

Previous research has shown that the level of EC is associated with self-reported and peer-rated sociability in both children and adolescents. English and Dutch pupils who score high on EC receive more nominations from their classmates for being kind and cooperative, and for having leadership qualities (e.g., Mavroveli et al., 2007, 2009; Mavroveli and Sánchez-Ruiz, 2011). These results were replicated in a prospective design with adolescents (Frederickson et al., 2012). In addition to facilitating prosocial behavior, there is also evidence that EC decreases antisocial behavior: pupils who score high on EC present less externalizing behaviors (aggression and delinquency; Santesso et al., 2006) and receive less nominations for being bullies (Mavroveli and Sánchez-Ruiz, 2011). There is also growing evidence showing that EC is causally involved in these outcomes: when EC is enhanced through training, empathy increases and antisocial behaviors decrease (e.g., Castillo et al., 2013; Pour et al., 2014). In Castillo et al. (2013), adolescents in the EC training group ($N = 361$) reported lower levels of physical/verbal aggression, anger and hostility compared to students in the control group ($N = 229$). Additionally, the EC program was particularly effective in increasing males’ empathic abilities. Pour et al. (2014) found the same results in a smaller sample ($N = 40$) of primary school students.

THE CURRENT STUDY

To our knowledge, no study has investigated how personality traits and intrapersonal and interpersonal ECs might work together in predicting adolescents’ likeability in their peer group. We hypothesized that personality traits and ECs would both be primary predictors of peer-rated likeability in adolescence. We further hypothesized, however, that the links between personality traits and peer-rated likeability would be moderated by ECs. Therefore, we propose that the association of extraversion

and agreeableness with peer acceptance depends on the levels of ECs. Specifically, we propose that the relationships between extraversion and agreeableness and likeability will be strengthened among those with higher ECs than among those with lower ECs.

The aim of the study was threefold: (1) to replicate the previously demonstrated relationships between personality and EC on peer-rated likeability (e.g., Jensen-Campbell et al., 2002; Lubbers et al., 2006; van der Linden et al., 2010; Mavroveli et al., 2007, 2009; Mavroveli and Sánchez-Ruiz, 2011; Frederickson et al., 2012); (2) to extend the results regarding EC by analyzing the respective contribution of intra- and inter-personal EC to this effect; and, most importantly, (3) to examine the interactive effects of personality (extraversion and agreeableness respectively) and EC on likeability.

We propose the following hypotheses: extraversion and agreeableness are both positively related to peer-rated likeability (H1); intra- and inter-personal ECs are both positively related to peer-rated likeability (H2); given the divergent results found in Belgium and Japan on the respective contribution of intra- and inter-personal ECs to social relationships, and because Poland lies in between these two countries in terms of social-related cultural values (Hofstede et al., 2010; Brycz et al., 2015), we had no *a priori* hypothesis on the respective contribution of intra- and inter-personal ECs to likeability in Poland. ECs moderate the relationship between extraversion and peer-rated likeability in such a way that the relationship is stronger among those with higher ECs than among those with lower ECs (H3); ECs moderate the relationship between agreeableness and peer-rated likeability in such a way that the relationship is stronger among those with higher ECs than among those with lower ECs (H4).

MATERIALS AND METHODS

Participants

The participants consisted of 230 students (47% female) from nine first- and second-grade classrooms of two upper secondary schools in Poland (the north-western part of Poland; Pomeranian District). The mean age was 15.97, $SD = 0.67$, ranging between 15 and 17. The average classroom size in this study comprised 26 students, ranging between 20 and 33. The education system in Poland consists of 6 years of primary school, followed by 3 years of lower secondary school, and then three or 4 years (depending on the type of school) of upper secondary school. Although only primary and lower secondary school are compulsory, the vast majority of students continue their studies in upper secondary school. The ethnic composition of the sample was solely Polish.

Measures Likeability

Likeability was assessed using the widely used peer nomination method (van der Linden et al., 2010; Garcia Bacete and Cillessen, 2017). Each participant could nominate three classmates for each of four questions: (1) most liked; (2) most supportive; (3) most cooperative; and (4) most admired. The average peer-rated likeability score was computed by summing up the peer

nominations across all questions and dividing them by four (i.e., the total number of questions). Subsequently, the average likeability score was standardized to *z*-scores within classrooms, which is a commonly used method to control for differences in classroom size (e.g., Ciarrochi and Heaven, 2009). In addition, in order to make sure that the peer nominations form one coherent factor, a principal components analysis with oblimin rotation was performed. The results revealed that all four questions loaded on one factor with an eigenvalue of 3.252, accounting for 81.30 per cent of the variance. All factor loadings exceeded 0.87.

Personality Traits

Personality traits were assessed using Costa and McCrae's (1992) Personality Inventory NEO-FFI (Polish adaptation by Zawadzki et al., 1998). The NEO-FFI comprises 60 self-descriptive statements, 12 for each of the five dimensions of personality: neuroticism (e.g., "I am not a worrier"; reversed), the tendency to experience negative emotions, such as anxiety and depression and cope poorly in response to stressors; extraversion (e.g., "I like to have a lot of people around me"), the tendency to experience positive emotions, to be sociable, active, cheerful and in search of stimulation; openness to experience (e.g., "I often try new and foreign foods") reflects individuals who are open, imaginative, creative and willing to explore new ideas; agreeableness (e.g., "I try to be courteous to everyone I meet"), the dimension of interpersonal relations, characterized by altruism, modesty, trust and cooperative tendencies; and conscientiousness (e.g., "I keep my belongings clean and neat"), the tendency to be organized, persistent, reliable, and a follower of rules and ethical principles. Items are rated on a five-point Likert scale, ranging from 1 (*completely disagree*) to 5 (*completely agree*). Scale scores were formed by averaging the responses to the items associated with each personality dimension, after appropriate items were reversed. As scores on each scale increase, individuals are describing themselves as scoring higher on each personality dimension.

Emotional Competence

Intra- and inter-personal emotional competences were assessed with the PEC (Brasseur et al., 2013). This instrument consists of 50 five-point items (25 items for each dimension) with answers on a five-point Likert scale, ranging from 1 (*completely disagree*) to 5 (*completely agree*) and provides an intra-personal EC score, an inter-personal EC score and a total EC score. Examples of items are: "during an argument, I can't identify if I am sad or angry (reversed)" and "I am usually able to influence the way other people feel", for intra- and inter-personal EC, respectively. The validation process of the PEC (see Brasseur et al., 2013) has shown the satisfactory psychometric properties of the questionnaire: both subscales showed high internal consistency, the two-factor structure was confirmed, and concurrent and predictive validity were as expected, on subjective and objective criteria alike (see also Mikolajczak et al., 2014). In the current analyses, we specifically focused on the intra- and inter-personal EC scores. Scores for intra- and inter-personal ECs were calculated by averaging the responses to the items associated with each EC dimension, after appropriate items were reversed.

Procedure

Trained research assistants (i.e., psychology students who volunteered to take part in this project) administered all measures in each of the nine classrooms. The participants were given a brief introduction to the project and were assured that the collected data would be kept confidential and only used for research purposes. The questionnaires were administered in paper-and-pencil format with written instructions. Participants first filled out the NEO-FFI and then the PEC. Once the questionnaires were completed, they were returned to the research assistants. Subsequently, the participants were asked to nominate three classmates for each of four questions. When sociometric ratings were completed, protocols were collected by the research assistants. The first part of the procedure (i.e., questionnaires) required the participants to provide their names and surnames, while the second part (i.e., sociometric nominations) was anonymous. The average time participants spent on completing all measures was about 35 min. No compensation was awarded to the participants. Due to the excellent collaboration of the schools and teachers, and low absenteeism in classes, the participation rate was 100% in all classrooms except three, in which the participation rates were 85, 86, and 94%. For students who were absent, the study was conducted on a later date (within 3 weeks after the data in the classrooms were collected). Finally, out of 236 possible participants, data were collected from 230 students (i.e., the total participation rate was 96%). The study was reviewed and approved by school heads and teachers. Parental consent was obtained prior to data collection, during parent-teacher conferences at school. Students participated on a voluntary basis; no one refused to participate. All study procedures were approved by the Ethics Committee of the SWPS University of Social Sciences and Humanities, Faculty in Sopot (Ref. No. WKE-S-28-I-36), by which human subjects' protection is ensured.

RESULTS

Preliminary Results

Table 1 contains the means, standard deviations, internal consistency coefficients (Cronbach's α) and intercorrelations of all the variables measured. The pattern of bivariate correlations between the variables was in line with our expectations and fully supports our H1 and H2. First, extraversion and agreeableness were both significantly and positively associated with peer-rated likeability. Second, intra- and inter-personal ECs were both significantly and positively associated with likeability. Note that while the bivariate correlation between extraversion and likeability was significantly stronger than the correlation between agreeableness and likeability ($z = 2.05$, $p < 0.05$), the bivariate correlation between inter-personal ECs and likeability was not statistically stronger than the correlation between intra-personal ECs and likeability ($z = -0.35$, ns). Both intra- and interpersonal ECs were positively associated with extraversion, agreeableness, openness to experience and conscientiousness, and negatively associated with neuroticism. We also observed a small, albeit significant, negative correlation between neuroticism

TABLE 1 | Internal consistency reliability (Cronbach's α), means, standard deviations and intercorrelations among all study variables.

Variables	M	SD	1	2	3	4	5	6	7	8	Gender	Age
(1) Likeability	0	0.98	(0.92)	0.34***	0.16*	−0.17**	0.03	0.10	0.30***	0.33*	−0.05	0.09
(2) Extraversion	2.54	0.56		(0.79)	0.23**	−0.24***	0.10	0.16*	0.40***	0.42***	−0.04	0.10
(3) Agreeableness	2.41	0.51			(0.79)	−0.19**	0.27***	0.21**	0.29***	0.35***	−0.05	0.12
(4) Neuroticism	1.67	0.69				(0.85)	−0.10	−0.26***	−0.40***	−0.30***	−0.13*	−0.05
(5) Openness to experience	2.38	0.44					(0.80)	0.12	0.31***	0.25***	−0.11	0.04
(6) Conscientiousness	2.65	0.57						(0.82)	0.30***	0.24***	−0.05	−0.03
(7) Intrapersonal ECs	3.25	0.46							(0.86)	0.56***	−0.14*	0.15*
(8) Interpersonal ECs	3.43	0.53								(0.91)	−0.15*	0.16*

Diagonal values are the internal consistency estimates for each scale. Gender is coded 0 = female, 1 = male.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (all two-tailed significance tests).

and likeability, and positive correlations between age and both intra- and inter-personal ECs scores.

Main Results

In order to examine the main and interactive effects of personality traits and ECs on peer-rated likeability, a moderated hierarchical regression analysis was conducted. The variables were entered into the regression model in four steps. In order to rule out the possibility that associations between personality traits, ECs and likeability could be confounded by socio-demographic characteristics, the participants' gender (dummy coded: female = 0, male = 1) and age were entered in the first step as control variables. Extraversion and agreeableness were entered in the second step. Intra- and inter-personal ECs were entered in the third step. In the fourth step, in order to examine whether the main effects of extraversion and agreeableness were moderated by ECs, four interaction terms were entered, which were products of personality traits and ECs. These terms were: extraversion \times intra-personal EC; extraversion \times inter-personal EC; agreeableness \times intra-personal EC; and, agreeableness \times inter-personal EC. Personality traits and ECs were centered prior to creating interaction terms, rendering the beta-weight of the interaction terms more directly interpretable (Cohen et al., 2003). The data were examined for multicollinearity between independent variables using the tolerance and the variance inflation factor (VIF). Analyses indicated that there was no concern for multicollinearity, as all VIFs were below 2.5 (e.g., O'Brien, 2007). All statistical analyses were performed using the SPSS version 24 statistical package.

The results are depicted in **Table 2**. As can be seen, the full model explains 18% of the variance in peer-rated likeability. The results showed that none of the variables entered in Step 1 emerged as a significant predictor of likeability. In Step 2, when extraversion and agreeableness were entered, the amount of variance explained increased significantly ($\Delta R^2 = 0.11$, $p < 0.001$), but only extraversion emerged as a significant predictor of likeability. When ECs were entered in Step 3, the amount of variance explained increased significantly ($\Delta R^2 = 0.04$, $p < 0.01$), but only inter-personal ECs emerged as a significant predictor of likeability. Extraversion remained significant. These results indicate that

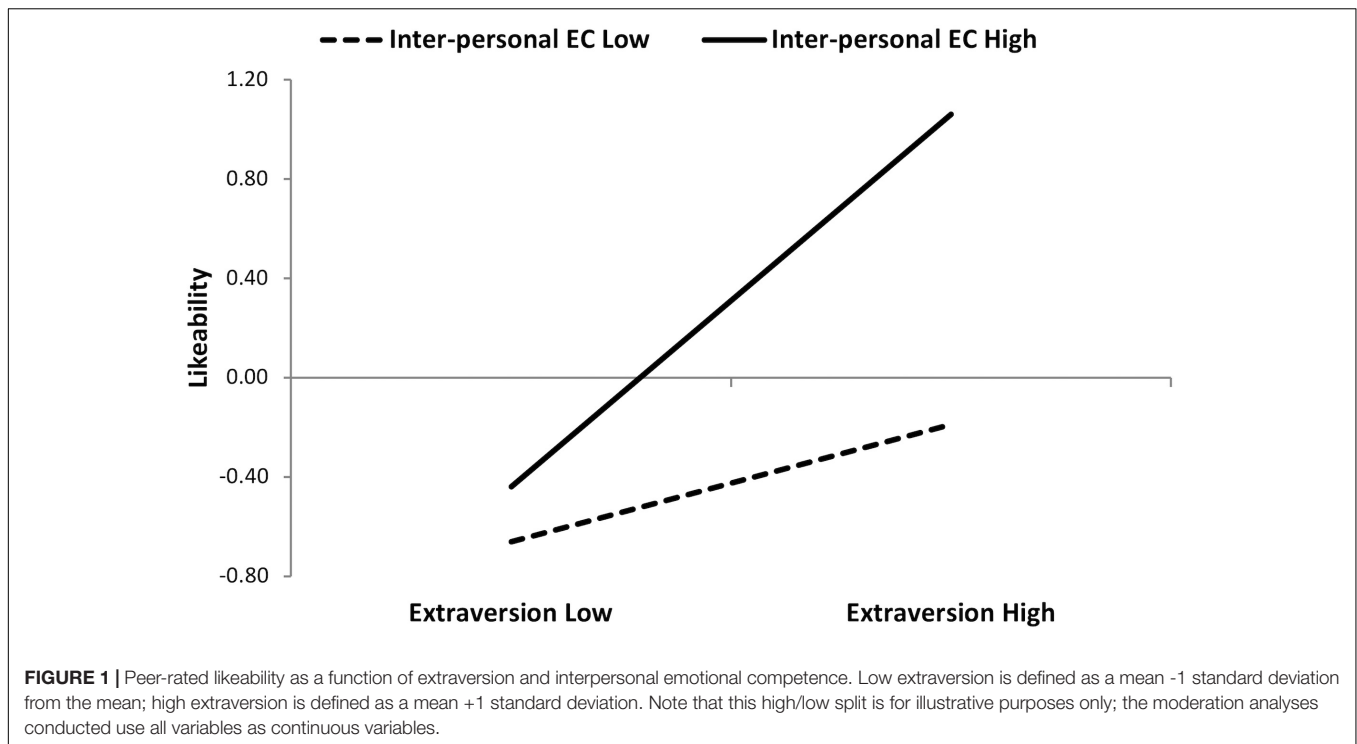
TABLE 2 | Results of the moderated hierarchical regression analyses on the influence of extraversion, agreeableness and emotional competence on peer-rated likeability.

Variables	Step 1 β	Step 2 β	Step 3 β	Step 4 β
Gender	−0.05	−0.03	0.01	−0.01
Age	0.09	0.05	0.02	0.02
Extraversion		0.32***	0.22**	0.23**
Agreeableness		0.08	0.01	0.05
Intrapersonal ECs (Intra EC)			0.10	0.07
Interpersonal ECs (Inter EC)			0.18*	0.22**
Extraversion \times Intra EC				−0.09
Extraversion \times Inter EC				0.29**
Agreeableness \times Intra EC				0.10
Agreeableness \times Inter EC				−0.11
R^2 (adjusted)	0.00	0.11	0.15	0.18
ΔR^2	0.00	0.11	0.04	0.03

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

inter-personal ECs predicted likeability above and beyond personality traits. In Step 4, when interaction terms were entered, the amount of variance explained increased significantly ($\Delta R^2 = 0.03$, $p < 0.05$), but only the interaction of extraversion and inter-personal ECs emerged as a significant predictor of likeability. Extraversion and inter-personal ECs remained significant.

In order to examine further the shape of the interaction, the simple slope procedure recommended by Aiken and West (1991) was employed. Therefore, the relationship between extraversion and interpersonal ECs was plotted, comparing students who scored more than one standard deviation above and below the average level of interpersonal ECs. As shown in **Figure 1**, extraversion predicted greater likeability among students high in interpersonal ECs ($\beta = 0.60$, $p < 0.01$) but not among students low in interpersonal ECs ($\beta = -0.06$, $p = 0.78$). In other words, extraversion only increases likeability for students high in interpersonal ECs. These results support H3. Note that the opposite is also true: interpersonal ECs only increase likeability among students high in extraversion. H4, predicting the moderating effect of ECs in the relationship between agreeableness and peer-rated likeability, was not confirmed.



DISCUSSION

The present study aimed to investigate the interactive effects of personality (extraversion and agreeableness) and emotional competence (intra- and interpersonal ECs) on peer-rated likeability. The results showed that both extraversion and agreeableness were significantly and positively related to peer-rated likeability, which is consistent with previous studies (e.g., Jensen-Campbell et al., 2002; Lubbers et al., 2006). It should be noted, however, that extraversion and agreeableness were not equally predictive of likeability: extraversion was more strongly associated with this variable than agreeableness. First, the correlational findings show that the extraversion–likeability relationship was significantly stronger than the agreeableness–likeability relationship. Similar results were reported by Wolters et al. (2014). Second, when extraversion and agreeableness were entered simultaneously into the regression model, agreeableness lost its significance in predicting likeability. Similar results were demonstrated by van der Linden et al. (2010).

We also replicated and extended findings from previous research on the relationship between EC and likeability. We demonstrated that both intra- and interpersonal ECs positively correlated with likeability, which is consistent with previous studies (Petrides et al., 2006; Mavroveli et al., 2007, 2009). Interpersonal EC, however, seems more important, as intrapersonal EC lost its significance in predicting likeability when both intra- and interpersonal ECs were entered simultaneously into the regression model. Moreover, both intra- and interpersonal ECs were associated with personality traits, that is, ECs were positively related to extraversion, agreeableness, openness to experience and conscientiousness, and negatively

related to neuroticism, which is consistent with previous research (e.g., Nozaki and Koyasu, 2016). In addition, interpersonal EC predicted likeability above and beyond extraversion and agreeableness. This result is important because it demonstrates the incremental validity of EC beyond personality traits in the prediction of likeability. Previous studies have already shown the incremental validity of ECs in the prediction of social functioning (e.g., van der Zee and Wabeke, 2004), but the PEC, which was used in the current study, allowed us to examine the incremental validity of ECs in more detail, as two different features of EC were taken into account.

Finally, and most importantly, our study yielded new insights into the determinants of likeability, as it demonstrates how extraversion and interpersonal EC combine to influence success in achieving peer acceptance. Specifically, extraversion predicted greater likeability among adolescents with high interpersonal EC but not among adolescents with low interpersonal EC. The opposite was also true: interpersonal EC predicted greater likeability among adolescents with high extraversion but not among adolescents with low extraversion. Why is the combination of high extraversion and high interpersonal EC crucial to increasing peer acceptance?

We believe that extraversion gives adolescents the motivation to create relationships with their peers (Lucas and Diener, 2001; Ciarrochi and Heaven, 2009), while EC provides the skills needed to maintain these relationships (e.g., Lopes et al., 2004, 2005). As a result, it may affect success in attaining peer acceptance. Extroverts are “the life of the party”, outgoing, cheerful and action-oriented individuals, who are likely to respond enthusiastically to exciting challenges (Costa and McCrae, 1992; Lucas and Diener, 2001). These characteristics are definitely

an advantage in a classroom setting, as highly extroverted adolescents attract more attention and are positively evaluated by their peers (Ciarrochi and Heaven, 2009). Nevertheless, as our study demonstrated, being an extrovert is not enough. In order to achieve peer acceptance, extroverted adolescents must also have sufficient interpersonal EC at their disposal: they have to be able to identify appropriately, understand, express, regulate and utilize the emotions of others (Brasseur et al., 2013). Alternatively, we may argue that being an emotionally competent adolescent is not enough to be liked. Adolescents who want to gain their peers' acceptance also need to be active and socially approachable; they simply have to enjoy being with people. Taken together, our results clearly suggest that adolescents need to be both extrovert and possess high interpersonal EC to be judged highly likeable by their peers.

Our study contributes to the constantly accumulating evidence on the effects of an individual's dispositions on peer-rated likeability in adolescence. First, to the best of our knowledge, none of the previous studies have evaluated the effects of two independent dimensions of EC (i.e., intra- and interpersonal ECs) on likeability. Second, the current study is the first to examine the interactive effects of personality traits and EC on likeability. Third, our study provides a possible explanation for the disparity in earlier studies examining the personality-likeability relationship. Fourth, as our research was carried out in Poland, a country undergoing a socio-economic transition from collectivistic to individualistic society (Brycz et al., 2015), it nicely complements previous studies, conducted mainly among North American, Dutch and English adolescents, functioning in individualistic rather than collectivistic societies (Hofstede et al., 2010). It appears that the links between personality and likeability, and between EC and likeability are similar in different countries or at least in different European countries, regardless of their cultural orientations.

There are several limitations to the current study that should be acknowledged. First, the present study used a cross-sectional design; hence, statements about causal relationships should be put forward with caution. Although we implied a certain causal order for the variables (i.e., peer-rated likeability resulted from the adolescents' personality traits and ECs), other causal directions are possible as well (e.g., likeability as an antecedent of personality traits and ECs). This issue is especially evident when we consider that not only relationships with peers, but also personality traits, including trait EI, are subject to change throughout development (Lamb et al., 2002; Keefer et al., 2013). Future longitudinal studies might clarify the associations demonstrated in the current study. Second, in this study we referred to likeability, which, as alluded to before, represents only

one feature of social status in a peer group. Future research is needed to determine the role of ECs in predicting popularity among peers. Third, it should be noted that in comparison to the main effects, the percentage of explained variance attributable to the role of the extraversion \times interpersonal EC interaction in predicting peer-rated likeability was rather modest (0.03). Nevertheless, researchers have argued that even a 1% contribution to the total variance should be considered important as the estimation of interactions is generally low (McClelland and Judd, 1993). Fourth, the study participants filled in the questionnaires in the order fixed, which allowed us to separate the anonymous part of the study (personality traits and EC) from its non-anonymous part (sociometric nominations). Although this procedure provided the participants with greater comfort during data collection, it also increased the likelihood of response bias and, for this reason, should be considered a limitation of the study.

Despite the limitations noted above, our results bear several practical implications for the improvement of adolescents' position and acceptance within their peer group. They suggest that encouraging "rejected" adolescents to reach out to others in an extrovert fashion is necessary but insufficient to increase their acceptance and likeability. Improving their interpersonal EC is also necessary. There is, indeed, accumulating evidence showing that ECs can be lastingly increased via training programs targeting the core ECs (identification, understanding, expression, regulation and use of emotions) (for a review, see Mikolajczak and Peña-Sarrionandia, 2015). Efficient programs to increase intrapersonal EC in adolescents have been successfully developed in recent years (e.g., INTEMO in Spain; Castillo et al., 2013; RULER in the US; Brackett et al., 2012). The current results suggest that it could be particularly beneficial to adolescents if these programs were to extend their focus on interpersonal EC too.

AUTHOR CONTRIBUTIONS

DS developed the study design, performed the data collection, and the data analysis. DS and MM contributed to data interpretation and writing the manuscript, and approved the final version of the manuscript for submission.

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Development and Validation of Two Short Forms of the Managing the Emotions of Others (MEOS) Scale

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The 58-item MEOS assesses managing the emotions of others, a component of trait emotional intelligence (EI). Managing another person's emotions can be used with the intention of helping the target but also in a strategically manipulative manner; the subscales of the MEOS cover both these aspects of emotion management. In order to allow researchers to access shorter versions of the MEOS for use in studies where administering the full-length scale is not feasible, two short forms of the MEOS with six (MEOS-SF) and four (MEOS-VSF) items per sub-scale were developed and validated. Study 1 used factor analysis of pre-existing MEOS item data to select items for the short forms and also compared the bivariate correlations of the MEOS, MEOS-SF and MEOS-VSF with personality and global trait EI. Study 2 examined the MEOS-SF and MEOS-VSF in two new samples ($N = 394/226$). The results from both studies showed that the short forms had good psychometric properties and associations similar to those of the full-length MEOS with personality, global trait EI, and other measures. The MEOS-SF and MEOS-VSF are hence suitable for use in contexts where a brief assessment of the full range of the domain of managing the emotions of others is required. The availability of short subscales assessing the manipulative facets of the MEOS is especially relevant to the emerging area of "dark side" trait EI research.

Keywords: MEOS scale, interpersonal emotional management, emotional intelligence, "dark side" of EI, short form

INTRODUCTION

The Managing the Emotions of Others Scale (MEOS; Austin and O'Donnell, 2013) is a multidimensional scale which assesses interpersonal emotion management. Interpersonal emotional management is a facet of trait emotional intelligence (EI), which can be defined as "a distinct, compound trait located at the lower levels of personality hierarchies" which "comprehensively encompasses the emotion related facets of personality" (Petrides et al., 2007, p. 287). Managing another's emotions can be done a number of ways, which can be divided into two broad subtypes. One is a prosocial approach with the objective of helping the target, for example by attempting to reduce their negative emotions or distress. Alternatively, interpersonal emotion management can be used in a strategically manipulative manner to promote the objectives of the regulator rather than those of the target (e.g., Andrade and Ho, 2009; Netzer et al., 2015).

The MEOS was developed to provide broad coverage of the interpersonal emotional management domain. The test was developed using an item pool derived from a database of free-response descriptions of episodes of interpersonal emotion management; exploratory

factor analysis was used to determine the number of underlying dimensions in the preliminary scale and reduce its length by selecting the highest-loading items and the resulting factor structure was confirmed in a second sample (Austin and O'Donnell, 2013). In addition to the English version of the scale, translations into Polish (Jankowski et al., 2016) and Mandarin (Saklofske et al., 2016) have been created.

The MEOS has four core subscales which assess aspects of actively managing the emotions of others. Improving another's mood is covered by the Enhance (e.g., offering help and reassurance) and Divert (diverting another's low mood, e.g., by use of humor) subscales. The Worsen subscale includes approaches to mood worsening such as criticism of and undermining the target, whilst the Inauthentic subscale includes the use of tactics such as flattery and sulking to influence another person's mood. Two additional subscales (Conceal, Poor Skills) cover concealing one's own emotions as an interpersonal emotion management tactic, and poor self-assessed ability to change another's mood. Enhance and Divert are related to the positive, generally prosocial aspects of trait EI, whilst Worsen and Inauthentic represent aspects of its "dark side" (Davis and Nichols, 2016). Collectively the four core subscales cover dispositional interpersonal emotion management tendencies that can have both positive and negative effects on relationships with others. Examination of correlations amongst the core MEOS subscales (e.g., Austin et al., 2014) shows that Enhance and Divert are strongly positively correlated, as are Worsen and Inauthentic, indicating that people who use one of the mood-improving strategies are likely to use the other as well and, conversely, those who use one of the less pleasant "dark" approaches to changing another's mood are likely to also use the other. Interestingly, the cross-correlations between the Enhance/Divert and Worsen/Inauthentic pairs are quite weak, indicating that people are generally able to use both prosocial and manipulative approaches to managing the moods of others (Austin and O'Donnell, 2013).

Studies of the associations of the MEOS with personality (Austin and O'Donnell, 2013; Austin et al., 2014; Austin and Vahle, 2016) have found theoretically-interpretable correlations. Enhance and Divert were found to be positively and Worsen and Inauthentic negatively correlated with Agreeableness, associations which are interpretable in terms of the relationships of Agreeableness with affiliation and positive interpersonal relationships (Jensen-Campbell and Graziano, 2001; Traupman et al., 2009). Worsen and Inauthentic show strong positive associations with the Dark Triad and strong negative associations with Honesty-Humility (H), as would be expected given that both the Dark Triad and low H are associated with interpersonal manipulation (e.g., Jakobwitz and Egan, 2006; Jonason et al., 2012; Lee et al., 2013). The MEOS has also been used to examine the mechanisms by which trait EI enables manipulative relational behaviors (Bacon and Regan, 2016).

Examination of the associations of the MEOS with trait EI has shown that Enhance and Divert are positively and Worsen and Inauthentic negatively correlated with global trait EI. At the trait EI facet level a more nuanced but interpretable correlation pattern emerges with, for example, all four core subscales

being positively associated the Emotion Management subscale (assessing management of other's emotions) of the TEIQue (Petrides, 2009), but with the correlations with the TEIQue Empathy subscale mirroring the associations with total EI.

The MEOS comprises 58 items, a scale length which is not optimal for some study types, for example those employing multiple instruments or a repeat-measures-design, or in situations where participants are particularly likely to become bored or disengaged when completing a long scale. Given these considerations, the availability of shorter versions of the MEOS is desirable. Research designs requiring the use of short tests vary in the trade-off required between test length (with longer tests having generally better psychometric properties and construct domain coverage) and demands on participants (for example, experience sampling studies requiring completion of short surveys several times per day are more demanding than one-off surveys). To allow for the variation in these design issues, in this paper we develop two short versions of the MEOS containing six (MEOS-SF) and four (MEOS-VSF) items per subscale.

Description of Studies

The focus of the short form development was on the four core MEOS subscales together with Conceal. Earlier work on the MEOS has shown that the Poor Skills subscale scores have marginal internal reliability and that this subscale is not well-discriminated from global trait EI, with which has been found to correlate at around $r, -0.60$ (e.g., Austin and O'Donnell, 2013). Given the unsatisfactory psychometric properties of this subscale, this paper also incorporates a revision of the MEOS with Poor Skills omitted and focusses on creating short versions of the other five subscales. Study 1 used combined pre-existing data to develop two MEOS short forms using exploratory and confirmatory factor analysis, followed by examining the reliability and validity of scores of the new shorter versions. Study 2 re-examined the reliability and validity of the short form scores using two new samples and also extended results for the MEOS generally by examining its associations with several scales not included in earlier work.

STUDY 1

Method

This study used archival data from three previously-published papers (Austin and O'Donnell, 2013; Austin et al., 2014; Austin and Vahle, 2016).

Participants

Factor analysis was performed on the combined MEOS item data; full information on the component samples are provided in the publications cited above, and demographic information for the combined data used to develop the MEOS short forms is shown in **Table 1**. Each of the previous studies also included measures of personality and trait emotional intelligence (EI). The sizes of the subgroups used in the comparisons of correlations for the full-length and short MEOS scales with these measures are provided in the relevant table captions.

TABLE 1 | Sample details for Study 1.

	<i>N</i>	Percentage female	Mean (<i>SD</i>) age (years)
Sample 1	2,005	73.6	22.86 (8.57)
Sample 2	341	71.6	22.51 (8.22)

Samples 1 and 2 were randomly selected from the combined item-level MEOS data.

TABLE 2 | Exploratory factor analysis of the MEOS-SF.

	Enhance	Inauthentic	Conceal	Worsen	Divert
Enhance 3	0.74	0.04	0.01	−0.05	−0.04
Enhance 1	0.74	−0.01	−0.02	0.01	0.02
Enhance 2	0.73	−0.05	0.00	0.03	−0.02
Enhance 4	0.69	−0.04	0.01	0.05	0.10
Enhance 5	0.63	0.06	0.01	0.02	0.01
Enhance 6	0.58	−0.06	0.02	−0.03	0.07
Inauthentic 1	0.01	0.81	−0.07	−0.08	−0.11
Inauthentic 3	0.04	0.67	−0.12	0.10	−0.11
Inauthentic 2	−0.01	0.65	−0.04	0.11	−0.07
Inauthentic 6	−0.04	0.46	0.06	0.00	0.17
Inauthentic 5	−0.06	0.45	0.04	0.19	0.03
Inauthentic 4	−0.05	0.36	0.11	0.14	0.20
Conceal 1	0.08	0.01	0.75	0.02	−0.09
Conceal 2	0.04	−0.08	0.71	0.07	−0.01
Conceal 3	−0.01	0.03	0.67	−0.12	0.00
Conceal 4	0.02	−0.01	0.66	−0.10	−0.01
Conceal 5	−0.10	−0.13	0.60	0.13	−0.03
Conceal 6	0.03	0.23	0.36	−0.02	0.12
Worsen 2	−0.05	0.02	0.03	0.68	−0.02
Worsen 5	0.03	−0.05	0.03	0.63	0.00
Worsen 3	0.07	0.03	−0.02	0.62	0.02
Worsen 6	0.07	0.10	−0.07	0.62	−0.07
Worsen 1	−0.05	0.05	−0.02	0.61	−0.07
Worsen 4	−0.12	0.05	0.01	0.61	0.10
Divert 1	−0.01	−0.01	−0.05	−0.02	0.71
Divert 3	−0.01	−0.04	0.00	0.09	0.70
Divert 2	0.02	−0.02	−0.03	−0.04	0.66
Divert 5	0.06	0.00	0.00	−0.01	0.51
Divert 4	0.29	0.00	0.01	−0.07	0.46
Divert 6	0.13	0.05	0.01	−0.06	0.46

The factors accounted for 43% of the variance. Pattern matrix elements are shown. Loadings ≥ 0.4 are shown in bold, below 0.4 but > 0.3 in italic. Items are numbered in order of loading size in the EFA of the full MEOS. See **Table 5** for item wordings.

Instruments

The scales listed below were used in the correlation comparisons. Descriptive statistics for the scale scores and scale internal reliabilities are reported in the previously-published papers using these datasets (Austin and O'Donnell, 2013; Austin et al., 2014; Austin and Vahle, 2016).

Mini-markers (Saucier, 1994)

This set of 40 trait-descriptive adjectives provides scores on the Big Five dimensions of Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). Responses are on a five-point

TABLE 3 | Exploratory factor analysis of the MEOS-VSF.

	Enhance	Inauthentic	Conceal	Worsen	Divert
Enhance 3	0.74	0.03	0.02	−0.02	−0.04
Enhance 1	0.73	0.01	−0.01	−0.01	0.03
Enhance 2	0.73	−0.03	0.00	0.01	−0.02
Enhance 4	0.69	−0.02	0.01	0.02	0.10
Inauthentic 1	0.00	0.91	−0.01	−0.13	−0.06
Inauthentic 3	0.03	0.66	−0.09	0.12	−0.07
Inauthentic 2	−0.03	0.64	−0.01	0.10	−0.04
Inauthentic 6	−0.02	0.36	0.06	0.05	0.18
Conceal 1	0.05	0.02	0.75	0.05	−0.06
Conceal 3	−0.04	0.04	0.72	−0.08	0.01
Conceal 4	0.00	−0.01	0.70	−0.06	−0.01
Conceal 2	0.02	−0.06	0.63	0.07	0.02
Worsen 6	0.05	0.06	−0.07	0.68	−0.06
Worsen 2	−0.09	0.01	0.03	0.67	0.00
Worsen 3	0.03	0.02	−0.03	0.60	0.03
Worsen 5	−0.02	−0.02	0.04	0.57	0.01
Divert 3	−0.05	−0.04	0.01	0.09	0.78
Divert 1	0.05	0.02	−0.03	−0.06	0.63
Divert 2	0.04	0.01	−0.02	−0.07	0.62
Divert 5	0.06	−0.01	0.02	0.01	0.53

The factors accounted for 47% of the variance. Pattern matrix elements are shown. Loadings ≥ 0.4 are shown in bold, below 0.4 but > 0.3 in italic. Items are numbered in order of loading size in the EFA of the full MEOS. See **Table 5** for item wordings.

TABLE 4 | Factor score bivariate correlations for the MEOS-SF and MEOS-VSF.

	Enhance	Divert	Worsen	Inauthentic
MEOS-SF				
Divert	0.53			
Worsen	−0.21	−0.07		
Inauthentic	−0.07	0.08	0.47	
Conceal	0.06	0.14	0.00	0.00
MEOS-VSF				
Divert	0.43			
Worsen	−0.16	−0.02		
Inauthentic	−0.07	0.05	0.39	
Conceal	0.08	0.11	−0.04	−0.10

N = 2,005; substantive correlations shown in bold.

scale indicating how accurately the adjective describes the respondent, with end points very inaccurately, very accurately.

HEXACO-60 (Ashton and Lee, 2009)

This 60-item scale assesses the personality dimensions of Honesty-Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness (O). Responses are on a five-point scale with end points strongly disagree, strongly agree.

TABLE 5 | Items selected for the MEOS-SF and MEOS-VSF.

MEOS item	Item numbers used in Tables 2, 3	
ENHANCE		
43	Enhance 1	<i>If someone is feeling anxious, I try to calm them down by talking with them.</i>
38	Enhance 2	<i>When someone is anxious about a problem, I try to help them work out a solution.</i>
28	Enhance 3	<i>If someone is anxious, I try to reassure them.</i>
35	Enhance 4	<i>When someone is under stress I try to boost their confidence in their ability to cope.</i>
31	Enhance 5	<i>When someone is unhappy, I show that I understand how they are feeling.</i>
57	Enhance 6	<i>If someone has a problem I offer to help if they need it.</i>
DIVERT		
46	Divert 1	<i>If someone is angry, I try to divert their mood by being cheerful.</i>
53	Divert 2	<i>When someone is in a low mood I behave in a happy and cheerful way to make them feel better.</i>
33	Divert 3	<i>When someone is in a bad mood I try to divert them by telling jokes or funny stories.</i>
22	Divert 4	<i>When someone is unhappy I try to cheer them by talking about something positive.</i>
3	Divert 5	<i>I sometimes use humor to try to lift another person's mood.</i>
45	Divert 6	<i>If someone is being awkward, I try to defuse the situation by being cheerful and pleasant.</i>
WORSEN		
21	Worsen 1	<i>I use anger to get others to do things that I want them to do.</i>
19	Worsen 2	<i>I sometimes put someone down in public to make them feel bad.</i>
32	Worsen 3	<i>I know how to make someone feel ashamed about something that they have done in order to stop them from doing it again.</i>
47	Worsen 4	<i>I can make someone feel anxious so that they will act in a particular way.</i>
29	Worsen 5	<i>I use criticism to make others feel that they should work harder.</i>
20	Worsen 6	<i>If I don't like someone's behavior I make negative comments in order to make them feel bad.</i>
INAUTHENTIC		
4	Inauthentic 1	<i>I sometimes sulk to make someone feel guilty.</i>
44	Inauthentic 2	<i>I sometimes sulk to get someone to change their behavior.</i>
5	Inauthentic 3	<i>If someone's behavior has caused me distress, I try to make them feel guilty about it.</i>
37	Inauthentic 4	<i>I sometimes use flattery to gain or keep someone's good opinion.</i>
12	Inauthentic 5	<i>If I want someone to do something for me, I try to elicit sympathy from them.</i>
2	Inauthentic 6	<i>If I want someone to do something for me, I am especially nice to them before asking.</i>
CONCEAL		
30	Conceal 1	<i>I often conceal feelings of anger and distress from others.</i>
36	Conceal 2	<i>I hide my feelings so others won't worry about me.</i>
8	Conceal 3	<i>When someone has made me upset or angry, I often conceal my feelings.</i>
18	Conceal 4	<i>When someone has made me upset or angry, I tend to downplay my feelings.</i>
23	Conceal 5	<i>I don't believe in telling others about my problems – I keep them to myself.</i>
26	Conceal 6	<i>If someone tries to make me feel better when I am feeling low, I pretend to feel happier to please that person.</i>

All 30 items are used in the MEOS-SF. The 24 items of the MEOS-VSF are shown in *italic*.

TABLE 6 | CFA model fit.

	$\chi^2(df)$	χ^2/df	CFI	SRMR	RMSEA (90% CI)
MEOS-SF	834.73 (395)	2.11	0.88	0.071	0.057 (0.052,0.063)
MEOS-VSF	323.62 (160)	2.02	0.93	0.057	0.055 (0.046,0.063)

CFI, comparative fit index; SRMR, standardized root mean square residual; RMSEA, root mean square error of approximation.

Mach IV (Christie and Geis, 1970)

This 20-item scale assesses Machiavellianism, with responses on a five-point scale with end points strongly disagree, strongly agree.

NPI-16 (Ames et al., 2006)

This scale has 16 forced-choice items assessing grandiose narcissism.

Hypersensitive narcissism scale (Hendin and Cheek, 1997)

This 10-item scale, assesses vulnerable narcissism, with responses on a five-point scale with end points strongly disagree, strongly agree.

Levenson self-report psychopathy scale (Levenson et al., 1995)

This scale assesses primary (16 items) and secondary (10 items) psychopathy in general population samples, with responses on a five-point scale with end points strongly disagree, strongly agree.

Trait EI

Results are reported for total scores on the 144-item TEIQue (Petrides, 2009) and the 30-item TEIQue-SF (Petrides and

TABLE 7 | Internal reliabilities (omega coefficients) for Sample 1.

	MEOS-SF	MEOS-VSF
Enhance	0.87	0.84
Divert	0.82	0.79
Worsen	0.83	0.77
Inauthentic	0.79	0.78
Conceal	0.81	0.79

MEOS-SF, short form with six items per subscale; MEOS-VSF, very short form with four items per subscale.

Furnham, 2006). These measures have a 7-point response scale with end points completely disagree, completely agree.

Data Analysis

The combined item-level dataset was used to produce versions of the four core MEOS sub-scales and Conceal with six (MEOS Short Form: MEOS-SF) and four (MEOS Very Short Form: MEOS-VSF) items per subscale. These subscale lengths were selected to allow considerable shortening of the MEOS without excessive decrements in subscale score reliability or validity (Credé et al., 2012). Initial item selection was based on those items with highest loadings on their respective factors in an exploratory factor analysis, but a small number of items were substituted with lower-loading items to avoid having too many items with similar wordings and to maximize the construct breadth of the short forms. The exploratory factor analysis was repeated on the 30 items of the MEOS-SF and the 20 items of the MEOS-VSF to re-check that each item still had its principal loading on its designated factor. A confirmatory factor analysis was also performed on a subset of the combined data not included in the exploratory analysis. The correlations of the full MEOS, the MEOS-SF and the MEOS-VSF with personality and trait EI were compared to examine how similar the validity coefficients for scores on the three MEOS versions were, and the internal reliabilities of the MEOS-SF and MEOS-VSF subscale scores were examined.

Results

Exploratory Factor Analysis and Item Selection

A subset comprising a randomly selected 85% of the item-level data (Sample 1) was used for the exploratory factor analysis (EFA) stage of scale development, with the remaining 15% (Sample 2) being used for confirmatory factor analysis (CFA). Information about the two samples is shown in Table 1. EFA was performed on Sample 1 using principal axis factoring with direct oblimin rotation.

The standard approach in short-form test development when the factor structure of the full-length test has been previously established is to use this structure of the starting point for item selection (e.g., Donnellan et al., 2006; Van der Zee et al., 2013). In the case of the MEOS, both exploratory (Austin and O'Donnell, 2013, Studies 2 and 3) and confirmatory factor analysis (Austin and O'Donnell, Study 3) have previously established the six-factor structure described in the section Introduction. The

TABLE 8 | Bivariate correlations of the MEOS, MEOS-SF, and MEOS-VSF with personality and trait EI using data from Austin et al. (2014) Study 1.

	Enh	Enh-SF	Enh-VSF	Div	Div-SF	Div-VSF	Wor	Wor-SF	Wor-VSF	Inau	Inau-SF	Inau-VSF	Conc	Conc-SF	Conc-VSF
NPI	-0.16	-0.15	-0.12	-0.04	-0.03	-0.03	0.44	0.41	0.39	0.31	0.26	0.22	-0.17	-0.13	-0.18
HSN	-0.14	-0.16	-0.13	-0.11	-0.10	-0.07	0.38	0.36	0.33	0.50	0.45	0.40	0.00	0.04	0.00
P1	-0.44	-0.44	-0.42	-0.21	-0.21	-0.16	0.56	0.53	0.47	0.44	0.38	0.33	-0.07	-0.02	-0.08
P2	-0.33	-0.34	-0.33	-0.23	-0.23	-0.15	0.48	0.44	0.39	0.38	0.34	0.35	-0.10	-0.04	-0.09
Mach	-0.30	-0.28	-0.26	-0.13	-0.12	-0.08	0.42	0.38	0.34	0.37	0.30	0.24	0.03	0.07	0.00
EI	0.39	0.40	0.38	0.31	0.33	0.27	-0.24	-0.23	-0.19	-0.26	-0.24	-0.25	-0.11	-0.13	-0.10
N	-0.15	-0.13	-0.11	-0.16	-0.15	-0.14	0.34	0.30	0.28	0.42	0.37	0.36	-0.15	-0.12	-0.14
E	0.14	0.13	0.12	0.27	0.26	0.23	0.04	0.02	0.01	-0.05	-0.04	-0.05	-0.25	-0.24	-0.21
O	0.23	0.25	0.22	0.17	0.16	0.16	0.02	0.01	0.04	0.01	0.00	-0.02	-0.04	-0.03	-0.05
A	0.54	0.53	0.48	0.36	0.36	0.29	-0.53	-0.45	-0.41	-0.35	-0.33	-0.33	0.15	0.10	0.16
C	0.29	0.28	0.27	0.27	0.27	0.23	-0.20	-0.19	-0.16	-0.15	-0.12	-0.15	0.03	0.01	0.01

Enh, Enhance; Div, Divert; Wor, Worsen; Inau, Inauthentic; Conc, Conceal; NPI, Narcissistic Personality Inventory; HSN, Hypersensitive Narcissism Scale; P1, P2, primary, secondary psychopathy; Mach, Machiavellianism; N, E, O, A, C, five-factor model Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness. N range 349–370. Correlations with $p \leq 0.01$ shown in bold.

TABLE 9 | Bivariate correlations of the MEOS, MEOS-SF, and MEOS-VSF with personality and trait EI using data from Austin et al. (2014) Study 2.

	Enh	Enh-SF	Enh-VSF	Div	Div-SF	Div-VSF	Wor	Wor-SF	Wor-VSF	Inau	Inau-SF	Inau-VSF	Conc	Conc-SF	Conc-VSF
NPI	-0.13	-0.16	-0.16	-0.10	-0.07	-0.08	0.37	0.37	0.32	0.25	0.18	0.13	-0.12	-0.09	-0.10
HSN	-0.17	-0.17	-0.17	-0.17	-0.17	-0.16	0.40	0.35	0.31	0.51	0.46	0.44	0.14	0.19	0.15
P1	-0.40	-0.40	-0.40	-0.20	-0.20	-0.16	0.56	0.52	0.47	0.44	0.36	0.32	-0.04	-0.02	-0.06
P2	-0.29	-0.30	-0.28	-0.14	-0.14	-0.10	0.40	0.36	0.32	0.34	0.31	0.32	0.04	0.07	0.01
Mach	-0.35	-0.31	-0.31	-0.25	-0.24	-0.20	0.45	0.40	0.37	0.39	0.33	0.30	0.14	0.16	0.08
EI	0.40	0.40	0.37	0.34	0.35	0.31	-0.13	-0.11	-0.07	-0.22	-0.23	-0.28	-0.20	-0.20	-0.13
N	-0.07	-0.08	-0.07	-0.14	-0.14	-0.16	0.21	0.15	0.13	0.45	0.41	0.44	-0.10	-0.08	-0.14
E	0.14	0.11	0.10	0.29	0.29	0.28	0.09	0.06	0.05	0.09	0.08	0.04	-0.31	-0.31	-0.30
O	0.14	0.15	0.17	-0.01	-0.01	-0.04	0.04	0.02	0.03	0.06	0.03	0.00	-0.01	0.02	0.05
A	0.52	0.49	0.45	0.38	0.35	0.30	-0.49	-0.49	-0.46	-0.24	-0.20	-0.21	0.04	0.02	0.07
C	0.21	0.18	0.16	0.07	0.07	0.04	-0.10	-0.07	-0.08	-0.14	-0.14	-0.14	-0.12	-0.10	-0.07

Enh, Enhance; Div, Divert; Wor, Worsen; Inau, Inauthentic; Conc, Conceal; NPI, Narcissistic Personality Inventory; HSN, Hypersensitive Narcissism Scale; P1, P2, primary, secondary psychopathy; Mach, Machiavellianism; N, E, O, A, C, five-factor model Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness. N range 362–387. Correlations with $p \leq 0.01$ shown in bold.

TABLE 10 | Bivariate correlations of the MEOS, MEOS-SF, and MEOS-VSF with personality and trait EI using data from Austin and Vahle (2016).

	Enh	Enh-SF	Enh-VSF	Div	Div-SF	Div-VSF	Wor	Wor-SF	Wor-VSF	Inau	Inau-SF	Inau-VSF	Conc	Conc-SF	Conc-VSF
H	0.20	0.21	0.18	-0.01	-0.02	-0.03	-0.40	-0.35	-0.31	-0.55	-0.50	-0.41	0.05	0.03	0.06
E	0.23	0.22	0.21	0.12	0.11	0.09	-0.13	-0.13	-0.11	0.17	0.16	0.18	-0.11	-0.12	-0.13
X	0.29	0.23	0.23	0.34	0.33	0.30	0.00	0.02	0.02	-0.06	-0.07	-0.13	-0.18	-0.15	-0.13
A	0.27	0.25	0.22	0.12	0.11	0.08	-0.42	-0.38	-0.36	-0.28	-0.25	-0.28	0.29	0.25	0.31
C	0.20	0.21	0.21	0.01	0.01	-0.02	-0.26	-0.20	-0.20	-0.29	-0.28	-0.29	-0.01	-0.02	0.02
O	0.17	0.20	0.20	0.04	0.06	0.03	-0.07	-0.08	-0.08	-0.05	-0.04	-0.06	0.01	-0.01	0.03
EI	0.44	0.38	0.37	0.32	0.31	0.27	-0.22	-0.18	-0.18	-0.27	-0.27	-0.31	-0.05	-0.05	-0.02

Enh, Enhance; Div, Divert; Wor, Worsen; Inau, Inauthentic; Conc, Conceal; H, E, X, A, C, O, HEXACO model Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness; N range 390–398. Correlations with $p \leq 0.01$ shown in bold.

TABLE 11 | Descriptive statistics, internal and test-retest reliabilities for samples 3 and 4.

	Sample 3			Sample 4		
	Mean (SD)	Omega	Test-Retest	Mean (SD)	Omega	Test-Retest
Enhance	60.03 (8.38)	0.91	0.65	63.32 (6.81)	0.89	0.88
Divert	27.43 (4.10)	0.73	0.57	27.41 (4.06)	0.78	0.80
Worsen	30.80 (9.53)	0.90	0.70	25.76 (7.92)	0.87	0.78
Inauthentic	32.66 (7.03)	0.83	0.74	31.16 (6.95)	0.79	0.82
Conceal	23.26 (4.91)	0.80	0.69	24.37 (5.30)	0.82	0.84
Enhance-SF	23.83 (3.59)	0.82	0.55	25.45 (3.05)	0.84	0.82
Divert-SF	23.70 (3.70)	0.72	0.60	23.65 (3.63)	0.77	0.82
Worsen-SF	14.20 (4.67)	0.80	0.60	11.54 (3.92)	0.79	0.82
Inauthentic-SF	18.05 (4.18)	0.78	0.69	17.23 (4.09)	0.72	0.75
Conceal-SF	20.03 (4.50)	0.79	0.63	20.85 (4.74)	0.82	0.83
Enhance-VSF	15.83 (2.55)	0.80	0.50	16.91 (2.22)	0.82	0.78
Divert-VSF	15.79 (2.71)	0.66	0.63	15.53 (2.62)	0.70	0.78
Worsen-VSF	9.79 (3.26)	0.72	0.55	8.21 (2.89)	0.72	0.83
Inauthentic-VSF	11.77 (3.02)	0.77	0.65	11.45 (3.09)	0.74	0.68
Conceal-VSF	13.64 (3.29)	0.79	0.61	14.46 (3.43)	0.80	0.72
H	31.58 (6.16)	0.73		33.32 (6.42)	0.73	
E	34.21 (6.34)	0.75		34.57 (6.45)	0.75	
X	32.59 (6.86)	0.83		31.60 (7.56)	0.85	
A	31.33 (6.50)	0.79		33.17 (6.87)	0.82	
C	35.67 (6.45)	0.81		33.86 (6.86)	0.82	
O	32.12 (6.76)	0.78		34.96 (6.64)	0.76	
SEA	20.08 (5.06)	0.89		19.22 (4.85)	0.84	
OEA	21.56 (4.28)	0.84		21.32 (4.19)	0.85	
UOE	21.20 (4.78)	0.84		20.05 (4.52)	0.77	
ROE	19.13 (5.76)	0.90		18.50 (4.72)	0.82	
TEIQue-SF total score	141.78 (21.43)	0.87				
Emotion Management				41.21 (7.24)	0.73	
Relationship Skills				49.70 (6.86)	0.69	
Social Competence				50.26 (10.32)	0.85	
Empathy				47.31 (7.48)	0.80	
Extrinsic Affect Improving	23.45 (3.56)	0.86	0.64	22.40 (4.44)	0.84	
Extrinsic Affect Worsening	5.83 (2.49)	0.80	0.47	4.55 (1.86)	0.75	
Intrinsic Affect Improving	20.08 (4.92)	0.84	0.61	19.52 (4.85)	0.79	
Intrinsic Affect Worsening	9.48 (4.03)	0.89	0.62	8.99 (3.70)	0.85	
PA	34.21 (7.60)	0.89	0.70	32.02 (7.09)	0.86	
NA	23.41 (7.75)	0.87	0.55	26.00 (7.56)	0.85	
Life Satisfaction	24.39 (6.59)	0.89	0.76	23.42 (6.55)	0.86	

H, E, X, A, C, O, Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness; SEA, self-emotional appraisal; OEA, others' emotional appraisal; UOE, use of emotion; ROE, regulation of emotion in self; PA, positive affect; NA, negative affect.

scree criterion and parallel analysis methods for factor number determination were however examined in the current data to verify that there was no major inconsistency with the previously-established factor structure. The scree criterion indicated the extraction of six factors, whilst parallel analysis marginally indicated seven factors, with the seventh sample and randomly-generated seventh eigenvalues being numerically very similar. Examination of the seven-factor solution showed that this differed from the six-factor one in splitting the Inauthentic factor into two sub-factors. To preserve the consistency of the short forms with the established MEOS factor structure, retaining a

unitary Inauthentic factor, the item content of the short forms was derived from the six-factor solution, which showed good simple structure, with the factors explaining 41% of the variance.

The Poor Skills factor was not examined further and was excluded from subsequent analyses. For the other five factors, the six highest-loading items on each were reviewed for content. For Enhance there were four items which referred to approaches to helping an anxious person. As the focus of the MEOS is on approaches to managing the emotions of others rather than the specific emotional state of the target, in order to reduce the number of anxiety items, the lowest-loading item of this type

(item 50: *If someone is feeling anxious, I try to offer practical help*) was replaced with the next highest-loading item (item 57: *If someone has a problem I offer to help if they need it*). For Worsen there were two similarly-worded items referring to the use of anger to get others to act as desired. The lower-loading of these (item 16: *I use displays of anger to motivate others*) was replaced with the next highest-loading item (item 20: *If I don't like someone's behavior I make negative comments in order to make them feel bad*). For Inauthentic three high-loading items referred to sulking. The lowest-loading of these (item 9: *If someone says or does something I don't like, I sometimes sulk*) was replaced with the next highest-loading item (item 2: *If I want someone to do something for me, I am especially nice to them before asking*). An EFA of the 30 items selected for the MEOS-SF using principal axis factoring with direct oblimin rotation and specifying five factors was performed. The factor pattern matrix showed good simple structure. Compared to the initial analysis using all the MEOS items there were some changes in the rank order of loadings within each factor. Each item had its principal loading on its subscale, with all but two of these being above 0.4 (two values of 0.36 for an Inauthentic and a Conceal item). The four highest-loading items for each factor from this analysis were selected for the MEOS-VSF and the EFA was repeated with these items, again resulting in good simple structure and only one principal loading below 0.4 (0.36 for an Inauthentic item). **Tables 2, 3** show the factor structures of the MEOS-SF and MEOS-VSF, **Table 4** shows the factor score correlations, which showed the same structure as for the full-length MEOS, with strong correlations between the pairs Enhance/Divert and Worsen/Inauthentic with the remaining correlations low. **Table 5** shows the item wordings for the two short forms.

Confirmatory Factor Analysis

CFA of the MEOS-SF and MEOS-VSF was performed on Sample 2 using EQS 6.3. Fit indices for a simple structure model with correlated factors for each scale are shown in **Table 6**. All fit indices other than the comparative fit index for the MEOS-SF (0.88, below the acceptable fit cut-off of 0.90) fell in the acceptable fit range (e.g., Schweizer, 2010). It would be possible to improve model fit for both scales by model modifications (adding cross-loadings and/or correlated error terms) but this risks creating a model which fails to generalize to new samples (MacCallum et al., 1992), so modified models are not presented here.

Internal Reliability and Validity

Table 7 shows internal reliabilities, using the omega coefficient (Dunn et al., 2014; Trizano-Hermosilla and Alvarado, 2016) for the MEOS-SF and MEOS-VSF scores; all subscale scores showed satisfactory internal reliability. Comparisons of bivariate correlations of the MEOS, MEOS-SF, and MEOS-VSF with personality traits (Five-Factor and HEXACO), the Dark Triad and trait EI are shown in **Tables 8–10**. These results show that the substantive correlations with other scales were of comparable size for the full-length MEOS and its short forms.

TABLE 12 | Bivariate correlation comparisons for Sample 3.

	Enh	Enh-SF	Enh-VSF	Div	Div-SF	Div-VSF	Wor	Wor-SF	Wor-VSF	Inau	Inau-SF	Inau-VSF	Conc	Conc-SF	Conc-VSF
H	0.26	0.24	0.22	0.08	0.05	0.05	-0.48	-0.44	-0.42	-0.54	-0.46	-0.36	0.06	0.05	0.08
E	0.18	0.18	0.15	0.18	0.17	0.17	-0.12	-0.12	-0.13	0.16	0.18	0.21	-0.18	-0.17	-0.16
X	0.28	0.27	0.26	0.33	0.32	0.28	-0.08	-0.05	-0.03	-0.11	-0.09	-0.12	-0.21	-0.22	-0.20
A	0.26	0.23	0.19	0.17	0.15	0.12	-0.42	-0.38	-0.35	-0.36	-0.33	-0.33	0.28	0.23	0.27
C	0.25	0.25	0.24	0.17	0.16	0.14	-0.29	-0.27	-0.25	-0.26	-0.20	-0.17	0.01	-0.01	0.01
O	0.22	0.23	0.25	0.16	0.13	0.08	-0.14	-0.13	-0.12	-0.13	-0.15	-0.19	0.12	0.12	0.09
SEA	0.22	0.19	0.16	0.16	0.15	0.12	-0.09	-0.06	-0.02	-0.12	-0.14	-0.03	-0.10	-0.10	-0.09
OEA	0.47	0.46	0.41	0.40	0.37	0.36	-0.24	-0.24	-0.22	-0.18	-0.14	-0.14	0.07	0.06	0.08
UOE	0.29	0.28	0.27	0.29	0.29	0.27	-0.15	-0.13	-0.09	-0.14	-0.12	-0.13	-0.05	-0.06	-0.04
ROE	0.15	0.14	0.12	0.17	0.17	0.16	-0.18	-0.13	-0.10	-0.20	-0.16	-0.17	0.23	0.20	0.24
EI	0.35	0.33	0.31	0.30	0.29	0.24	-0.22	-0.18	-0.13	-0.27	-0.26	-0.28	-0.18	-0.20	-0.15
Extr Aff Imp	0.58	0.56	0.52	0.53	0.51	0.48	-0.24	-0.23	-0.23	-0.13	-0.09	-0.11	0.10	0.09	0.07
Extr Aff Wors	-0.27	-0.27	-0.24	-0.14	-0.15	-0.13	0.64	0.58	0.55	0.46	0.43	0.41	-0.15	-0.11	-0.15
Intr Aff Imp	0.23	0.20	0.18	0.32	0.31	0.29	0.01	0.00	0.00	0.07	0.10	0.07	-0.11	-0.11	-0.11
Intr Aff Wors	-0.11	-0.10	-0.09	-0.08	-0.08	-0.05	0.28	0.26	0.21	0.26	0.23	0.21	0.13	0.15	0.10
PA	0.35	0.29	0.28	0.33	0.30	0.26	-0.06	-0.04	-0.02	-0.16	-0.16	-0.18	-0.01	-0.01	0.00
NA	-0.10	-0.12	-0.13	-0.10	-0.10	-0.09	0.21	0.18	0.15	0.25	0.23	0.24	0.10	0.12	0.09
Life Satis	0.07	0.06	0.05	0.11	0.11	0.12	-0.08	-0.06	-0.04	-0.09	-0.08	-0.10	-0.13	-0.14	-0.09

Enh, Enhance; Div, Divert; Wor, Worsen; Inau, Inauthentic; Conc, Conceal; H, E, X, A, C, O, Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness; SEA, self-emotional appraisal; OEA, others' emotional appraisal; UOE, use of emotion; ROE, regulation of emotion in self; Extr Aff Imp, Extrinsic Affect Improving; Extr Aff Wors, Extrinsic Affect Worsening; Intr Aff Imp, Intrinsic Affect Improving; Intr Aff Wors, Intrinsic Affect Worsening; PA, positive affect; NA, negative affect. N range 390–393. Correlations with $p \leq 0.01$ shown in bold.

TABLE 13 | Bivariate Correlation comparisons for Sample 4.

	Enh	Enh-SF	Enh-VSF	Div	Div-SF	Div-VSF	Wor	Wor-SF	Wor-VSF	Inau	Inau-SF	Inau-VSF	Conc	Conc-SF	Conc-VSF
H	0.19	0.18	0.16	-0.06	-0.07	-0.08	-0.42	-0.40	-0.38	-0.55	-0.48	-0.32	0.09	0.06	0.09
E	0.22	0.20	0.21	0.10	0.08	0.10	-0.13	-0.15	-0.08	0.13	0.14	0.22	-0.15	-0.12	-0.09
X	0.21	0.17	0.17	0.33	0.30	0.23	0.04	0.06	0.06	-0.07	-0.09	-0.17	-0.21	-0.21	-0.16
A	0.24	0.21	0.18	0.24	0.25	0.18	-0.45	-0.42	-0.44	-0.33	-0.36	-0.42	0.36	0.29	0.36
C	0.14	0.14	0.16	0.05	0.04	0.03	-0.13	-0.09	-0.06	-0.13	-0.15	-0.11	-0.04	-0.05	-0.04
O	0.06	0.08	0.12	-0.02	-0.01	-0.06	-0.10	-0.12	-0.12	0.05	0.04	-0.05	-0.05	-0.05	-0.03
SEA	0.18	0.14	0.14	0.07	0.05	0.02	0.01	-0.01	0.01	-0.13	-0.14	-0.16	-0.13	-0.14	-0.09
OEA	0.58	0.52	0.51	0.35	0.32	0.28	-0.17	-0.19	-0.16	-0.16	-0.12	-0.06	0.14	0.16	0.20
UOE	0.26	0.23	0.22	0.22	0.20	0.13	-0.07	-0.05	-0.03	-0.09	-0.10	-0.13	-0.12	-0.12	-0.10
ROE	0.17	0.13	0.12	0.23	0.24	0.22	-0.08	-0.07	-0.08	-0.10	-0.09	-0.18	0.18	0.14	0.18
Emenage	0.22	0.21	0.18	0.08	0.06	0.04	0.27	0.19	0.19	0.12	0.13	0.10	-0.17	-0.15	-0.13
Relskills	0.42	0.38	0.37	0.25	0.23	0.19	-0.35	-0.31	-0.25	-0.27	-0.26	-0.20	0.09	0.06	0.13
Socomp	0.31	0.30	0.30	0.28	0.25	0.20	0.01	0.02	0.02	-0.03	-0.02	-0.07	-0.21	-0.20	-0.16
Empathy	0.53	0.49	0.48	0.29	0.27	0.21	-0.42	-0.39	-0.34	-0.30	-0.28	-0.26	0.13	0.11	0.19
Extr Aff Imp	0.49	0.43	0.41	0.41	0.37	0.32	-0.08	-0.10	-0.09	-0.02	-0.02	-0.05	0.13	0.15	0.13
Extr Aff Wors	-0.15	-0.20	-0.24	-0.08	-0.08	-0.05	0.42	0.39	0.36	0.33	0.30	0.29	-0.16	-0.13	-0.13
Intr Aff Imp	0.25	0.21	0.19	0.33	0.28	0.25	-0.04	-0.04	-0.03	0.02	0.03	-0.02	-0.13	-0.13	-0.08
Intr Aff Wors	-0.10	-0.11	-0.13	-0.05	-0.05	-0.02	0.08	0.02	-0.02	0.20	0.18	0.20	0.10	0.11	0.11
PA	0.24	0.19	0.19	0.30	0.31	0.28	0.01	0.03	0.02	-0.05	-0.06	-0.10	-0.10	-0.11	-0.06
NA	-0.04	-0.06	-0.05	-0.08	-0.09	-0.07	0.12	0.07	0.07	0.22	0.20	0.21	-0.03	0.03	0.01
Life Satis	0.18	0.16	0.18	0.20	0.19	0.14	-0.08	-0.05	-0.04	-0.09	-0.10	-0.15	-0.23	-0.25	-0.18

Enh, Enhance; Div, Divert; Wor, Worsen; Inau, Inauthentic; Conc, Conceal; H, E, X, A, C, Q, Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness; SEA, self-emotional appraisal; OEA, others' emotional appraisal; UOE, use of emotion; ROE, regulation of emotion in self; Extr Aff Imp, Extrinsic Affect Improving; Extr Aff Wors, Extrinsic Affect Worsening; Intr Aff Imp, Intrinsic Affect Improving; Intr Aff Wors, Intrinsic Affect Worsening; PA, positive affect; NA, negative affect. N range 222–223. Correlations with $p \leq 0.01$ shown in bold.

Discussion

The development of the MEOS-SF and MEOS-VSF from data available from previous studies resulted in the subscale scores displaying good internal reliability, whilst the factor structure of both short forms was the same as that found for the full-length MEOS. CFA fit was satisfactory rather than good, but the context for this result is that CFA models for multidimensional scales at both the facet and item level often fail to achieve good fit (e.g., Aluja et al., 2004). For a direct comparison for a similar length scale, see Donnellan et al. (2006), who reported similar fit indices to those for the MEOS-SF for a simple structure model for the 25-item Mini-IPIP scale. In addition, the correlations of the MEOS-SF and MEOS-VSF with personality and trait EI were similar to those for the full-length MEOS, indicating similar validity for the subscale scores for the full-length MEOS and its short forms. As it is important to verify the reliability and validity of the MEOS short form scores using independent data, a second study was undertaken, which also included several measures whose associations with the MEOS have not previously been examined.

STUDY 2

Method

Ethics Statement

Two new datasets were obtained for this study. Ethical approval for the study was obtained from the relevant university ethics committees: the Ethics Committee of the Psychology Department, University of Western Ontario for Sample 3 and the Ethics Committee of the School of Philosophy, Psychology and Language Sciences, University of Edinburgh for Sample 4.

Participants

Sample 3 comprised 394 students at the University of Western Ontario who participated for course credit. The sample comprised 78 males, 316 females and were mostly (98%) in the age group 17–22 years. A subset of 116 students completed a retest survey, with a mean test-retest interval of 34 days. Sample 4 comprised 226 students at the University of Edinburgh who participated for course credit. The sample comprised 54 males, 172 females. The mean age was 19.3 years, standard deviation 3.1 years. A subset of 36 students completed a retest survey, with a mean test-retest interval of 32 days.

Instruments

In addition to the MEOS, the survey contained the scales listed below. Internal reliabilities for all scale scores are presented in Table 11.

HEXACO-60 (Ashton and Lee, 2009)

This 60-item scale assesses the personality dimensions of Honesty-Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness (O). Responses are on a five-point scale with endpoints strongly disagree, strongly agree.

Trait EI

Sample 3 participants completed the 30-item TEIQue-SF (Petrides and Furnham, 2006). Sample 4 participants completed selected subscales of the full TEIQue (Petrides, 2009) which fall

within the interpersonal trait EI domain (Emotion Management, Relationship Skills, Social Competence and Empathy). These scales have a 7-point response scale with endpoints disagree completely, agree completely. All participants also completed the Wong and Law Emotional Intelligence Scale (WLEIS; Wong and Law, 2002). This 16-item scale has subscales Self-emotion appraisal (SEA), Others' emotion appraisal (OEA), Use of emotion (UOE) and Regulation of emotion (ROE). The test has a seven-point response scale with endpoints completely disagree, completely agree.

Emotion regulation of others and self-scale (EROS; Niven et al., 2011)

This 19-item scale has two subscales relating to regulation of own emotions (Intrinsic Affect Improving and Worsening) and two relating to regulation of the emotions of others (Extrinsic Affect Improving and Worsening). Responses are on a five-point scale with endpoints not at all, a great deal.

Positive and negative affect schedule (PANAS; Watson et al., 1988)

The 20-item (10 items for positive affect, PA and 10 for negative affect, NA) version of this scale was used. For each emotion listed participants responded on a five-point scale from very slightly or not at all to extremely, indicating the extent to which they had experienced that emotion during the past week.

Life satisfaction (Diener et al., 1985)

The five-item Satisfaction With Life Scale (SWLS) has responses on a 7-point scale with endpoints strongly disagree, strongly agree.

For Sample 3 the retest survey included the MEOS, EROS, PANAS and SWLS, whilst only the MEOS was included in the retest for Sample 4.

Procedure

All surveys were completed online. Participants were recruited via their respective undergraduate subject pools. On completion of the initial survey participants could choose to provide a contact email if interested in completing a follow-up survey. Participants who provided an email were subsequently contacted with a link allowing access to the retest survey.

Data Analysis

Reliability (internal and test-retest) of the MEOS-SF and MEOS-VSF scores were examined and the correlations of the full MEOS and the short forms with the other study measures were examined. As the associations of the MEOS with the EROS, WLEIS, PANAS, and SWLS have not been reported previously, these are described in a separate section, including results which cross-validate the MEOS with the Extrinsic subscales of the EROS.

Results

Reliability and Validity

Table 11 shows descriptive statistics, and the internal reliabilities and test-retest reliabilities of scores on the MEOS versions and other study measures.

Apart from MEOS-VSF Divert in Sample 3, all short MEOS subscale scores had internal reliabilities above 0.7. Test-retest reliabilities were good for subscale scores of all versions of the MEOS in Sample 4, with only the MEOS-VSF Inauthentic score test-retest reliability falling below 0.7; other values were comparable to the range 0.71–0.83 previously reported for scores on the full-length MEOS (Austin and O'Donnell, 2013). Test-retest reliabilities of scores on the MEOS versions in Sample 3 were lower and were also similarly low for EROS subscale scores.

Comparisons of bivariate correlations of the MEOS, MEOS-SF and MEOS-VSF with personality, trait EI, EROS, PA, NA and life satisfaction are shown in the **Tables 12, 13**. As in Study 1, these results show that the substantive correlations with other scales were of comparable size for the full-length MEOS and its short forms.

Sex Differences in MEOS Scores

Previous work has indicated a consistent sex difference in scores on the Worsen scale, with males scoring higher than females (Bacon and Regan, 2016) and with sex acting as a significant predictor when included as a predictor with personality and trait EI in regression models for this subscale score (Austin et al., 2014; Austin and Vahle, 2016). Sex differences in scores for all versions of the MEOS in Samples 3 and 4 were examined using *t*-tests, correcting for multiple comparisons. The only significant results were higher scores for males on Worsen for the MEOS, MEOS-SF and MEOS-VSF in Sample 3 [$t_{(389)} = 3.85, p < 0.001$; $t_{(391)} = 4.40, p < 0.001$; $t_{(391)} = 4.80, p < 0.001$] and on the MEOS-SF and MEOS-VSF for Sample 4 [$t_{(224)} = 3.53, p = 0.001$; $t_{(224)} = 3.61, p < 0.001$].

MEOS Associations With the EROS, WLEIS, PANAS, and Life Satisfaction

The associations of the MEOS with the other study scales showed the expected strong correlations of Enhance and Divert with the conceptually-related Extrinsic Affect Improving scale, and of Worsen and Inauthentic with the conceptually-related Extrinsic Affect Worsening scale. For the WLEIS, significant associations were positive for Enhance and Divert and negative for Worsen and Inauthentic, with the associations of Enhance and Divert with OEA scores being the strongest. Enhance and Divert were also strongly positively correlated with PA, with Worsen and Inauthentic more weakly associated with NA. Enhance and Divert also showed weak positive associations with life satisfaction.

Discussion

The results showed satisfactory or good internal reliabilities for the MEOS-SF and MEOS-VSF subscale scores in both samples and a pattern of similar correlations with scores on other measures across all MEOS versions. Test-retest reliabilities of the short form scores were good in Sample 4 but lower in Sample 3. Low test-retest reliability coefficients were also found for subscale scores of the conceptually similar EROS scale and for NA scores in this sample; it is unclear why this sample showed low retest stability across several measures. Examination of sex differences showed that males scored higher than females on the Worsen

subscale of the short forms; this difference is consistent with previous results for the full-length MEOS.

The associations of the MEOS with the EROS, WLEIS and PANAS are of interest as they have not been examined previously. Associations of the EROS extrinsic subscales with the core MEOS factors showed the expected pattern of strong associations of Enhance and Divert with Extrinsic Affect Improving, and of Worsen and Inauthentic with Extrinsic Affect Worsening. This aligns with the conceptual relationships of the MEOS core subscales and the EROS extrinsic subscales. The MEOS associations with the WLEIS subscales were consistent with the pattern of positive associations with trait EI for Enhance and Divert and negative associations for Worsen and Inauthentic found in previous work (e.g., Austin and O'Donnell, 2013), with the larger associations for Enhance and Divert with OEA being consistent with this WLEIS facet covering perceiving and understanding others' emotions (Wong and Law, 2002), although this pattern did not extend to Worsen and Inauthentic. The associations of the core MEOS factors with PA and NA parallel previous results showing that using interpersonal affect regulation for improving or worsening others' moods has congruent associations with affective well-being (Niven et al., 2012).

GENERAL DISCUSSION

In these two studies two short forms of the MEOS were developed and examined using both previously-available data and two new samples. The results showed that the MEOS-SF (six items per subscale) and the MEOS-VSF (four items per subscale) scores were reliable and also displayed similar validity coefficients with a range of personality, trait EI and well-being measures to those of the full-length MEOS. New results cross-validating the MEOS with the interpersonal scales of the EROS (Niven et al., 2011), which also assess interpersonal emotion management, were also presented.

The limitations of the present work include the use of predominantly female student samples. Further work on all MEOS versions in samples more representative of the general population is desirable, including the study of age differences in interpersonal emotion management.

The present work was also limited by only including self-report scales. One important way to extend the results would be to examine how MEOS scores are associated with behavioral measures of interpersonal emotion management, for example by examining the effects of these scores as potential moderators of approaches to regulating another's emotions in laboratory social interaction scenarios (Andrade and Ho, 2009), or in realistic social interactions. Given the positioning of interpersonal emotion management within the social domain, the creation and use of peer-report MEOS versions would also be of considerable interest. An example of an area where peer reports could be informative is in the examination of sex differences in the way in which interpersonal emotional management is used in social interactions (Bacon and Regan, 2016).

The good psychometric properties of the MEOS short forms mean that these scales are suitable for use in contexts where a brief assessment of interpersonal emotion management is required. All versions of the MEOS allow examination of the manipulative as well as the helpful/prosocial aspects of interpersonal emotion management, so are particularly relevant to studies where the “dark side” facets of trait EI, as well as its more prosocial aspects, are of interest. The short forms should be particularly useful in some of the areas for future research highlighted above, since short scales are of practical utility for behavioral and longitudinal studies, and for studies using peer-reports. The specific choice of the MEOS-SF or MEOS-VSF, assuming a study design for which the full MEOS is not suitable, depends on a trade-off between the better reliability and domain coverage of the MEOS-SF against the smaller number of items per subscale, and hence demand on participants, for the MEOS-VSF. The brevity of the MEOS-VSF means that it would be particularly suitable for studies using experience sampling (e.g., Catterson et al., 2017) and similar repeat-measure designs, where

there is a requirement to complete the same scale on multiple occasions. For single surveys where the requirement for a very short scale is less pressing, the MEOS-SF would generally be more suitable.

DATA AVAILABILITY

The raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

AUTHOR CONTRIBUTIONS

EA: Project design and administration, survey creation, data collection, data preparation and coding, data analysis, writing of manuscript; DS: Project design and administration, manuscript revision; MS: Project design and administration, survey creation, data collection, data preparation and coding, manuscript revision.

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Enhancing the Prediction of Emotionally Intelligent Behavior: The PAT Integrated Framework Involving Trait EI, Ability EI, and Emotion Information Processing

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Emotional Intelligence (EI) has been conceptualized in the literature either as a dispositional tendency, in line with a personality trait (trait EI; Petrides and Furnham, 2001), or as an ability, moderately correlated with general intelligence (ability EI; Mayer and Salovey, 1997). Surprisingly, there have been few empirical attempts conceptualizing how the different EI approaches should be related to each other. However, understanding how the different approaches of EI may be interwoven and/or complementary is of primary importance for clarifying the conceptualization of EI and organizing the literature around it. We introduce a theoretical framework explaining how trait EI, ability EI, and emotion information processing – a novel component related to EI recently introduced in the literature (e.g., Fiori and Vesely Maillefer, 2018) – may contribute to effective emotion-related performance and provide initial evidence supporting its usefulness in predicting EI-related outcomes. More specifically, we show that performance in a task in which participants had to infer the mental and emotional states of others, namely a Theory of Mind task, was predicted jointly (e.g., interaction effects) by trait EI, ability EI, and emotion information processing, after controlling for personality and IQ ($N = 323$). Our results argue for the importance of investigating the joint contribution of different aspects of EI in explaining variability in emotionally laden outcomes.

Keywords: emotional intelligence, trait EI, ability EI, emotion information processing, integrated framework

INTRODUCTION

For the past almost three decades, there has been debate surrounding the definition and measurement of Emotional Intelligence (EI; Matthews et al., 2002; Zeidner et al., 2008, 2012). The dominant theoretical frameworks remain *ability* EI and *trait* EI. The *ability* EI (AEI) approach conceptualizes EI as an ability, framing it as a form of intelligence, specifying that cognitive processing is implicated in emotions, and that it should thus be assessed through performance measures (Mayer and Salovey, 1997; Freeland et al., 2008). It was formulated from the four-factor Salovey-Mayer model (Mayer and Salovey, 1997), is now being refined upon

(MacCann and Roberts, 2008), and a three-factor solution has been acknowledged (removal of ‘using emotions’) as a better empirical fit (e.g., Keele and Bell, 2008; Fiori et al., 2014). The general trait EI approach is related to personality and most often focuses on the emotional self-efficacy of the individual that is measured through self-report scales (Palmer and Stough, 2001; Petrides and Furnham, 2001; Schutte et al., 2009). *Trait EI* (TEI) has been researched extensively by scholars such as Petrides and Furnham (2001) and many others, who have developed a range of trait models (e.g., Palmer and Stough, 2001; Wong et al., 2007). Some research has also utilized “mixed models” of EI (e.g., Bar-On, 2006), which include a combination of personality traits, dispositions, and competencies related to emotion, though these have shown to have little incremental variance when predicting important outcomes (Joseph et al., 2015).

Establishing the criteria necessary for the accurate conceptualization of EI has involved many challenges. More current discussion on EI has introduced the idea of *emotion information processing* (EIP) as an additional component related to EI that may account for variability in emotionally intelligent behavior (Fiori and Vesely Maillefer, 2018). The way individuals process emotion information, such as how they acquire, perceive, encode, pay attention to, retain, and retrieve emotion information (Suedfeld and Tetlock, 1977), is an aspect that is little explored in the literature with respect to EI and that would capture how individuals experience emotions. Indeed, it is argued that EI also requires a fluid, experiential component able to differentiate individuals with real practical emotional skills from ‘intelligent machines’ that would be able to perform well on ability EI tests based solely on algorithmic, rather than emotional, processes (Ortony et al., 2007). The same concern emerges when observing individuals who may lack practical interactive skills, such as individuals with Asperger’s Syndrome, who may improve on ability EI tests through learning without being able to change their emotionally intelligent behavior in person (Montgomery et al., 2010). This is congruent with the idea that ability EI measures tap more into the knowledge people have about emotions rather than the application of it to real life situations (Fiori, 2009; Fiori and Vesely Maillefer, 2018).

The notion that emotion information processing is associated with EI is supported by a few studies that have investigated this issue. Individuals higher in TEI showed attentional biases toward positive, rather than neutral and negative, emotional stimuli (Lea et al., 2018). Further, a recent systematic review on EI and its relationship to both emotionally laden (hot) and not emotionally laden (cool) cognitive processes measured by computer lab tasks (go-nogo, IGT, stroop etc.) showed differential relationships between emotion information processing and different means of measuring EI (self-report ability, performance-based ability, and self-report mixed models; Gutiérrez-Cobo et al., 2016), with higher predictive value of performance-based ability on emotion information processing. The introduction of a separate but related concept, emotion attention regulation (EAR), which involves focusing emotion-related attention for the purpose of information processing rather than in order to regulate one’s own internal state (Elfenbein et al., 2017), has further reinforced the

account that emotion information processing is an important component of the construct of EI.

Whether it should be represented as a trait or an ability, assessed using self-report or performance measures, or whether the constructs to date effectively describe EI in its practical application, what all of these theoretical frameworks share in common is their conceptualization of EI as a distinct construct from traditional IQ and personality, which facilitates the potential for prediction of, and influence on, various real-life outcomes (e.g., Ciarrochi et al., 2000; Petrides et al., 2007).

Surprisingly, there is little understanding regarding whether and how the different EI perspectives relate to one another. Furthermore, though some theoretical articles do discuss how trait EI and ability EI could jointly predict outcomes (e.g., Seal and Andrews-Brown, 2010), very few empirical contributions address the possibility of statistical interaction of approaches (for an exception see Salguero et al., 2015). And yet, understanding how the different attributes of the same underlying EI construct may be interwoven and/or complementary is of primary importance for clarifying the conceptualization of EI and organizing the literature around it. An attempt to theoretically understand different components of EI was made with the tripartite model (Mikolajczak, 2009; Mikolajczak et al., 2009), where three levels of EI, namely (1) knowledge – reflecting what people know about emotions, (2) ability – to apply this knowledge in real-world situations, and (3) traits – reflecting the propensity to behave in a certain way in emotional situations (typical behavior), are theoretically proposed. Although this conceptualization of the EI components is helpful in understanding the complexity of emotionally intelligent behavior, it does not provide specific directions regarding how such components would interact with each other in order to yield better performance. A comprehensive and developed model is the one proposed by Seal and Andrews-Brown (2010), which explains how different components of EI may interact predicting emotional intelligent behavior by means of a moderated-mediation framework. The authors identified three paradigms composing their integrative model of EI: emotional quotient that they viewed as preferred patterns of behavior, emotional ability that they considered as the potential capacity of the individual, and emotional competence, which represents the actual behaviors impacting performance. In the proposed model, the effect of trait EI on performance outcomes is mediated by emotional competence and this relationship is moderated by ability EI.

Our conceptualization of how different components of EI may interact to produce emotionally intelligent behavior presents similarities with the above-mentioned model, although we consider the different EI components on the same level. Specifically, we argue that each EI conceptualization represents a different attribute of EI, each of which interactively impact associated outcomes. In addition, we do not conceptualize emotional competence as the mechanism through which the other EI components may lead to higher performance; instead, relying on the vocational behavior literature (Bloom, 1976; Bellier, 2004) we consider emotional competence as the shared variance among the different EI components. Importantly,

we introduce a new third approach among the different EI components, together with trait and ability EI–emotion information processing–and then provide initial evidence regarding the extent to which this novel framework predicts adaptive performance. Prior to introducing our study, we look to some theoretical and empirical reasoning in favor of integrating a combination of approaches for the purpose of predicting adaptive outcomes.

Predictors of Emotionally Intelligent Performance

With this objective in mind, we turn to a discussion on the way in which the different EI components may contribute to effective performance. Inconsistencies in language and terminology have contributed to blurring the lines among the various EI definitions. Terms such as ability, trait, competence, capacity, and self-efficacy, are often utilized inconsistently, requiring us to query whether EI refers to the *potential* to behave in an emotionally intelligent manner, the *frequency* with which we do so on a daily basis (typical behavior), or the way we would behave if we were being evaluated at our best (maximal performance). Furthermore, when looking at emotionally intelligent behavior, the literature has also confused what we see as the outcome of having high EI versus the components of EI that account for these outcomes. For instance, some studies argue that having the ability to manage emotions as measured by the MSCEIT (an emotion knowledge based test) is equivalent to being able to regulate emotions in a specific situation, which is not necessarily the case (see Peña-Sarrionandia et al., 2015 for how the two constructs can be conceptualized). For instance, one may be able to employ a breathing technique during practice as well as understand conceptually that employing it would help to calm oneself down if upset, however, one may not be able to implement this technique in the ‘heat of the moment.’ Further, the situation may have an impact on whether one is able to reflect enough in order to call on the effective technique.

This difficult distinction between predictors and outcomes, and more specifically, ability versus performance, has also been discussed in the context of general intelligence and personality research (Chamorro-Premuzic and Furnham, 2004). The authors make the distinction between actual intellectual ability (including crystallized and fluid intelligence), and performance on IQ tests, though in recognition that the latter is a very strong predictor of the former. Their model then specifies also that certain personality factors have an impact on both actual ability, IQ test performance, and subjectively assessed intelligence, the latter of which also impacts IQ test performance (Chamorro-Premuzic and Furnham, 2004), emphasizing both the multiplicity of factors as well as their complex interrelationships that can all contribute to performance. For the purpose of clarity, emotionally intelligent behavior is here considered the general outcome with different EI components defining the individual components that aim to predict this outcome.

Looking broadly at general competence models also provides support for the integration of a range of attributes (traits, abilities, and processing) into a single model that should predict positive

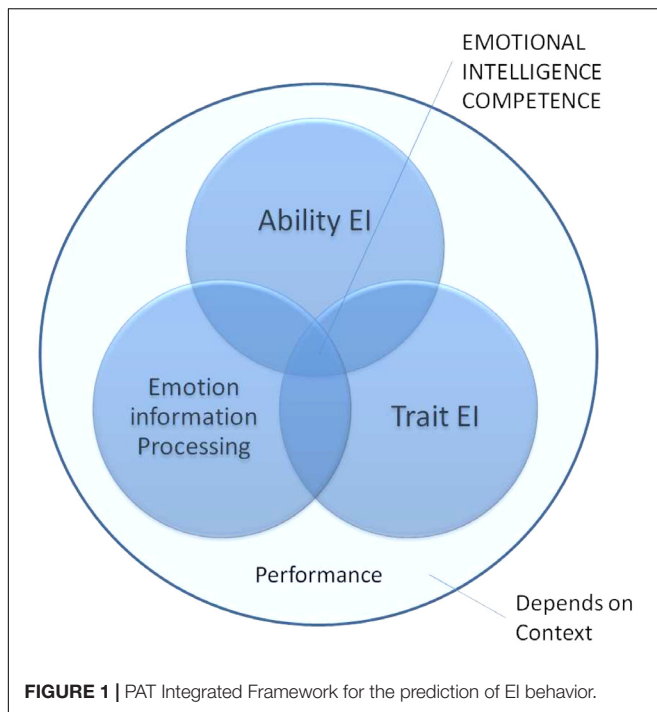
performance in a specific domain. An influential typology, known as Bloom’s Taxonomy utilized to assess performance in educational settings, is comprised of a variety of factors called KSAs: knowledge, skills, attitudes (Bloom et al., 1971; Bloom, 1976). Within this literature, work competence is based on these three cognitive domains: mental (Knowledge), affective (growth in feelings or emotional areas; Attitudes), and psychomotor (manual or physical skills; Skills), each of which jointly contributes to learning outcomes. Further, Kanfer and Ackerman (2005) discuss an overview of work competence that includes abilities, knowledge and skills, motivation, personality, and self-concept (such as self-confidence and self-efficacy) and indicate that work-related behavior can be predicted by both ability and non-ability characteristics. Their conceptualization tends to be focused on maximal performance (what the individual can do at their best) and also makes a distinction between competence and performance indicating that the latter is influenced by external (e.g., failed equipment) and transitory (e.g., temporary distraction) factors in addition to these internal factors such as traits, abilities, and skills (Kanfer and Ackerman, 2005).

A model known especially in the vocational behavior literature seems more comprehensive and describes professional competence as being comprised of three major components: *savoir* (declarative knowledge or having theoretical understanding of information), *savoir-être* (general attitude or tendency toward behavior of knowledge; behavioral competencies), and *savoir-faire* (the application of this knowledge or procedural knowledge; functional competencies). Each of these can predict performance outcomes independently as well as interact with each of its counterparts to create competence – the interaction of all three components (Bellier, 2004). The model is set within its specific context, which may also affect the outcome. This model is akin to the independent and interactive contribution of knowledge, application of such knowledge, and basic trait dispositions that may drive effective performance with all three required to reach ‘full competence,’ the most comprehensive predictor of performance.

Bearing on these theorizations, we propose a comprehensive and integrated approach in which we employ the above-mentioned components plus the new dimension of emotion information processing–representing how individuals react to contextual emotional stimuli–to predict ‘emotionally intelligent’ or ‘adaptive’ behavior. In this article, we utilize the definition of adaptive according to the developmental psychopathology model (see Ellis et al., 2012) as referring to behaviors that augment an individual’s wellbeing, cooperation, and social integration (e.g., Kochenderfer-Ladd, 2004). The idea here is not to propose a ‘new model’ of EI, but to look at the way in which these difference approaches of looking at EI may interact with one another to better predict performance and behavior.

The PAT Integrated Framework

Situated within a specific context, the PAT (representing **EIP** – **AEI** – **TEI**) integrated framework includes each of ability EI (AEI), trait EI (TEI), and Emotion Information Processing (EIP). The framework (**Figure 1**) poses the following basic assumptions:



- (1) Each EI component is relatively independent.
- (2) There is a two-way interaction between each EI component.
 - (a) $AEI \times TEI$
 - (b) $EIP \times AEI$
 - (c) $TEI \times EIP$
- (3) *Emotional Intelligence competence* consists of the interaction of all three components
 - (a) All three components do not necessarily contribute equally but are always at play.
 - (b) The level of EI competence, and thus performance, can be context-dependent.
 - (c) Context can also influence the level of contribution of each EI component.

Each EI Component Is Relatively Independent

Each component of EI is different and could independently predict behavioral outcomes. Congruent with the literature, each of trait EI, ability EI, and emotion information processing has been previously established as a valuable construct in predicting behavior and performance. Trait EI has long been linked to outcomes related to emotionally intelligent behavior, such as better coping and reduced exam-related stress (Austin et al., 2010), higher levels of leadership (George, 2000; Caruso et al., 2014), workplace flourishing and performance (Di Fabio and Saklofske, 2014; Wan et al., 2014), higher educational achievement (e.g., Bar-On, 2004; Zeidner et al., 2012), and various other physical and/or psychological outcomes (e.g., Palmer et al., 2002; Slaski and Cartwright, 2002; Vesely et al., 2014).

Similarly, the predictive value of ability EI has shown convergence for a wide range of similar outcomes, also showing

associations with improved health and wellbeing variables such as stress, coping, teacher efficacy, job satisfaction and performance, social effectiveness and academic achievement (e.g., Brackett et al., 2004; Lyons and Schneider, 2005; Fiori, 2015). Further, and in response to various criticisms, both trait EI and ability EI have repeatedly shown to have incremental validity above and beyond personality and general intelligence on a wide range of outcomes (e.g., Joseph and Newman, 2010; Siegling et al., 2015a; Andrei et al., 2016).

The role of emotion information processing in predicting several emotion-related outcomes is documented in the literature. For instance, research has shown that attention to threatening information, which is particularly developed in high anxiety individuals, may be an advantage when the situation requires high vigilance, but may also impair performance in the case of highly demanding tasks (e.g., Matthews and Dorn, 1995). Results from the broader literature of emotion suggest that high EI individuals may, in principle, benefit from a modulation of emotion information processing (such as either hyphenated attention, or inhibition of the processing of emotion information) depending on the situation.

Within the EI literature, previous works have investigated the association between EI and several types of emotion information processing (Gutiérrez-Cobo et al., 2016), such as inspection time (Austin, 2005; Farrelly and Austin, 2007), or attention to emotion information (Fiori and Antonakis, 2012). A recent study (Elfenbein et al., 2017) introduced the regulation of attention toward and away from emotional stimuli as an emotion information processing tasks associated with ability EI and predictive of subjective well-being.

There Is a Two-Way Interaction Between Each EI Component

With reference to each of the proposed two-way interactions, we theorize that each component of EI also has the potential to interact with each other. Few studies have assessed both ability EI and trait EI within the same dataset, with some of them theorizing how they may be related to each other. For example, Salguero et al. (2015) examining a sample of female students, found that the relationship between ability EI and symptoms of depression was negative only when individuals were high in perceived EI. The vast majority of studies assessing the impact of both trait EI and ability EI together on the same outcome variables have considered the two perspectives as complementary, both theoretically and within their specific studies (e.g., Mikolajczak, 2009; Foster and Roche, 2014; Gardner et al., 2014) and have not tested the hypothesis that ability EI and trait EI may jointly contribute to emotionally intelligent outcomes. For instance, ability EI and trait EI were shown to contribute independently to performance on a Theory of Mind Task (Ferguson and Austin, 2010) and ability EI and trait EI have shown differential impact on mental health outcomes through diverse roles on coping (Davis and Humphrey, 2012).

Additionally, though no studies of emotion information processing interacting with ability EI or trait EI have been conducted, Austin (2010) showed that ability EI (specifically understanding of emotions) predicted inspection time on an

emotion perception task for aspects involving more conscious emotion information processing, raising questions around the means by which these interact at automatic versus voluntary levels. Within the broader literature of cognition and intelligence, aside from seminal theoretical frameworks interpreting the role of information processing in linking personality to performance (e.g., Humphreys and Revelle, 1984), additive effects of personality and speed of processing were found to predict performance on intelligence tests (Bates and Rock, 2004). Interestingly, very little in the literature has been done in conceiving of (emotion) information processing as a variable that may interact with personality and/or ability to produce higher performance. In our framework, the joint contribution of emotion information processing with each of ability EI and trait EI is expected in light of potential beneficial effects of information processing in boosting the effects of cognitive (ability) or personality (trait) individual differences on task performance. For example, within a cognitive task, individuals who are higher on neuroticism tend to look at threatening stimuli more, which may then negatively affect performance. However, individuals who are high on neuroticism, but also good at inhibiting attention to negative stimuli, may lessen this effect.

Emotional Intelligence Competence Consists of the Interaction of All Three Components

The idea is that EI competence includes contributions from all three components: emotional knowledge and its application (ability EI), processing of emotion information (emotion information processing), and a disposition toward a certain action (trait EI). However, there must not necessarily be equal contribution from each component, as various factors, both individual and contextual, may influence each component, and thus, overall performance. Dependent on the type of performance, joint contribution might be more relevant than independent contributions, such as in the example above where compensation leads to a better outcome than just having personality or information processing alone.

In order to illustrate how the framework with its different assumptions may account for performance, we provide an example of a situation of interpersonal conflict at work in which a customer service representative has to deal with a customer who is unsatisfied with a product. In this example, we identify emotionally adaptive behavior as performing the appropriate actions in order to calm the customer down and end the communication with the customer being less upset than he or she was at the beginning of the interaction. In order for this to happen, one may argue that it would be necessary for the customer service representative to have the knowledge of what types of emotions people (self and others) might feel when they are dissatisfied and understand how this, in turn, would affect their behavior (ability EI). One would also have to recognize one's own tendency to behave in a certain way given this type of conflict situation (one's typical response or trait EI), and be able to attend to and inhibit possible maladaptive responses in the moment (e.g., being able to hold back), while also expressing oneself appropriately (e.g., tone and word use) despite possible interfering anger/frustration (emotion information processing).

Higher EI competence in some situations may be present with a different ratio of contribution from each EI component, with each having the capacity to affect the other(s). For instance, one may be able to compensate for lack of knowledge about what the other interaction partner feels by applying a habitual response that is usually effective to reduce conflict (e.g., making a joke about the situation). Each of these EI aspects and/or their possible interactions with one another would contribute to how people react in a wide range of situations and are thus included in our approach to predicting emotionally intelligent behavior.

Utilizing variations of the above scenario, **Table 3** provides some examples of how the three EI components may interact to produce more or less adaptive outcomes. One can see how the salience of one or more of the EI components and their interaction could result in these adaptive or maladaptive outcomes (also depending on contextual and personal factors). For instance, if conflict situations are quite common for an individual because he or she works in a customer service complaints department, one might argue that trait EI would present as most salient with the level of emotionally intelligent behavior also being impacted by one's previous knowledge of the emotional experience (ability EI). Here, the processing of emotion information in the moment (emotion information processing; physiological reactions and focus) is generally habituated. If it is a typical day and the individual is generally a sociable person, has the tendency to try to see things from the perspective of others (high trait EI), and understands how to be effective at problem-solving when others are upset (high ability EI), the likelihood of helping the customer hang up the phone happy is much higher (i.e., emotionally competent behavior). In this case emotion information processing may not have much of an impact.

In another situation, ability EI and emotion information processing may act more strongly – for example, where one could rely on knowledge to express oneself effectively. Congruent with the literature on the impact of declarative knowledge on academic outcomes (e.g., Hailikari et al., 2008; Dunlosky et al., 2013), when given time in which one may prepare, can rely on strategy, and can use one's knowledge to predict future events, one may perform more effectively. This may be the case for a person who is new to a customer service complaints department but has taken classes about conflict resolution. In this case, the person has little previous experience in the field, but has learned how to deal with problems and how to understand the conflict situations. With the help of some inhibition processes (high emotion information processing), the person could deal more effectively with the complaints of the clients. Hence, various combinations of EI components could result in more or less favorable outcomes.

In summary, one of the main features of the proposed PAT integrated framework (see **Figure 1**) is that it proposes each EI element to predict performance individually as well as when interacting with each of its counterparts. Further, EI components within an interaction can lead to different outcomes (higher or lower) than merely the additive effect(s) of each EI component individually.

Furthermore, the joint contribution of all three EI components characterizes *emotional intelligence competence*. This interaction is called ‘competence’ because it includes and integrates all the components from the literature that have shown to contribute to effective behavior, including declarative and procedural knowledge, past experience, capacity to execute certain tasks, and habitual responses. The salient feature of EI competence *at high levels* is that it ensures the most effective performance by integrating the different components in a way that allows them to compensate for reciprocal shortcomings. Because of this compensatory effect, the predictive ability of the interaction of EI components is seen as *superior* to the predictive ability of the individual contribution of these components, even if one or more components is low. However, whether EI competence (three-way interaction) leads to better or worse performance depends on the EI competence level. This may be either higher or lower as a function of the combination of the three components, thus leading to higher or lower EI performance based on the most adaptive combinations. EI competence best predicts emotionally intelligent performance as it takes all components at stake into consideration and is thus a more accurate representation of the contributors to behavior in emotional situations; however, a two-way interaction, and individual components may also predict performance.

Finally, the framework acknowledges that context may also impact EI competence, and thus performance. EI components may be affected differently by different settings, thus interacting differently and leading to the achievement of more or less emotionally intelligent behavior. For example, in a professional setting, one might have better emotional inhibition skills than in a family setting, where one has habituated to reacting more impulsively given that social desirability may be less demanding.

The Present Study

The purpose of the current study was to provide initial evidence of the usefulness of the PAT integrated framework in accounting for emotionally laden performance. More specifically, we aimed to test the hypothesis that the integration of the three EI components, or three-way interaction, would predict performance in addition to personality, intelligence, and the direct contributions of each single EI component. Other theoretical models have proposed a distinction of different EI components (e.g., Mikolajczak, 2009), but none to our knowledge have hypothesized the same type of integration of the different EI components in the form of a complex interaction. Furthermore, although the role of emotion-information processing as related to EI has been previously mentioned in the literature (e.g., Roberts et al., 2007) we are not aware of any *empirical* contribution that tested its role in predicting emotion-laden outcomes in interaction with other EI-related components.

Our hypothesis regarding the joint effect of the three EI-components was tested in a task requiring complex mental inferences about another person’s intentions and feelings (a Theory of Mind task). The characterization of Theory of Mind (ToM) refers to the ability to take the perspective of others, specifically to impose their mental states (e.g., beliefs, emotions, desires) on oneself and utilize this information to predict and

interpret their behavior (e.g., Premack and Woodruff, 1978; Saxe et al., 2004). This variable is strategically chosen as it is highly relevant to emotionally intelligent behavior, and it has been studied as a separate domain of research from EI.

For instance, a study revealed a positive association between ability and trait EI with performance on tasks measuring social cognitive, but not social perceptual ToM (Ferguson and Austin, 2010). Still under discussion is whether ToM is affected by certain aspects of EI or whether ToM and EI are independent constructs that may interact (Blair, 2002). Evidence suggests that during childhood development ToM influences one’s understanding of emotions, which thus impacts further development of ToM (Meerum Terwogt and Stegge, 2001). The bottom line is that knowledge of emotions, more specifically their emotional understanding, is required in order to develop ToM (e.g., Hughes and Leekam, 2004; Rieffe et al., 2005). Congruent with this, both ToM and EI have been put forth as being important for social interactions (Brackett et al., 2006; Mavroveli et al., 2007; Paal and Bereczkei, 2007).

Further literature examining ToM and EI in the same dataset often recognizes the related nature of these constructs, but also their clear differences. A study looking at these constructs in a population of individuals with Aspergers Syndrome, for example, identifies each as independent explanations for social deficits, utilizing each of these two separate constructs and exploring alternative and additive explanations for their impact on social difficulties (Montgomery et al., 2013). Further, two important studies linking ToM and EI in both children (Qualter et al., 2011) and in adults (Ferguson and Austin, 2010), highlight that these are linked, but distinct constructs, utilizing ToM as an outcome variable and EI as a predictor in both studies. Recent literature has also highlighted the complex nature of ToM and its numerous non-emotional components including those that are cognitive or behavioral (Baker et al., 2014), further supporting the idea that ToM is a broader concept than EI, which includes making inferences on different types of mental, and not only emotional, states of others (see also Ferguson and Austin, 2010).

We set out to look at the impact of all three components of EI, as discussed by our framework, on a ToM task that required identifying the mental and emotional states of individuals depicted only through their eyes. Inferring attitudes and intentions in this way is a behavior that each individual is engaged in on a daily basis, at least any time an interpersonal interaction occurs. Because of its importance in socially adaptive behavior we employed this task in the current research as an example of emotionally intelligent behavior. Regarding the different EI components, we selected only some aspects of each. Concerning the measure of trait EI, we employed the subscale of emotionality because, theoretically, it relates the most to tasks involving emotional cues and making inferences regarding the emotional state of another individual. In addition, this subscale is one of the trait EI dimensions that shows incremental validity on wellbeing-related outcomes (Siegling et al., 2015b) and loads the most into the global trait EI dimension (Laborde et al., 2016). Regarding ability EI, we chose Emotion Understanding as it has shown to load the most strongly onto the latent factor of EI (MacCann et al., 2014). Finally, as for emotion information processing, we

employed a task that captures attention to emotional stimuli: the emotional Go/Nogo task (Casey et al., 1997). The capacity to engage attention toward emotional stimuli and disengage from it when needed have been discussed as promising emotional processing underlying the functioning of EI (Fiori, 2009; Fiori and Antonakis, 2012), thus we included them in the current investigation.

MATERIALS AND METHODS

Participants

Participants included 400 undergraduate and graduate students (46% female), with an age range from 17 to 48 ($Mean = 21.41$ and $SD = 3.27$). Participants were recruited from a Swiss University. Participants were required to have fluent knowledge of English as all the tests and questionnaires were in English.

Measures: Main Variables

Demographic Information

Questions included information related to age, sex, grade level, program of study, and English level.

Trait EI

The Trait EI Questionnaire-Short Form (TEIQue-SF; Cooper and Petrides, 2010) is a 30-item self-report measure that yields a global trait EI score and four factor composites, including Well-Being, Self-Control, Emotionality, and Sociability. Participants indicate their responses on a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree). An example of an item is as follows, “Many times, I can’t figure out what emotion I’m feeling.” This measure aims to assess the individual’s self-perceived abilities and behavioral dispositions. The TEIQue emotionality subscale was chosen to represent the trait EI portion of the model as it has shown to be the subscale that loads the most into the global trait EI (Laborde et al., 2016) and, in our sample, it showed the lowest shared variance with personality. According to Petrides (2009) the TEIQue-SF has an internal consistency of 0.88 for global trait EI. The alpha-level for global Trait EI in the current sample was 0.83 and 0.56 for Emotionality.

Ability EI

The Situational Test of Emotional Understanding-Short Form (STEU; MacCann, 2006; MacCann and Roberts, 2008) is a 42-item measure that tests the respondents’ knowledge of which emotion is most likely to be felt in a range of situations. It is a performance-based measure of EI that covers 14 emotions in total. Scoring of answers as correct/incorrect is based on Roseman’s (2001) appraisal-based emotion model. An example of an item: “Xavier completes a difficult task on time and under budget. Xavier is most likely to feel? (Pride) The alpha level reported by the authors is 0.67 (MacCann and Roberts, 2008) and it was 0.62 in our sample.”

Emotion Information Processing

An emotional Go/Nogo task was utilized as a means of measuring emotion information processing (EIP). This task

involves responding as fast as possible to emotional cues—in this case face expressing certain emotions—which corresponds to given criteria, such as faces expressing happiness. These ‘go’ trials are interspersed with trials—the Nogo trials—to which individuals do not have to respond because they do not correspond to the given criterion, such as a neutral face when the criterion is to respond to a happy face. The task yields four types of answers: correct responses to the go trials (or true positive), incorrect responses to the go trials (false positive), correct responses to the nogo trial (true negative) and incorrect responses to the nogo trials (false negative). In the current study we employed the same protocol used in previous studies (e.g., Tottenham et al., 2011), which is characterized by the prevalence of go trials (70%) over Nogo trials (30%). Pictures of neutral faces were always interspersed with emotional faces expressing one of four emotions (happiness, fear, anger, and sadness). There were 12 practice trials followed by 8 blocks of 30 trials each in which the same emotional pair (e.g., happy–neutral) was alternated in three cycles of 10 trial each in which there was a percentage of go trials of either 100, 70, or 30%. Participants responded to 240 trials overall. Stimulus duration was 500 ms with 1000 ms between trials to ensure that participants had enough time to respond. We recorded the overall number of correct answers and errors hits to the go and nogo trials; furthermore, we factor analyzed the four types of answers and identified two main latent factors accounting for 97.7% of the scores, which were retained for further analysis and indicated difficulties in maintaining focalized attention (EIP_DA), and difficulties to inhibit emotional responses (EIP_DI).

Reading the Mind in the Eyes Test

The Reading the Mind in the Eyes Test (Revised and online version; Baron-Cohen et al., 2001) assesses an individual’s ability to perceive the mental state of others using an image of only their eyes. It is recognized as a measure of ToM (e.g., Oakley et al., 2016). It consists of 36 gray-scale photos of people taken from magazines. These photos are cropped and rescaled so that only the area around the eyes can be seen. Each photo is surrounded by four mental state terms and the participant is instructed to choose the word that best describes what the person in the photo is thinking or feeling. Participants were instructed to select the most appropriate item and responses were coded as correct or incorrect. The alpha level was 0.63.

Measures: Control Variables

Brief HEXACO Inventory

The Brief HEXACO Inventory is a 24-item questionnaire that assesses the 6 HEXACO model personality dimensions: honesty, emotionality, extraversion, agreeableness, conscientiousness, and openness (BHI, De Vries, 2013). Participants are asked to respond these self-reflective items using a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The alpha reliabilities of the dimensions range between 0.43 and 0.72 (De Vries, 2013). Reliabilities in our sample ranged from 0.36 to 0.57, which may appear low values, but ultimately reflect the few number of items per scale.

Verbal Reasoning Test

The Verbal Reasoning test from the Kit of Factor-Referenced Cognitive Tests (Ekstrom et al., 1976) was used to assess a domain of intelligence. This particular cognitive factor is assessed by asking participants to reason with both visual and verbal information in order to draw inferences regarding relationships. Individuals had 8 min to solve 30 problems. Reliability for this sample was 0.65.

Procedure

The data presented here were part of a larger National Science Foundation Project on the investigation of EI, which has received research ethics approval from the authors' University ethics committee. Students were recruited from several French-speaking Swiss universities and participated by first filling out questionnaires online and then in a lab session. They gave written consent to participate in the study and received monetary compensation (60 CHF) for a full 3-h session. To participate to this study, students were asked to have a good level of English because all the administered questionnaires, tests, and exercises were in English.

Statistical Analysis

Descriptive statistics and correlations were calculated including means, standard deviations, and Pearson Correlations using the Statistical Package for Social Sciences version 22 (IBM SPSS Statistics 22; SPSS Inc., Chicago, IL, United States). Multiple regressions analysis using Stata 14 (StataCorp, 2015) were used to test the three-way interaction effects between trait emotional intelligence (TEI), ability emotional intelligence (AEI), and the two indicators of emotion-related information processing task (EIP) on the performance variable (e.g., number of correct answers in the reading the mind in the eyes test). Verbal reasoning, sex, English level, and personality traits were included as control variables.

All independent variables were mean-centered prior to computing their respective product terms, to improve interpretability of the regression coefficients and reduce collinearity between the 3-way interaction predictors and the main effects (Schielzeth, 2010). Four interaction terms were included in the analysis—AEI X TEI, AEI X EIP, TEI X EIP, AEI X TEI X EIP. As EIP was assessed by two indicators, difficulties in maintaining focalized attention (DA), and difficulties to inhibit emotional responses (DI), two separate regressions were run to test both 3-way interactions as predictors of performance (the Reading the Mind in the Eyes test).

RESULTS

Table 1 shows Pearson correlations for independent, dependent, and control variables. Reading the Mind in the Eyes (RME) was correlated significantly with all three EI components, except with EIP-DI, and mostly strongly with EIP-DA ($r = -0.36$); their correlations are quite modest, supporting the idea that EI and ToM are related but distinct constructs. In congruence with previous research, Ability EI and Trait EI showed a low but

TABLE 1 | Means, standard deviations, and correlations.

	<i>n</i>	Mean	SD	STEU	TEIQue	EIP-DA	EIP-DI	RME	H	Em	Ex	A	C	O	VR	Gender	EL
STEU	400	15.57	3.50	1													
TEIQue	400	4.65	0.75	0.12*	1												
EIP-DA	394	0.06	0.03	-0.33***	-0.06	1											
EIP-DI	394	0.09	0.06	-0.12*	-0.05	-0.00	1										
RME	329	26.24	4.20	0.35***	0.14*	-0.36***	-0.10	1									
H	400	14.60	2.77	0.13*	0.14**	-0.09	-0.06	0.15**	1								
Em	400	11.36	3.17	-0.04	0.02	0.06	-0.01	0.07	0.12*	1							
Ex	400	15.29	2.34	0.16**	0.22***	-0.14**	-0.14**	0.10	0.10	-0.03	1						
A	400	11.50	2.54	0.04	0.10	0.03	-0.05	-0.09	0.17**	-0.08	0.01	1					
C	400	13.95	2.83	-0.03	0.18***	0.02	-0.03	-0.00	0.16**	-0.04	0.16**	0.02	1				
O	400	15.09	2.51	0.04	0.19***	-0.04	0.00	-0.17**	-0.09	-0.09	0.13*	-0.03	0.01	1			
VR	400	12.33	3.79	0.35**	0.07	-0.25***	-0.16**	0.35***	0.16**	-0.03	0.03	0.07	-0.05	0.13*	1		
Gender	400	0.46	0.50	0.15**	0.07	-0.09	-0.00	0.20***	0.22***	0.43***	0.11*	-0.07	-0.01	0.07	-0.02	1	
EL	400	3.51	0.66	0.19***	0.08	-0.16**	0.06	0.22***	0.03	-0.05	0.05	-0.05	-0.08	0.09	-0.18***	0.06	1

n, total sample size; STEU, Situational Test of Emotional Understanding; TEI, emotionality subscale of Trait Emotional Intelligence Questionnaire - Short Form; EIP-DA, difficulties in maintaining focalized attention in the emotional Go/Nogo task; EIP-DI, difficulties to inhibit emotional responses in the emotional Go/Nogo task; RME, Reading the Mind in the Eyes; H, Honesty; EM, Emotionality; Ex, Extraversion; A, Agreeableness; C, Conscientiousness; O, Openness; VR, verbal reasoning; EL, english level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

significant correlation ($r = 0.12$; e.g., Vesely et al., 2014). Both indicators of EIP were correlated with Ability EI but not with Trait EI. Of the control variables, agreeableness and emotionality were not correlated significantly with any of the independent or dependent variables. Honesty, extraversion, conscientiousness, and openness to experience were correlated significantly with one or more of the independent variables. The intelligence proxy variable, verbal reasoning, had a significant, moderate correlation with Ability EI ($r = 0.35$), EIP-DA ($r = -0.25$), EIP-DI ($r = -0.16$), and RME ($r = 0.35$). Gender was also significantly correlated to Ability EI ($r = 0.15$) and RME ($r = 0.20$) and English level significantly correlated to Ability EI, EIP-DA, and RME. Only honesty and openness from the personality traits were entered as control variables in the final regressions due to the lack of association of the other personality traits with the dependant variable.

The results of the multiple regression analysis to test the 3-way interaction effect of Ability EI, Trait EI, and *EIP-DA* on the reading the mind in the eyes task showed that the 3-way interaction term was significant (see **Table 2**). All the 2-way interactions and the main effect of Trait EI were not significant. On the other hand, the main effects of Ability EI and difficulties to inhibit emotional responses were significant. Verbal reasoning, gender and English level predicted all three significantly the score on the reading the mind in the eyes task. R^2 was 31.49%.

The results of multiple regression analysis to test the 3-way interaction effect of Ability EI, Trait EI, and *EIP-DI* on the reading the mind in the eyes task showed that the 3-way interaction term was non-significant as well as all the 2-way interaction and the main effects of Trait EI and EIP-DI. Only Ability EI had a significant main effect on the outcome.

Figure 2 shows the three-way interaction plot indicating the relationships between Ability EI, Trait EI, and Emotion Information Processing—difficulties to maintain focalized attention responses (*EIP-DA*) and their combined impact on RME. The top plot shows that when Ability EI and Trait EI are both high, low percentage of errors in *EIP-DA* result in better performance on RME. When Trait EI is high and Ability EI is low, Emotion Information Processing does not impact the scores on RME. Referring to the middle graph, when the Trait EI score is average, Emotion Information Processing impacts performance regardless of the level of Ability EI. The bottom plot shows that when Trait EI and Ability EI are low, Emotion Information Processing seems to impact scores on RME: low scores on AEI, low scores on TEI, but a high EIP, result in better performance. When Trait EI is low and Ability EI is high, Emotion Information Processing does appear to improve only slightly the performance on RME.

DISCUSSION

The present study proposes a new framework integrating three approaches to conceptualizing the best predictor of emotionally intelligent behavior: trait EI, ability EI, and

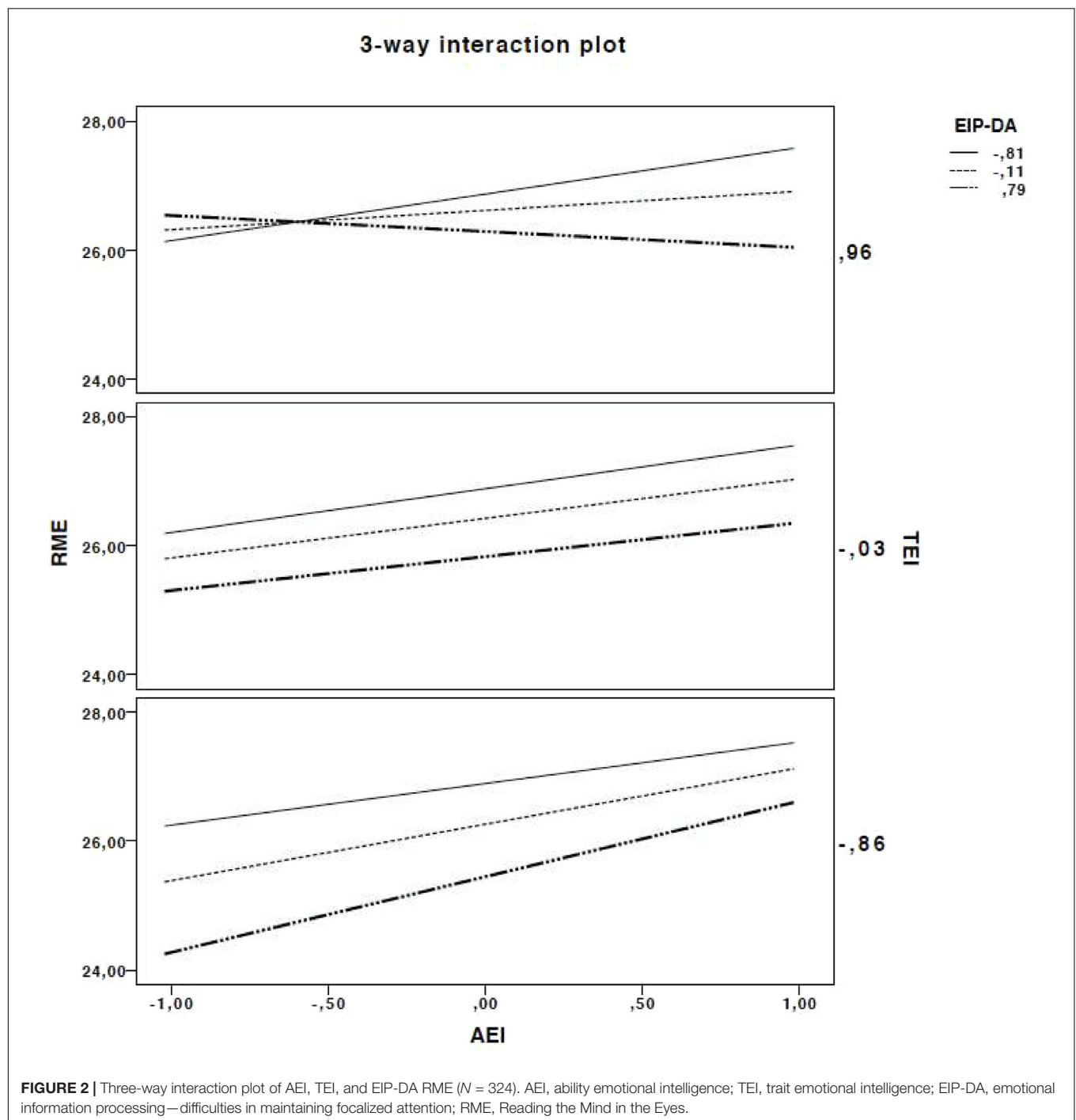
TABLE 2 | Summary of multiple regression analysis for variables predicting reading the mind in the eyes ($N = 323$).

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
DV: RME					
AEI	0.17	0.06	0.14	2.60	0.010
TEI	0.31	0.29	0.05	1.07	0.286
EIP-DA	-0.65	0.25	-0.16	-2.59	0.010
AEI \times TEI	-0.14	0.08	-0.09	-1.81	0.071
AEI \times EIP-DA	-0.03	0.05	-0.04	-0.60	0.551
TEI \times EIP-DA	0.39	0.31	0.07	1.26	0.207
AEI \times TEI \times EIP-DA	-0.19	0.08	-0.15	-2.37	0.018
AEI	0.23	0.07	0.19	3.41	0.001
TEI	0.45	0.29	0.08	1.53	0.128
EIP-DI	-0.20	0.21	-0.05	-0.93	0.351
AEI \times TEI	-0.15	0.08	-0.09	-1.88	0.061
AEI \times EIP-DI	-0.02	0.06	-0.02	-0.34	0.736
TEI \times EIP-DI	-0.03	0.28	-0.01	-0.12	0.904
AEI \times TEI \times EIP-DI	-0.12	0.08	-0.08	-1.53	0.127

Results of block 1 with only control variables are not reported. AEI, ability emotional intelligence; TEI, trait emotional intelligence; EIP-DA, emotional information processing—difficulties in maintaining focalized attention; EIP-DI, emotional information processing—difficulties to inhibit emotional responses.

emotion information processing. It then empirically tests the framework's ability to predict adaptive performance by means of an interaction of the three EI components using an emotionally laden ToM task in a sample of university students. Results reveal the proposed model to be a good fit for the data. The multiple regression analysis indicated that when all EI components as well as interactions are included in the model, performance can be predicted by a three-way interaction between Ability EI, Trait EI, and Emotion Information Processing. The three-way interaction, what we have characterized as EI competence, was able to predict variance in ToM (measured by RME) above and beyond the role of each EI individually and when controlling for personality and intelligence. In addition, the three-way interaction predicted performance on top of the ability and trait EI interaction, showing that the inclusion of emotion information processing as a complementary EI component may help to better predict emotion-laden performance.

Looking at the more specific relationships between Ability EI, Trait EI, and Emotion Information Processing, different combinations and levels of each EI component seem to yield different outcomes in ToM. It seems that high Emotion Information Processing may boost performance when either the individual has both low Trait EI and Ability EI, or when the individual has high Trait EI and high Ability EI. In other words, it seems that Emotion Information Processing, in particular being capable of maintaining focalized attention, boosts the effect of trait and ability EI and exerts a compensatory effect for deficiencies in Trait and Ability EI. In the specific case of the Reading the Mind in the Eyes task performance, our results suggest that focalizing attention on the emotional cues of the task stimuli (such as the shape of the eyes or the direction of the eyesight) helped to score higher when



individuals were falling short on the ability to understand emotions (Ability EI) and the habitual responses to emotional situations (Trait EI).

Overall, results highlight the important role of the interaction of the different EI components in predicting higher performance. Indeed, such components are often investigated individually, but omitting the measurement of the other components may provide only a limited representation of emotionally intelligent behavior. One of the most important advantages

of investigating the join contribution of Ability EI, Trait EI, and Emotion Information Processing is that each component may compensate for the lack of the other components, ultimately leading to better performance. The predictive ability of the three-way interaction (EI competence) is superior to the predictive ability of the additive effect of each EI component individually as the interaction of EI components can change the outcomes for better or for worse.

A concrete example may be that, in the measurement of racing speed, engaging in a certain amount of weight training and cardio together would improve race times more or less than just the additive effect of either weight training and cardio individually (i.e., individually they would remove 3 s plus 4 s from one's race time vs. in the case of an interaction – they would remove more than 7 s – perhaps because, combined, they result in greater gains due to the way in which muscles recover when doing cardio). It could also mean that neither has an effect on speed unless both contribute. The more EI components are accounted for, the more accurate the representation obtained of emotionally intelligent behavior can be. In the PAT integrated framework, high EI competence can be achieved when all three EI components interact with each other at optimal levels, resulting in the best possible performance.

The noted race example as well as those examples presented in **Table 3**, each showing how EI components may interact and thus lead to more or less adaptive outcomes, are congruent with the majority of literature on competence and general learning indicating that different types of knowledge, characteristics, and processes [e.g., declarative/procedural knowledge; implicit/explicit processes (in this case emotional knowledge/processes)] can work together to be effective at performing a range of tasks competently (Anderson, 1983; Bellier, 2004). Additionally, they fit with examples from the literature in which individuals are taught skills in one domain to compensate for deficiencies in others within emotionally laden situations. For example, this has been demonstrated in individuals engaged in cognitive behavioral therapy for anxiety, where cognitive reappraisal is utilized to reduce fear responses to certain stimuli (Beck, 2011). Further, and more specific to EI, a variety of outcome variables have been studied measuring both Ability EI and Trait EI within the same sample, indicating the importance of both, but in different ways. For example, Ability EI and Trait EI showed differential impact on mental health outcomes through diverse roles on coping. Specifically, Ability EI was described as driving the selection of coping strategies, whereas Trait EI influenced coping efficacy, in other words their later implementation (Davis and Humphrey, 2012). Results such as these are relevant to the current study as they show further evidence of various aspects of EI contributing differently to important outcomes.

Limitations

We believe we have provided initial evidence supporting the utility of using an integrated approach in investigating predictors of emotionally intelligent performance; nevertheless our results warrant replication because of the following limitations. The use of short-forms of measures (e.g., TEIQue-SF; HEXACO) as well as the general use of self-report questionnaires have acknowledged limitations, such as some low reliability values, especially for the emotionality subscale of the TEIQue and for the HEXACO personality traits due to the few items included in the scale, together with common method bias, vulnerability to social desirability, and ecological validity (Grubb and McDaniel, 2007; Roberts et al., 2007). In our study we found a low reliability for the

emotionality subscale of the trait EI questionnaire, for this reason results should be taken with a note of caution.

This study also utilized only one subscale (or aspect) of each EI component (i.e., emotion understanding for Ability EI; emotionality for Trait EI; emotional Go/Nogo for Emotion Information Processing). Though these were chosen strategically as (a) these subscales are the most relevant in relation to ToM and other emotionally intelligent outcomes and (b) the emotionality subscale from the TEIQue has shown the lowest shared variance with personality in our sample, replication with more complete measures as well as with other outcome variables and additional experimental conditions (such as those measuring stress inoculation), could provide a more comprehensive understanding of the PAT integrated framework.

Replacing each measure of EI with different measures utilizing different theoretical models (such as the Genos 7-factor model rather than the TEIQue and the GERT/STEM in addition to the STEU) could also add to future consideration. Further, novel measures of EIP that measure individual differences need to be developed. In our study we employed a typical emotion information processing task employed in the emotion and cognition literature, however, the emotional Go/Nogo is not generally employed as a stable individual difference measure in attentional processes. New measures that capture both attentional processes and that can reliably differentiate individuals still need to be introduced in the EI literature. Additionally, given the possibility that use of an undergraduate student sample resulted in higher scores on measures of daily functioning and well-being (such as EI and IQ) than found in the general population, a different sample should be used to assess the model once again.

Implications and Future Directions

Among the most important implications of our study, the understanding of which aspect of EI is 'deficient' may allow us to identify where to provide intervention. Previous EI training programs have shown to be effective in improving EI as well as in increasing performance outcomes in different fields (Nelis et al., 2009, 2011; Pool and Qualter, 2012). For example, Di Fabio and Kenny (2011) used a short training program focusing on Trait EI improvement where post-program results indicated that students had less difficulty related to career decision-making. Further, in the domains of psychology and education, results of EI training (programs utilizing Ability EI and Trait EI models) have indicated not only that EI improves post-program compared to controls at follow-up, but also that stress decreases alongside increases in adaptive coping and other outcome variables like teacher efficacy (Brackett et al., 2011; Vesely-Maillefer, 2015). Though Emotion Information Processing is a new domain in EI research, studies conducted on inhibition and attention processes in clinical psychology have shown that deficits in these domains can be improved through various interventions (e.g., Shafir, 2015; Scott and Weems, 2017). The positive impact of EI training coincidental with the knowledge that each EI attribute may contribute to performance outcomes individually and interactively, supports the need for further studies combining training aimed at improving Ability EI, Trait EI, and Emotion Information Processing.

TABLE 3 | Hypothetical examples of EI interactions.

Individual Factors (expectations; typical or atypical; experiences; practice)	TEI	AEI	EIP	Outcome and explanation
This happens daily; you have been working there for years	High Your habitual emotional response, (which is adaptive) is ready and comes relatively automatically	Average to High You have the emotional knowledge of how to deal with this situation and experience doing so	Low Your brain and body do not effectively process the emotion-related information High Your brain and body can effectively process the emotion-related information	More adaptive outcome (both) EIP does not seem to be utilized as much as TEI and AEI (e.g., inhibition of a negative reaction is not required because your habitual reaction is adaptive)
It is your first day on the job; you rarely deal with conflict in general	Low You resort to a habitual emotional response that is inappropriate in professional circumstances (e.g., invalidating the customer's point of view)	Low You have never worked in customer service and have poor knowledge of emotion management	Low Your brain and body do not effectively process the emotion-related information High Your brain and body can effectively process the emotion-related information	Less adaptive outcome (both) Even inhibition of a negative habitual emotional response could not help as you do not have a knowledge base to draw from
It is your first day on the job; you have taken classes on conflict resolution; you expect conflict	Low You habitual response is inappropriate in a professional circumstance (e.g., making a joke)*	High Your theoretical learning provided you with a good emotional understanding of the customer's perspective	High Your brain and body can effectively process the emotion-related information and Low Your brain and body do not effectively process the emotion-related information	More adaptive outcome You use AEI and EIP together to override TEI (i.e., you inhibit your tendency to tell a joke and express an adaptive phrase according to your understanding) Less adaptive outcome Your AEI is overridden by low EIP and low TEI [e.g., history of negative emotional experiences take over and you impulsively resort to your habitual response (make an inappropriate joke)]
You have dealt a lot with conflict in a previous position, but you do not seem to have consistent outcomes	High You are self-confident and pride yourself in identifying the emotional responses of your clients	Low Though you think you know - you do not have a good understanding of emotion management and you misunderstand many emotionally laden situations	High Your brain and body can effectively process the emotion-related information and Low Your brain and body do not effectively process the emotion-related information	More adaptive outcome Though AEI is low, your high TEI and high EIP can compensate (e.g., your attention to the client's emotions validates their experience despite your lack of understanding) Less adaptive Outcome Your lack of attention to the client's emotions and your lack of understanding do not complement your high TEI

Not all possible combinations from the model are exemplified here; just some salient examples. *This is assuming that the course did not improve TEI.

Context: You are involved in a conflict situation at work where you hold a customer service position. The customer is upset with the product and is yelling at you.

In sum, we have provided the first theoretical and empirical account for how the different components of EI—which traditionally have been investigated as different approaches in studying EI—may jointly predict emotionally intelligent behavior. The integration of these different components of EI into a more comprehensive framework allow us not only to bridge the gap between the terminology and conceptual inconsistencies within the literature, but it also makes both empirical and theoretical sense based on previous research. The PAT framework proposed has several important features. It provides a rationale as to why each EI component contributes to emotionally intelligent behavior individually and

jointly. It shows how within the interaction of all three EI components (in the current framework conceptualized as EI competence), EI components may compensate for each other in yielding the most adaptive emotional outcomes. Further, it indicates that EI competence at all levels is the best predictor of EI-related performance. It clarifies terminology and conceptual inconsistencies within the literature by making a more clear distinction between predictors and outcomes. Ultimately it also allows for a more inclusive understanding of the way in which EI in general may explain variability in these outcomes. These results provide initial support for exploring further the relationships between different

components of EI and to develop comprehensive models for predicting and improving performance in emotionally laden situations.

ETHICS STATEMENT

All subjects gave written informed consent to participate in the study. The study protocol was approved by the Ethics Committee of the Faculty of Business and Economics of the University of Lausanne.

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Predicting Career Decision-Making Difficulties: The Role of Trait Emotional Intelligence, Positive and Negative Emotions

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The current study evaluated the relationship between positive and negative emotions, trait emotional intelligence (trait EI) and difficulties in career decision-making. We examined whether trait EI could predict career indecisiveness, a type of career decision-making difficulty, over and above the “Big Five” personality traits. We also examined the mechanism through which trait EI affected career indecisiveness by investigating the mediating role of positive and negative emotions. Survey data were collected from a sample of 600 undergraduate students in a university in southwest United States, who completed questionnaires measuring trait EI, positive emotions, negative emotions, personality traits, and career indecisiveness. Hierarchical multiple regression analyses indicated that trait EI accounted for a significant proportion of the variance in career indecisiveness that was not explained by the “Big Five” personality traits. The parallel mediation analysis revealed that positive and negative emotions partially mediated the relationship between trait EI and career indecisiveness. Using the framework of Fredrickson’s (2001) broaden and build theory of positive emotions, the study provides empirical evidence explaining the mechanism through which trait EI helps individuals cope better with challenging situations in life. Trait EI aids the elicitation of positive emotions and the down-regulation of negative emotions, which, in turn, broaden the range of thoughts and actions that come to mind, helping individuals function more effectively in the context of career decision-making. Implications for career counseling and opportunities for further research are discussed.

Keywords: trait emotional intelligence (Trait EI), career decision-making difficulties, career indecisiveness, positive and negative emotions, trait emotional intelligence questionnaire (TEIQue)

INTRODUCTION

Selecting a career can be one of life’s most challenging decisions. People often feel overwhelmed by the amount of information they need to absorb when considering the numerous career paths they could potentially follow (Gati and Levin, 2014). A well-researched topic in career psychology, career decision-making difficulties are defined as “the difficulties encountered by individuals while making career-related decisions. They refer to all problems and challenges that need to be addressed prior to, during, or after the decision-making process” (Saka et al., 2008, p. 403).

Facing the challenge of career decision-making could happen at diverse stages of life. It is observed among high school students, who try to decide on their future career by choosing a major, as well as among college students who might continue to struggle with career decisions even after starting an undergraduate program. As Lichtenstein et al. (2009) further explained:

Throughout the undergraduate years, students... often contemplate professional options with no direct relationship to their undergraduate major. For example, a student with a pre-med degree might choose a graduate program in law while a student with an engineering degree might choose a job in investment banking. Students can wrestle with job and career decisions late into their senior year—and beyond (p. 228).

Broadly speaking, career decision-making difficulties are categorized into two types: Career indecision versus career indecisiveness. Career indecision is a state that most people in modern societies go through at some point in their lives when deciding on their future career. In most cases, it will ultimately be resolved over time, either by individuals themselves or with the help of career counselors (Gati et al., 2011). In contrast, some individuals experience a more chronic type of career decisional difficulties stemming from emotional problems or personality-related factors, called career indecisiveness (Gati et al., 2011). Indecisive individuals are “unable to make a vocational choice no matter how carefully they are led through a decision-making process” (Salomone, 1982, p. 498). The prominent factors associated with career indecisiveness identified in previous research were incorporated by Saka et al. (2008) into a theoretical framework referred to as Emotional and Personality-related Career Decision-Making Difficulties (EPCD). Based on the taxonomy of EPCD, difficulties pertaining to the three clusters of ‘pessimistic views,’ ‘anxiety,’ and ‘self-concept and identity’ lead to career indecisiveness in individuals (Saka et al., 2008).

Career decision-making is a rational process, which involves emotions. Emotional information is critical to “shape the individuals’ judgments, decisions, priorities and actions” (Salovey et al., 2000, p. 506). Rational decision-making strategies are often insufficient unless individuals can emotionally manage the uncertainty, ambiguity, and unpredictability that are involved in the decision-making process (Gelatt, 1989). According to Fredrickson’s (2001) broaden and build theory, positive emotions

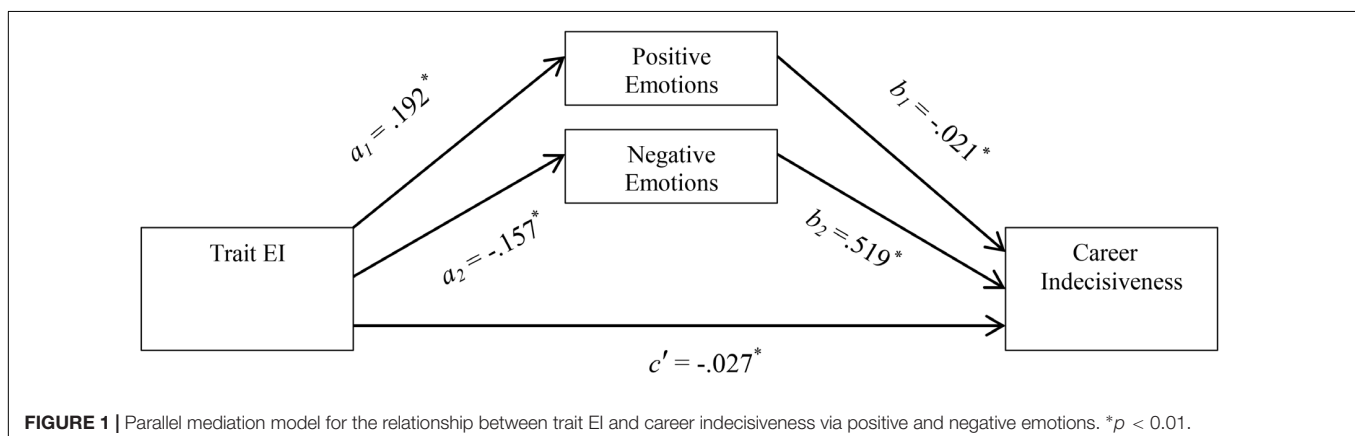
expand the cognitive context by broadening the range of thoughts and actions that come to mind. Positive emotions result into patterns of thought that are more “flexible (Isen and Daubman, 1984), creative (Isen et al., 1987), integrative (Isen et al., 1991), open to information (Estrada et al., 1997), and efficient (Isen and Means, 1983; Isen et al., 1991)” (Fredrickson, 2001, p. 221). These patterns are useful in the decision-making process, where flexibility towards options, coping with stress, adaptability, and engagement are important keys to success.

Trait EI, which is defined as a constellation of emotional perceptions assessed through questionnaires and rating scales (Petrides et al., 2007), is likely to facilitate the career decision-making process by fostering positive emotions and helping individuals regulate the flow of negative emotions involved in the challenges associated with the transition from school to the world of work. A significant body of evidence has linked EI to fewer career decision-making difficulties (e.g., Di Fabio and Palazzeschi, 2009; Di Fabio et al., 2012, 2013; Di Fabio and Saklofske, 2014; Petrides et al., 2016). However, there is a dearth of information on the role of positive and negative emotions in conjunction with trait EI in predicting career indecisiveness.

Personality traits are significantly related to trait EI (Vernon et al., 2008) as well as career decision-making difficulties (Martincin and Stead, 2015). A specific line of research has been investigating the incremental validity of trait EI over and above the “Big Five” personality dimensions and related constructs (e.g., Andrei et al., 2016; Siegling et al., 2017). Examining the incremental validity of trait EI rules out the rival hypothesis that the variation in the criterion variable is accounted for by personality traits, rather than trait EI.

Study Aims and Hypotheses

The primary aim of this study was to determine if trait EI can predict career indecisiveness beyond personality traits. A second aim was to examine whether positive and negative emotions mediate the relationship between trait EI and career indecisiveness. Considering the capacity of positive emotions to facilitate the decision-making process by expanding the cognitive context and the array of thoughts and actions that come to mind, and the reverse effect of negative emotions, which limit thought-action repertoires (Tugade and Fredrickson, 2001), it is



plausible that trait EI may influence career indecisiveness through the development of strategies to draw on positive emotions and regulate the flow of negative emotions (see **Figure 1**). Accordingly, the following hypotheses were formulated:

Hypothesis 1: Trait EI will predict lower levels of career indecisiveness beyond the “Big Five” personality dimensions.

Hypothesis 2: Positive and negative emotions will mediate the relationship between trait EI and career indecisiveness.

This study extends the previous work on EI and career decision-making difficulties in several important ways. First, most of the previous studies that examined the associations between EI and career decisional difficulties have focused on career indecision, rather than career indecisiveness. To our knowledge, there is only one previous study (Di Fabio and Saklofske, 2014) on the link between EI and career indecisiveness. Second, the present study assesses the incremental validity of trait EI in predicting career indecisiveness beyond the “Big Five” personality traits. Unless personality traits are controlled for, significant proportions of variance in career decisional difficulties cannot be attributed to trait EI. Last, the study examines the mechanism through which trait EI influences career indecisiveness via positive emotions and negative emotions using a parallel mediation model. Investigating the role of positive and negative emotions, in relation to EI, provides greater insight into explaining how emotionally intelligent individuals are able to successfully cope with stressful encounters (Tugade and Fredrickson, 2001).

MATERIALS AND METHODS

Participants

Undergraduate students at a major research university in the southwestern United States were invited to participate in this study. A total of 739 individuals took part in a comprehensive online survey, which included four separate questionnaires. The responses of those who either left the survey incomplete or were inattentive when answering the questions were removed (139 entries), leaving 600 complete observations. In order to detect inattentive responses, items such as “If you are a human being,

please select 4” were inserted among the survey questions. Wrong answers to these questions in addition to repeated selection of the same choice number for several questions in a row were interpreted as signs of inattentive responding.

The minimum required sample size for a multiple regression analysis was determined using the XLSTAT statistical package. According to the results, at least 500 observations were needed in order to work with the recommended power of 0.8 to detect an effect size of 0.02. The final sample comprised 46% male and 54% female undergraduate students, mostly between 18 and 21 years of age (93%). Most were college sophomores (38%), juniors (28%), and seniors (33%) with very few freshmen (1.1%). The sample consisted mostly of United States citizens (98%), with 70% classified as white, 19% as Hispanic, 3.3% as African American, 0.5% as Native American, 6% as Asian-American, and 2% as other.

Measures

The survey incorporated four separate questionnaires, all of which were valid, reliable, and well-documented in terms of psychometric characteristics.

Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF)

The TEIQue-SF comprises 30 items responded to on a seven-point Likert scale (Petrides, 2009). Cronbach’s alpha reliability for the global score on the present sample was 0.88.

Emotional and Personality Career Decision-Making Difficulties Scale-Short Form (EPCD-SF)

EPCD-SF is a 25-item self-report questionnaire measuring career indecisiveness. Items are responded to on a nine-point Likert scale (Saka et al., 2008). Cronbach’s alpha reliability on the present sample was 0.92.

Big Five Inventory (BFI)

The BFI is a 44-item self-report questionnaire based on a five-point Likert scale measuring the personality traits of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience (John et al., 2008). Cronbach’s alpha reliabilities on the present sample were 0.88 for Extraversion,

TABLE 1 | Means, standard deviations, and correlations for trait EI, the “Big Five” personality traits, positive emotions, negative emotions and career indecisiveness.

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
(1) Trait EI	155.25	19.38	1								
(2) Career indecisiveness	4.07	1.36	−0.570*	1							
(3) Positive emotions	35.91	6.80	0.548*	−0.369*	1						
(4) Negative emotions	21.36	6.55	−0.466*	0.455*	−0.211*	1					
(5) Extraversion	3.43	0.84	0.426*	−0.291*	0.411*	−0.127*	1				
(6) Agreeableness	3.98	0.59	0.339*	−0.162*	0.230*	−0.300*	0.142*	1			
(7) Conscientiousness	3.75	0.61	0.425*	−0.279*	0.299*	−0.274*	0.063	0.308*	1		
(8) Neuroticism	2.68	0.74	−0.599*	0.508*	−0.423*	0.571*	−0.225*	−0.268*	−0.221*	1	
(9) Openness	3.41	0.64	0.262*	−0.083	0.253**	−0.024	0.154*	0.134*	0.093	−0.137*	1

n = 600, * *p* < 0.01.

TABLE 2 | Summary of the hierarchical regression analysis with career indecisiveness as the criterion variable.

Variable	R^2	ΔR^2	b	β	SE B	F	ΔF	95% CI
Step 1	0.318*					55.45*		
Extraversion			−0.308*	−0.192*	0.056			[−0.418, −0.198]
Agreeableness			0.053	0.023	0.085			[−0.113, 0.219]
Conscientiousness			−0.393*	−0.178*	0.080			[−0.549, −0.236]
Neuroticism			0.789*	0.432*	0.066			[0.659, 0.920]
Openness			0.043	0.02	0.072			[−0.099, 0.185]
Step 2	0.377*	0.059*				59.78*	55.837*	
Extraversion			−0.143	−0.089	0.058			[−0.257, −0.028]
Agreeableness			0.117	0.051	0.081			[−0.043, 0.277]
Conscientiousness			−0.171	−0.077	0.082			[−0.332, −0.010]
Neuroticism			0.498*	0.273*	0.075			[0.351, 0.644]
Openness			0.136	0.065	0.070			[−0.002, 0.274]
Trait EI			−0.025*	−0.365*	0.003			[−0.032, −0.019]

$n = 600$, * $p < 0.01$, CI = Confidence Interval.

TABLE 3 | Summary results of mediation analyses.

	Coefficients	SE	BC Bootstrap 95% CI	
			Upper	Lower
Direct effect of trait EI on career indecisiveness	−0.027*	0.003	−0.0337	−0.0218
Indirect effect of trait EI on career indecisiveness via positive emotions	−0.004*	0.0016	−0.0074	−0.0011
Indirect effect of trait EI on career indecisiveness via negative emotions	−0.008*	0.0014	−0.0111	−0.0056

* $p < 0.01$.

0.79 for Agreeableness, 0.80 for Conscientiousness, 0.81 for Neuroticism, and 0.79 for Openness.

Positive and Negative Affect Scale (PANAS)

The PANAS was included in the survey to measure positive and negative emotions. It consists of two scales, Positive Activation (PA) and Negative Activation (NA). Each scale contains 10 items, responded to on a five-point Likert scale (Watson et al., 1988). Cronbach's alpha reliability on the present sample was 0.87 for PA and 0.82 for NA.

Procedure and Data Analysis

After obtaining IRB approval and permission from the developers to use the four measurement instruments, the researchers sent an invitation e-mail containing the survey link to several professors who taught undergraduate courses at a major research university in southwest United States. Once the data were collected and cleaned, descriptive statistics, Pearson's correlations, hierarchical regressions, and mediation analysis were conducted to test the study's hypotheses.

RESULTS

Means, standard deviations, and correlation coefficients for all variables in the study are reported in **Table 1**. Variance inflation factors (VIFs) for each independent variable were computed to evaluate the impact of multicollinearity in the data. The VIFs for this sample were within the acceptable interval—the largest being 2.45, indicating that multicollinearity did not threaten the validity of the results. The bivariate correlation matrix of the interval variables in the study revealed significant correlations in the expected direction.

To test Hypothesis 1, a hierarchical multiple regression analysis was conducted. In the first step, the control variables, including the “Big Five” personality traits (Agreeableness, Openness to Experience, Extraversion, Conscientiousness, and Neuroticism) were entered. Trait EI was entered in the second step to obtain its added value in explaining variance in career indecisiveness.

The “Big Five” personality traits together accounted for 32% of the variance in career indecisiveness, $R^2 = 0.32$, $F(5,594) = 55.45$, $p < 0.001$. When trait EI was added at the second step, the regression model remained significant, $F(6,593) = 59.78$, $p < 0.001$, with trait EI accounting for an additional 6% of variance in career indecisiveness. The regression coefficient for trait EI (−0.025) was significantly negative $t(593) = 7.47$, $p < 0.001$, indicating that it was associated with lower levels of career indecisiveness, holding constant the control variables in the model (see **Table 2**). The results showed that high trait EI students tended to experience less career indecisiveness than their low trait EI peers, after controlling for their standing on the “Big Five” personality dimensions.

To test Hypothesis 2, we employed an SPSS macro, PROCESS (Model 4; Hayes, 2013), to estimate the indirect effect of trait EI on career indecisiveness via the two mediators (positive emotions and negative emotions). As illustrated in **Figure 1**, those higher in trait EI reported a higher level of positive emotions (Path a_1 in **Figure 1**, $b = 0.192$, $SE = 0.012$, $p < 0.001$), which, in turn, was linked with lower levels of career indecisiveness (path b_1 in

Figure 1, $b = -0.0216$, $SE = 0.007$, $p = 0.006$). In contrast, higher trait EI was linked to less negative emotions (path a_2 in **Figure 1**, $b = -0.157$, $SE = 0.012$, $p < 0.01$), which, in turn, were associated with lower career indecisiveness (path b_2 in **Figure 1**, $b = 0.519$, $SE = 0.007$, $p < 0.001$).

To calculate 95% bias-corrected confidence intervals (CI) for the point estimate, 10,000 bootstrap samples were generated. When the CI of the indirect effect of a mediator do not include 0, it is considered statistically significant (Hayes, 2013). As shown in **Table 3**, a 95% bias-corrected confidence interval showed that the indirect effect of trait EI on career indecisiveness via positive emotions ($b = -0.004$) was consistently less than zero (-0.0074 to -0.0011). The indirect effect of trait EI on career indecisiveness via negative emotions ($b = -0.008$) was also consistently less than zero (-0.0111 to -0.0056). The results revealed the existence of a parallel mediation effect, as trait EI was indirectly related to career indecisiveness via its relationship to positive and negative emotions. The mediation was partial, since the unstandardized beta coefficient for the direct effect of trait EI on career indecisiveness (path c' in **Figure 1**) after controlling for positive and negative emotions was significant ($b = -0.027$, $SE = 0.003$, $p < 0.001$).

DISCUSSION

The results of the multiple hierarchical regression analysis supported Hypothesis 1, trait EI explained a significant proportion of variance in career indecisiveness that was not explained by the “Big Five” personality dimensions. More specifically, trait EI increased the predictive ability of the regression model by 6%. While this may seem small, in the presence of numerous contextual and situational factors that can affect the career decision-making process for an individual, it represents a very considerable increase. Demonstrating the role of trait EI in predicting career indecisiveness over a and above standard measurement of personality is particularly meaningful in that it should give pause to those who argue that EI is merely a “repackaging” of personality traits (see also Andrei et al., 2016).

It is likely trait EI helps people decode the emotional weight that they associate with different options, and have more faith in their choices, decreasing the feelings of confusion, hesitation, and self-doubt that are often experienced by indecisive individuals. In contrast, low trait EI might eventually result in inability to control and eliminate causes of career indecisiveness, such as pessimistic views towards the process of career decision-making and its outcomes or the feeling of guilt, arising from favoring a career choice that is not approved by significant others (Saka et al., 2008).

The study results also demonstrated a partial mediation effect of positive and negative emotions in the relationship between trait EI and career indecisiveness. High trait EI individuals are better able to elicit positive emotions and regulate any negativity that tends to arise in challenging situations, such as career decision-making. The enhanced experience of positive emotions and the down-regulation of negative emotions subsequently create patterns of thoughts that are more flexible, inclusive, receptive, creative, and variable (Tugade and Fredrickson, 2001),

thus improving the functionality and career decision-making of individuals.

The study has important implications for career counselors. Paying attention to the emotional and personality-related aspects of career decision-making difficulties can assist in accurately diagnosing the sources of difficulty and developing appropriate interventions. If a client is experiencing significant career indecisiveness, the underlying emotional issues often cannot be resolved through typical consultations limited to supplying career information and rational decision-making strategies (Gati and Levin, 2014). Interventions focusing on clients' emotions should be incorporated, with one option being trait EI training for the client (e.g., Nelis et al., 2011).

This study focused exclusively on undergraduate students at a major research university in the United States. However, the situation of those college students living in other geographic or cultural regions may not be identical to that of the sample of this study. Furthermore, career indecisiveness could be a concern for a wider variety of individuals, including high school students and professionals who are considering a change of career. The results of this study should not be extrapolated beyond the specific context and circumstances of its research participants. This leaves valuable opportunities to expand the research into other populations and to determine if the trait EI effects on career decision-making difficulties can be further generalized. Future research could also incorporate a greater number of background variables, such as participants' ethnicity, age, socioeconomic status, and field of study, and look for interaction effects between them and trait EI in the prediction and resolution of various types of career decision-making difficulties.

DISCLOSURES

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors have no financial or personal relationships with individuals or organizations that could inappropriately influence the study.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of Texas A&M University, Institutional Review Board (IRB) for the protection of human research participants. The protocol was approved by the Texas A&M, IRB. All subjects gave written informed consent in accordance with the Declaration of Helsinki.

AUTHOR CONTRIBUTIONS

FF conducted the research as part of her Ph.D. degree requirements, wrote and revised the manuscript. FN supervised the research as FF's dissertation committee chair. KP collaborated with FF in revising the manuscript and generating the final draft.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Trait Emotional Intelligence Profiles of Parents With Drug Addiction and of Their Offspring

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This study examines the relationship between trait emotional intelligence (trait EI) and general health (General Health; GHQ-28) in two samples of Greek parents with ($n = 52$; Mage = 39.78; SDage = 6.68; 41 men and 11 women) and without ($n = 51$; Mage = 43.53; SDage = 4.61; 40 men and 11 women) addiction problems. In addition, it compares the trait EI scores of their offspring ($N = 81$; Mage = 11.71; SDage = 2.15; 51 boys and 30 girls). Results showed that parents with drug addiction exhibited lower levels of trait EI and poorer general health than peers. In addition, global trait EI and two of its subscales, Well-being and Emotionality, had stronger correlations with depression in the addiction than in the comparison group. Well-being was a significant predictor of general health and its subscales (Somatic symptoms, Anxiety/insomnia, Social dysfunction, and severe depression) in both groups. No differences were found between the offspring of the two groups.

Keywords: addiction, substance abuse, mental health, TEIQue, children of parents with drug addiction

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INTRODUCTION

Emotions and Addiction

The American Psychiatric Association (2013) summarizes the required criteria for the diagnosis of substance use disorders in four broad categories: difficulties in controlling substance consumption; an impact on the individual's social life; substance use despite the physical or psychological harm; and pharmacological components, such as withdrawal and tolerance. The term addiction, although not included in the APA manual, is often used in order to describe the established and severe substance use (O'Brien, 2011; American Psychiatric Association, 2013).

Comorbidity of addiction with mental and affective disorders is quite high and has received a lot of attention in the literature (Bennett, 2002; Kassel and Veilleux, 2010; Lai et al., 2015). Affective disorders, such as depression, are especially common in opiates use (Matsa, 2006; Compton et al., 2007; American Psychiatric Association, 2013). The occurrence of both affective and substance use disorders can exacerbate the impact of the symptoms on well-being, relating to others, and everyday functioning. It also highlights the connection between substance use and emotion regulation difficulties (Bennett, 2002; Witkiewitz and Wu, 2010).

Individuals addicted to drugs are overwhelmed by their feelings. They have difficulties in differentiating and expressing emotions, especially negative ones (Baker et al., 2004). Substances are often used as a means of regulating pain, stress or frustration (Freud, 1930; Matsa, 2008; Witkiewitz and Wu, 2010), a possibility also proposed by Khantzian (1985, 1997) in his "self-medication hypothesis." As further discussed below, this hypothesis is particularly interesting from

the perspective of trait emotional intelligence (trait EI) theory because it suggests that optimization of trait EI profiles as a means of emotion regulation could reduce the need for reliance on drug use. Indeed, such optimization has also been suggested in relation to medically approved pharmacological interventions in order to tackle recognized psychopathological conditions (Petrides et al., 2017).

Trait Emotional Intelligence

Trait emotional intelligence (trait EI or trait emotional self-efficacy) refers to a constellation of emotional self-perceptions assessed by questionnaires and rating scales (Petrides et al., 2007). Essentially, the construct concerns people's perceptions of their emotional abilities.

Trait EI has been shown to predict a variety of life outcomes, such as psychological resilience, socioemotional competence, and peer relations (Frederickson et al., 2012). Its relationship with health has been demonstrated in many studies (Costa et al., 2014), including a large meta-analysis covering mental, psychosomatic, and physical health (Martins et al., 2010; see also Andrei et al., 2016). However, in contrast to trait EI links with mental health, the construct's links with addiction and substance use have received very limited attention (Kun and Demetrovics, 2010). This represents a clear gap in the literature, particularly when we take into account the central role of emotions in addictive behaviors.

Personality and Addiction

Individuals with drug addiction experience difficulties in the accurate evaluation of emotional cues and in appreciating the consequences of their actions to themselves and to other people (Khantzian, 1997; Kornreich et al., 2003; McCrady and Epstein, 2013). Terracciano et al. (2008) examined the profiles of drug users on the Big Five personality dimensions. They found that heroin and cocaine users scored higher on Neuroticism, were more susceptible to depressive feelings and hostility, more impulsive, more easily stressed out, and more likely to feel guilty and ashamed than all other participating groups (tobacco smokers, marijuana users, and a comparison group). In addition, they scored lowest on the major personality dimension of Conscientiousness as well as on various socially desirable facets, like excitement seeking (Extraversion) and straightforwardness, trust, and compliance (Agreeableness).

A study conducted in Norway with individuals addicted to opioids yielded similar results (Kornør and Nordvik, 2007). Generally, Neuroticism was elevated in individuals with drug addiction relative to controls even when different personality tests were employed. However, Brooner et al. (2002) noted that when potentially confounding factors like mental disorders were controlled for, the personality traits most robustly differentiating people with opioid addiction from non-addicted peers were Conscientiousness, Agreeableness, and Excitement-seeking. In addition, Sutin et al. (2013) examined the role of poverty in the relationships between personality traits and drugs. They concluded that high neuroticism and low agreeableness were related to drug use regardless of poverty status. In contrast, low

Conscientiousness proved to be a risk factor only under specific financial conditions.

Emotional Intelligence and Addiction

Kun and Demetrovics (2010) traced the relationship between EI and related constructs with addictions back from 1990 until 2009 and found that low EI was associated with more addiction problems. In terms of EI components, "decoding and differentiation of emotions" and "regulation of emotions" seemed to contribute significantly to addictions. Considering the limitations of previous research, Kun and Demetrovics (2010) pointed out the need for conducting separate studies, based on the type of the substance abused (heroin, cocaine, etc.), and proposed that samples be derived from clinical, instead of community, populations. With respect to trait EI specifically, negative relationships have been reported in both adults and adolescents (Riley and Schutte, 2003; Resurrección et al., 2014).

While the relationship between trait EI and addiction is under-researched, that between parental addiction and offspring trait EI has never been addressed. Moreover, no studies have compared the trait EI profiles of children of parents with versus without addiction. Some researchers (e.g., Scaife, 2007), argued that the children of parents with addiction exhibit emotional difficulties and may be at greater risk of becoming involved with drugs. However, others claim that most such children can function satisfactorily in the emotional and behavioral domains despite the adverse circumstances (e.g., Pilowsky et al., 2004; Velleman and Templeton, 2016).

The Present Study

In consideration of the call for clinical and substance-specific samples in research on trait EI and addiction (Kun and Demetrovics, 2010), we decided to study participants in an opiate substitution therapy program. Because we were interested in the trait EI profiles of both parents and their children, eligibility to the study was restricted to individuals with addiction who were parents. Since childhood and adolescence are developmentally different periods (Shaffer and Kipp, 2013), children and adolescents were examined separately.

The first objective of the study was to examine if individuals with drug addiction differ from peers in trait EI, general health, and their various subscales (well-being, self-control, emotionality, and sociability for trait EI; somatic symptoms, anxiety-insomnia, social dysfunction, and severe depression for general health). In line with previous research (Riley and Schutte, 2003; Kun and Demetrovics, 2010; Resurrección et al., 2014), it was hypothesized that individuals with drug addiction would score lower on trait EI and general health and their subscales than a comparison group. Parents with drug addiction are characterized by lack of emotionality and control, conflicted relationships, and insecure parent-child attachment relationships (Scaife, 2007). Accordingly, it was hypothesized that the offspring of parents with drug addiction would score lower on trait EI than the comparison group. It should be noted here that, to the best of our knowledge, this is the first study to investigate trait EI in the children of parents with drug addiction. Considering the connection between trait EI and life outcomes, such as academic

performance and psychosocial adaptation (Mavroveli et al., 2009; Ferrando et al., 2011), the identification of low trait EI in children of parents with drug addiction could well suggest an area of early intervention.

The current research design incorporates a comparison group as well as indicators of mental health. Accordingly, associations between trait EI and general health are explored both in the addiction and in the comparison group. Based on trait EI theory, which predicts that emotions are fundamentally important to health (see Petrides et al., 2016) and given that individuals with addiction experience severe emotional disturbances (Lai et al., 2015), stronger correlations between trait EI and general health were anticipated in the addiction than the comparison group.

Correlations between parent-offspring trait EI scores were examined, separately in the addiction and comparison groups. Based on previous research (e.g., Vernon et al., 2008; Gugliandolo et al., 2015) we expected these correlations to be moderately strong.

In summary, the hypotheses of the study were as follows:

- *Hypothesis 1:* Individuals with drug addiction would score lower than their comparison group peers on trait EI and general health and their subscales.
- *Hypothesis 2:* Offspring of parents with drug addiction would score lower on trait EI than their peers in the comparison group.
- *Hypothesis 3:* Correlations between trait EI and general health would be stronger in the addiction than the comparison group.
- *Hypothesis 4:* There would be significant correlations between parent-offspring trait EI scores in both the addiction and the comparison groups.

In addition to these hypotheses, which mostly concerned global trait EI scores, for purposes of completeness and in order to identify the source of any differences in global trait EI scores we extended the analysis to the factor level of the construct (Well-being, Self-control, Emotionality, and Sociability) without, however, advancing specific hypotheses about these results.

MATERIALS AND METHODS

Participants

The sample comprised 103 adult participants, 42 adolescents and 39 children (see **Table 1** for detailed descriptives). Among the adults, 52 were addicted to drugs and were recruited from substitution units of the Organization Against Drugs Program in Thessaloniki, Greece. At the time the research was conducted, five units existed in Thessaloniki all of which were approached. Comparison group participants were recruited from three primary and two secondary schools and were carefully matched to the addiction group on parental gender and nationality as well as on offspring age and gender. Schools were selected from regions that represented the socioeconomic status of the participants in the experimental group as closely as possible.

Parents of children younger than eight or older than fifteen and a half years were excluded from the study. This age span

was chosen firstly because research on offspring of parents with drug addiction has hitherto focused mainly on the early or late developmental stages and less on the middle period, and secondly, because the TEIQue-CSF cannot be used with children younger than 8 years old. Parents with serious disorders like severe depression, psychosis, etc., were also excluded. In order for severe disorders to be identified, diagnostic records were checked, oral reports from therapists were obtained and, in some cases, a short interview was conducted by a researcher. From the fifty-two parents who participated in the study, 20 adolescents and 19 children completed the appropriate TEIQue instruments. The remaining 13 declined to participate.

Measures

Trait Emotional Intelligence Questionnaires (TEIQue; Petrides, 2009). This family of instruments has been designed to assess the affective aspects of personality that are comprehensively encompassed by trait EI in various populations. In the present study, the relevant Greek adaptations (Petrides et al., 2007; Stamatoopoulou et al., 2016) were used.

Parents completed the TEIQue-SF (Cooper and Petrides, 2010), which comprises 30 items and yields scores on global trait EI and its four subscales (Well-being, Self-control, Emotionality, and Sociability). Adolescents filled out the 30-item adolescent short form (TEIQue-ASF; Petrides et al., 2006). Finally, children completed the TEIQue-CSF (Mavroveli et al., 2008), which comprises 36 items and yields a global trait EI score only. Internal consistencies for all TEIQue scores are presented in **Table 2**.

General Health Questionnaire (GHQ-28; Goldberg, 1978; Moutzoukis et al., 1990). The GHQ assesses mental, physical, and emotional well-being. Parents completed the 28-item version, comprising four 7-item subscales (somatic symptoms, anxiety-insomnia, social dysfunction, and severe depression). Higher scores on GHQ actually indicate poorer health. Internal consistencies for the GHQ variables are presented in **Table 2**.

Procedure

Participants were approached through an opiate substitution program operating in Greece, as mentioned above. This allowed us to control for type (opiates) and severity of drug use (participants in substitution programs all suffer from severe addiction). Participants were admitted on the basis that addiction in opiates was fully established. This was certified by extensive screening tests and interviews, based on the DSM criteria, and conducted by a psychiatrist, a psychologist, and a social worker. Opiate addiction did not preclude the use of other substances, but it did mean that opiates were both the drug for which treatment was sought and the primary drug of use as shown by regular urine tests conducted during the treatment program. Authorized substances for opiate substitution treatment were methadone and buprenorphine.

Members of the units who were parents were identified from unit records. Parents were approached by a researcher and asked if they wished to participate in the study. In the second part of the data collection, parents were recruited for the comparison group. Researchers visited three primary and two secondary schools and administered the materials to children at the beginning of

TABLE 1 | Participant age statistics for the addiction and comparison groups.

Group	Addiction			Comparison		
	M	SD	N	M	SD	N
Parent	39.78	6.68	52	43.53	4.61	51
Father	39.76	7.21	41	43.78	4.73	40
Mother	39.86	4.38	11	42.62	4.21	11
Adolescent	13.40	1.12	20	13.54	0.90	22
Boy	13.61	1.00	14	13.50	1.04	15
Girl	12.90	1.31	6	13.62	0.51	7
Child	9.79	1.27	19	9.85	1.24	20
Boy	9.69	1.49	11	9.59	1.13	11
Girl	9.93	0.98	8	10.16	1.37	9

class. One envelope included the parent's questionnaires, with a brief description of the study, and the second the child's questionnaires. Pupils were asked to return the questionnaires to their teachers the following day.

Participants were assured that their answers would remain strictly confidential. They were informed that they had the right to withdraw at any time, if they wished to do so, and that they were free to not answer any questions that made them feel uncomfortable. They were also instructed that there were no right or wrong responses to the questionnaires. Informed consent for children and adolescents was obtained by parents or guardians. For the comparison group, written permission was also obtained from the Greek Ministry of Education, Lifelong Learning, and Religious affairs.

RESULTS

Chi-square tests showed no significant differences between the two groups (addiction and comparison) in terms of parental gender, $\chi^2(1) = 0.003$, $p = 0.96$ and nationality, $\chi^2(3) = 1.87$, $p = 0.60$. Similarly, there were no differences in terms of number of children, $\chi^2(1) = 0.03$, $p = 0.86$, and adolescent gender, $\chi^2(1) = 0.02$, $p = 0.90$. *T*-tests showed that children, $t(37) = 0.14$, $p = 0.89$ and adolescents, $t(40) = 0.46$, $p = 0.65$ did not differ in age either.

However, there were some significant differences between the two groups. Thus, mean educational level was lower in the addiction ($M = 2.23$, $SD = 0.96$) than the comparison ($M = 3.39$, $SD = 1.36$) group, $t(101) = 5.02$; $p < 0.01$. In the group with addiction, the percentage of participants who had gone beyond compulsory education (primary and secondary school) was 34.6%, whereas in the comparison group, it was 82.3%. The mean educational level of the partners ($M_{\text{addiction}} = 2.80$, $SD_{\text{addiction}} = 1.26$; $M_{\text{comparison}} = 3.16$, $SD_{\text{comparison}} = 1.03$) was similar for both groups [$t(97) = 1.60$; $p = 0.12$]. Last, a *t*-test and a chi-square test, respectively, showed that the addiction and comparison groups differed in average parental age $t(90.76) = 3.32$, $p < 0.01$ (see **Table 1**) and marital status, $\chi^2(4) = 15.62$, $p < 0.01$. In the addiction group, 55.8% of participants were married, 19.2% divorced, 7.7% had a

single-parent family, 13.5% lived together with a partner, and 3.8% were widowed. In the comparison group, 88.2% of the participants were married, 9.8% divorced and 2% had a single-parent family.

There were no gender differences in trait EI [$t(97) = 0.90$; $p = 0.37$] or general health [$t(101) = 1.15$; $p = 0.25$], thus the data were combined in subsequent analyses.

One-way ANOVAs with addiction status as the independent variable (addiction vs. comparison group) and global trait EI, general health and their subscales as the dependent variables were performed to test hypothesis H1. Similarly, one-way ANOVAs with addiction status as the independent variable and children and adolescents' trait EI as the dependent variables were used to test hypothesis H2.

The foregoing results are summarized in **Table 3**, where it can be seen that parents in the group with addiction scored lower on trait EI and higher on general health (indicating that they experienced *poorer* health) than parents in the comparison group. The only subscales that did not follow this pattern were emotionality (from trait EI) and Social dysfunction (from general health). These results supported H1, but not H2, since there were no differences in the scores of offspring.

In order to investigate whether the trait EI – general health relationships are stronger in the addiction than the comparison group (hypothesis H3), Pearson product-moment correlations were calculated (see **Table 4**) and compared statistically (see **Table 5**¹).

High correlations between trait EI and its subscales, and general health and its subscales were immediately apparent in both groups. In the parents with addiction group, trait EI correlated negatively with general health ($r = -0.43$, $p < 0.01$) and its subscales, with the exception of anxiety-insomnia. The strongest correlation was observed between trait EI and Depression ($r = -0.55$, $p < 0.01$). In contrast, trait EI and general health were uncorrelated in the comparison group.

Among all trait EI subscales, Well-being exhibited the strongest correlations with general health and its subscales. Results were quite similar across both groups. However, in the addiction group, Well-being did not correlate significantly with

¹The Fisher z statistic was applied in all cases where both correlations were statistically significant.

TABLE 2 | Internal consistencies for the TEIQue-SF and GHQ variables.

Scale	Total sample	Addiction group	Comparison group
Parent			
Global trait EI	0.78	0.77	0.78
Well-being	0.61	0.62	0.60
Self-control	0.61	0.56	0.66
Emotionality	0.50	0.41	0.59
Sociability	0.50	0.42	0.54
GHQ Global score	0.92	0.92	0.90
Somatic symptoms	0.79	0.79	0.74
Anxiety – insomnia	0.83	0.77	0.81
Social dysfunction	0.79	0.81	0.76
Severe depression	0.86	0.86	0.76
Adolescent			
Global trait EI	0.87	0.90	0.78
Children			
Global trait EI	0.81	0.86	0.68

EI, emotional intelligence; GHQ, General Health Questionnaire.

TABLE 3 | Means, SD, and one-way analyses of variance (ANOVA) for the effects of addiction on trait EI and general health.

Variable	Addiction		Comparison		ANOVA	
	M	SD	M	SD	F	Partial η^2
Parent ($n = 103$)						
Global trait EI	4.68	0.70	5.04	0.65	6.80 [†]	0.07
Well-being	4.93	1.08	5.52	1.01	8.23*	0.08
Self-control	4.36	1.13	4.81	1.15	3.83 [†]	0.04
Emotionality	4.79	0.85	4.91	0.90	0.51	0.01
Sociability	4.28	1.03	4.76	0.93	6.19 [†]	0.06
GHQ Global score	26.92	14.85	18.02	9.71	12.92*	0.11
Somatic symptoms	6.75	4.29	4.20	2.88	12.53*	0.11
Anxiety – insomnia	9.38	4.54	4.84	3.70	30.91**	0.23
Social dysfunction	5.98	4.16	7.20	2.91	2.94	0.03
Severe depression	4.81	4.93	1.78	2.42	15.51**	0.13
Adolescent ($n = 42$)						
Global trait EI	4.74	0.62	4.92	0.61	0.84	0.02
Child ($n = 39$)						
Global trait EI	3.73	0.38	3.72	0.33	0.01	0.00

EI, emotional intelligence; GHQ, General Health Questionnaire. Degrees of freedom for the denominator ranged between 97 and 101 for adults and were 40 for adolescents and 37 for children. η^2 = effect size.

[†] $p < 0.05$, one-tailed. * $p < 0.05$, two-tailed. ** $p < 0.01$, two-tailed.

Social dysfunction, while it correlated with Depression more strongly than in the comparison group ($r_{ag} = -0.67$, $p < 0.01$; $r_{cg} = -0.32$, $p < 0.05$; Fisher $z = 2.36$, $p < 0.05$). Self-control correlated negatively with general health ($r_{ag} = -0.29$, $p < 0.05$; $r_{cg} = -0.31$, $p < 0.05$) and Depression ($r_{ag} = -0.37$, $p < 0.01$; $r_{cg} = -0.44$, $p < 0.01$) in both groups (see **Table 5**). With the sole exception of a negative correlation with Depression in the addicted group ($r = -0.30$, $p < 0.05$), the Emotionality subscale of trait EI was not significantly correlated with general health or its subscales. Similarly, Sociability did not correlate with general health or its subscales, apart from somatic symptoms in the comparison group ($r = 0.38$, $p < 0.01$).

To determine the strongest predictors of general health, we performed a series of regressions with the total score and its subscales as DVs and the trait EI subscales as IVs, separately in individuals with addiction and peers. Inspection of VIF values showed no evidence of multicollinearity. Specifically, in the addiction group values ranged from 1.11 to 1.30 and in the comparison group from 1.06 to 1.31. All regressions reached statistical significance, except for Social dysfunction in the addiction group. Detailed results are presented in **Tables 6** (addiction group) and **7** (comparison group). It can be seen there that, in the group with addiction, the Well-being subscale of trait EI was the best predictor of general health and its subscales,

TABLE 4 | Correlations between global trait EI, general health, and their subscales for parents in the addiction ($n = 52$; above the diagonal) and comparison ($n = 51$; below the diagonal) groups.

	1	2	3	4	5	6	7	8	9	10
1. Trait EI	–	0.62**	0.71**	0.73**	0.63**	–0.43**	–0.30*	–0.25	–0.29*	–0.55**
2. Well-being	0.61**	–	0.27	0.23	0.18	–0.56**	–0.42**	–0.40**	–0.27	–0.67**
3. Self-control	0.73**	0.37**	–	0.40**	0.33*	–0.29*	–0.10	–0.27	–0.20	–0.37**
4. Emotionality	0.75**	0.24	0.38**	–	0.30*	–0.19	–0.11	–0.04	–0.14	–0.30*
5. Sociability	0.47**	0.10	0.20	0.19	–	–0.26	–0.23	–0.14	–0.24	–0.23
6. General health	–0.27	–0.51**	–0.31*	–0.03	0.26	–	0.87**	0.80**	0.78**	0.87**
7. Somatic symptoms	–0.12	–0.39**	–0.13	0.01	0.38**	0.84**	–	0.61**	0.60**	0.67**
8. Anxiety – insomnia	–0.26	–0.50**	–0.27	–0.04	0.28	0.88**	0.69**	–	0.41**	0.59**
9. Social dysfunction	–0.24	–0.40**	–0.21	–0.09	0.14	0.79**	0.60**	0.55**	–	0.59**
10. Severe depression	–0.27	–0.32*	–0.44**	0.04	–0.01	0.70**	0.41**	0.54**	0.42**	–

EI, emotional intelligence.

* $p < 0.05$, two-tailed. ** $p < 0.01$, two-tailed.**TABLE 5 |** Statistical comparisons (Fisher's z) of the correlations between trait EI, general health, and their subscales for parents in the addiction and comparison groups.

	Addiction	Comparison	Z
Well-being – GHQ	–0.56**	–0.51**	0.34
Well-being – somatic symptoms	–0.42**	–0.39**	0.18
Well-being – anxiety – insomnia	–0.40**	–0.50**	–0.62
Well-being – severe depression	–0.67**	–0.32*	2.35**
Self-control – GHQ	–0.29*	–0.31*	–0.11
Self-control – severe depression	–0.37**	–0.44**	–0.41

EI, emotional intelligence; GHQ, General Health Questionnaire.

* $p < 0.05$, two-tailed. ** $p < 0.01$, two-tailed.

with its strongest influence on Depression (the relationships were negative because higher scores on the GHQ-28 indicate poorer health). Findings were less consistent in the comparison group. More specifically: (i) Well-being was negatively related to (poor) general health and three of its subscales, (ii) Sociability was positively related to (poor) general health and its somatic symptoms subscale and negatively to the anxiety-insomnia subscale, and (iii) Self-control was negatively related to the Depression subscale.

In order to test hypothesis (H4), parent–offspring correlations were computed in the total sample and in the two groups separately (Table 8). Although the trends were in the expected direction, results showed no significant relationships for adolescent trait EI in either of the two groups (addiction and non-addiction) or the total sample. Findings were quite similar for children, whose global trait EI scores correlated significantly only with (i) parental global trait EI and Self-control in the total sample and (ii) parental Self-control in the addiction group.

DISCUSSION

Trait EI, General Health and Parental Addiction

One important aim of our study was to examine if parents with drug addiction and their children differ in their trait EI profiles

from their addiction-free peers. As hypothesized (H1), apart from the Emotionality subscale, parents in the addiction group scored lower on trait EI than parents in the comparison group. This is in accordance with previous research revealing various impairments in the emotional attributes of people with drug addiction (Schutte et al., 1998; Kornreich et al., 2003; Kun and Demetrovics, 2010). In addition, people with drug addiction tend to have restricted social networks. They are either isolated or socialize mainly with other people with drug addiction (Sherman et al., 2002; Scaife, 2007; Livingston et al., 2012). Communication in these relationships is not authentic, revolving around the substance of use, and obstructing the processing and sharing of feelings (McIntosh and McKeganey, 2000).

As regards general health, the literature supports our finding that depression and anxiety symptomatology is higher in people with addiction than in controls (Merikangas et al., 1998; Compton et al., 2007; Lai et al., 2015). Individuals with drug addiction often report negative feelings or conditions like sadness, hopelessness, stress, and insomnia. Somatic symptoms are also elevated in populations with drug addiction. Participants in treatment programs usually have a history of years of addiction. Their health condition is compromised due to poor standards of hygiene, neglect of health problems, and intravenous use, while contagious diseases, like hepatitis C, are common (Backmund et al., 2005; Friedman et al., 2006; Nelson et al., 2011). Accordingly, we expected individuals addicted to drugs to report more somatic symptoms than the comparison group. Social dysfunction was the only subscale of general health that did not differ between the two groups. It could be that participation in a treatment program enhanced the sense of self-efficacy in individuals with drug addiction as well as their perceived ability to manage routines and daily practice, although this finding should ideally be replicated on a new sample.

Hypothesis H3 was partially borne out by the data, as trait EI and one of its subscales correlated significantly more strongly with depression in the drug-addiction than the comparison group. Emotions are of central relevance to health and the overrepresentation of affective disorders in populations with drug addiction (Merikangas et al., 1998) means that trait EI will be even more important to such populations than to typical peers. As

TABLE 6 | Regressions of general health and its subscales on the four trait EI subscales in the addiction group.

Dependent variable	R	R ²	Adjusted R ²	F (df)	TEIQue	β	t
General health	0.607	0.368	0.309	6.26** (4, 43)	Wb	−0.56	4.37**
					Sc	−0.01	0.10
					Em	−0.01	0.11
					So	−0.13	1.01
Somatic symptoms	0.490	0.241	0.170	3.41* (4, 43)	Wb	−0.44	3.12**
					Sc	0.16	1.05
					Em	0.01	0.02
					So	−0.23	1.56
Anxiety – insomnia	0.454	0.206	0.132	2.79* (4, 43)	Wb	−0.42	2.90**
					Sc	−0.14	0.87
					Em	0.11	0.75
					So	−0.03	0.19
Social dysfunction	0.343	0.118	0.036	1.44 (4, 43)	Wb	−0.27	1.80
					Sc	0.03	0.16
					Em	−0.06	0.36
					So	−0.14	0.92
Severe depression	0.720	0.518	0.473	11.56** (4, 43)	Wb	−0.65	5.78*
					Sc	−0.08	0.63
					Em	−0.10	0.87
					So	−0.05	0.43

Wb, well-being; Sc, self-control; Em, emotionality; So, sociability.

* $p < 0.05$, two-tailed. ** $p < 0.01$, two-tailed.

TABLE 7 | Regressions of general health and its subscales on the four trait EI subscales in the comparison group.

Dependent variable	R	R ²	Adjusted R ²	F (df)	TEIQue	β	t
General health	0.631	0.398	0.346	7.60** (4, 46)	Wb	−0.48	3.85**
					Sc	−0.24	1.86
					Em	0.11	0.88
					So	0.33	2.81**
Somatic symptoms	0.579	0.335	0.277	5.80** (4, 46)	Wb	−0.42	3.22**
					Sc	−0.08	0.58
					Em	0.05	0.37
					So	0.43	3.44**
Anxiety – insomnia	0.613	0.376	0.321	6.92** (4, 46)	Wb	−0.48	3.81**
					Sc	−0.19	1.41
					Em	0.08	0.63
					So	−0.34	2.82**
Social dysfunction	0.449	0.201	0.132	2.90* (4, 46)	Wb	−0.38	2.66*
					Sc	−0.11	0.73
					Em	0.01	0.05
					So	0.20	1.48
Severe depression	0.533	0.285	0.222	4.57** (4, 46)	Wb	−0.22	1.63
					Sc	−0.47	3.26*
					Em	0.26	1.86
					So	0.06	0.49

Wb, well-being; Sc, self-control; Em, emotionality; So, sociability.

* $p < 0.05$, two-tailed. ** $p < 0.01$, two-tailed.

has been shown (e.g., Espinosa and Rudenstine, 2018; Rudenstine and Espinosa, 2018), trait EI can contribute to the treatment of depression, anxiety and borderline personality disorders related to life trauma (see also Nelis et al., 2011). Higher trait EI

may also play a protective role in relation to mental health symptomatology (Lea et al., 2018). It follows, then, that training in trait EI could contribute to the reduction of drug addiction difficulties.

TABLE 8 | Correlations between parental variables (in rows) and adolescent and children's global trait EI in the total, addiction, and comparison samples.

	Adolescent global trait EI			Children global trait EI		
	Total sample (<i>N</i> = 42)	Addiction (<i>n</i> = 20)	Comparison (<i>n</i> = 22)	Total sample (<i>N</i> = 39)	Addiction (<i>n</i> = 19)	Comparison (<i>n</i> = 20)
Global trait EI	0.18	0.33	0.27	0.40*	0.49	0.28
Well-being	0.21	0.36	0.28	−0.03	−0.09	0.01
Self-control	0.20	0.30	0.36	0.33*	0.55*	0.07
Emotionality	0.06	0.17	0.18	0.19	0.10	0.25
Sociability	0.13	0.21	0.38	0.14	0.05	0.20
General health	−0.01	−0.19	0.02	0.04	0.08	0.03
Somatic symptoms	0.01	−0.13	−0.04	−0.02	−0.08	0.18
Anxiety – insomnia	0.02	−0.10	0.23	−0.05	0.01	−0.02
Social dysfunction	−0.04	−0.16	−0.06	0.17	0.19	−0.07
Severe depression	−0.04	−0.15	0.03	0.07	0.14	0.06
Age of parents	−0.03	0.21	−0.17	0.15	0.28	−0.18
Education of parents	0.08	0.08	0.02	0.08	−0.05	0.20

**p* < 0.05, two-tailed.

Global trait EI did not correlate significantly with symptoms of anxiety-insomnia in the drug-addiction group, although its Well-being subscale did, as expected. Contrary to previous research (Martins et al., 2010), global trait EI was not significantly correlated with general health or its subscales in the comparison group. However, this was probably an artifact of the small sample size, since a clear pattern of negative relationships was observed, as expected. Moreover, the Well-being subscale of trait EI was significantly negatively correlated with general health and all of its subscales. Despite differences of magnitude, Well-being had a unique effect on general health and its subscales in both the addiction and the comparison groups. Three differences in the results of individuals with addiction and those without were most notable. First, in the comparison group, the Self-control subscale of trait EI explained most of the variance in Depression, whereas in the addiction group the strongest predictor was the Well-being subscale. For non-addicted individuals, Self-control was a better predictor of depressive symptomatology than their Well-being, whereas for individuals with drug addiction the opposite pattern was observed. Second, while in the addiction group none of the trait EI subscales was significantly related to Social dysfunction, in the comparison group, Well-being showed a significant negative correlation. Third, in the comparison group only, Sociability was positively related to somatic symptoms. This finding would have to be replicated with the full form of the TEIQue inventory, with particular emphasis on the possibility that the assertiveness facet of trait EI Sociability may have contributed to this “maladaptive correlation” as indeed it has to others, such as that with narcissism (Petrides et al., 2011).

Trait EI Profiles in Offspring

Children and adolescents of parents with drug addiction had similar trait EI profiles as the children and adolescents of addiction-free parents. It seems that, in this sample at least, offspring were largely unaffected by their parents' addiction, and concomitant personality, difficulties. Possible

explanations for this finding include that other people may have contributed to the development of children's emotional functioning, including the other parent, grandparents, or friends. For instance, grandparents and friends are often reported to play a vital role in the emotional development of children, especially when parents face mental or addiction problems (Cleaver et al., 2003; Bancroft et al., 2004; Sheridan et al., 2011).

The voluntary nature of participation in this study could have led to a disproportionate recruitment of high-functioning or motivated parents. Parents with drug addiction are often apprehensive that their participation in any kind of parent-child research may lead to the removal of their children from their care (Klee, 2002). For that reason, parents who had greater relationship difficulties with their children may have refused to participate. Similarly, parents with drug-addiction, who, at the time of the research, were absorbed in themselves and their addiction difficulties, may have been indifferent to a research project seeking to improve the understanding of the parent-child emotional interaction. Clearly, such individuals would have had reduced incentives to participate.

There are no other studies specifically comparing the trait EI profiles of children of parents with and without drug addiction. However, cognate studies focusing on children's emotional difficulties (Fals-Stewart et al., 2004) have revealed the existence of children who, despite adverse life circumstances (e.g., impaired parental mental health and parental addiction), are able to maintain an adequate level of emotional functioning and adaptive behavior. These children have been described as “resilient” (Luthar et al., 2000; Rutter, 2012; Cicchetti, 2013). In our study, children of parents with drug-addiction had similar trait EI scores as children in the comparison group. Therefore, it could be argued that these children were emotionally resilient to their parents' addiction problems and emotional difficulties.

These results, however, should be interpreted with caution, because resilience is considered to be domain- and time-specific. A child could be emotionally resilient, but not, for instance, academically resilient (Luthar et al., 1998). Moreover, a child could be resilient at the time of the investigation, but vulnerable sometime later. Our study relied on a cross-sectional design, which cannot address whether the resilience afforded by trait EI extends from childhood to adolescence. Thus, a longitudinal design with a larger sample size is recommended for future research in order to replicate and extend our findings.

Parent and adolescent trait EI ratings were uncorrelated in both the addiction and the comparison groups. Parent and children trait EI ratings were also uncorrelated, with the exception of a significant relationship between parental Self-control and children's global trait EI in the addiction group. It is possible that the perceived ability of parents with drug addiction to resist their impulses and regulate their stress may be conducive to the development of their children's trait EI. Self-control is exceptionally important in individuals with drug addiction because the urge to indulge in the consumption of drugs is persistent and difficult to resist.

Previous studies on parent-offspring correlations of trait EI (Vernon et al., 2008; Gugliandolo et al., 2015) have returned moderately strong values, which were generally not observed in our samples (hypothesis H4). However, trends were in the expected direction. It is worthwhile to investigate this issue with larger sample sizes because, if confirmed, a lack of association between parent-offspring trait EI scores may be indicative of a generalized psychological break in the parent-child relationship in populations of parents with drug addiction.

Future Research

Future research should endeavor to gather data from larger samples as well as from both parents in order to examine father-offspring, mother-offspring, and midparent-offspring correlations in drug-addiction and comparison groups. It would also be informative to examine these relationships developmentally, through a longitudinal design, with a view to enhancing our understanding of the factors that can promote or inhibit the development of trait EI in children of parents with drug addiction.

Our study examined only parents with drug addiction who participated in substitution programs. It would be desirable to extend the research to parents with drug addiction who participate in other types of programs or no programs at all. Parents with drug addiction may differ in their characteristics and priorities, depending on the type of treatment they choose. Similarly, parents with drug addiction who refuse treatment

could be less motivated or more preoccupied with addiction than parents with drug addiction who participate in therapeutic programs. Finally, it would be interesting for future research to consider variables like duration of addiction and of maintenance therapy as well as dosage and tolerance of the substitution substances used.

CONCLUSION

Our results lend support to the hypothesis that individuals with drug addiction have difficulties in processing and regulating emotional information. Regardless of whether these difficulties preexist or follow drug addiction, they should be treated in clinical practice and targeted in interventions. However, the finding that children in the addiction and comparison groups have similar trait EI profiles is especially important and encouraging. Previous research has revealed strong associations of trait EI with important variables like peer acceptance, pro-social behavior, socialization, body satisfaction and mental health in children and adolescents (Mavroveli et al., 2008; Frederickson et al., 2012; Resurrección et al., 2014; Gugliandolo et al., 2015; Cuesta-Zamora et al., 2018). If offspring of parents with drug addiction manage to maintain typical levels of trait EI, this would have positive repercussions in multiple other aspects of their life.

ETHICS STATEMENT

This study was carried out in accordance with the ethical recommendations of the American Psychological Society. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Pedagogical Institution – Greek Ministry of Education, Research and Religious Affairs as well as by the Organization against Drugs.

AUTHOR CONTRIBUTIONS

This research was part of GA's Ph.D. thesis at the Aristotle University of Thessaloniki. GA conceived the presented idea, developed the theoretical framework, collected the data, and wrote the first draft of the manuscript. GA and AS contributed to the design of the study. GA and KP performed the statistical analysis. KP provided feedback and critically revised the article for important intellectual content. All authors contributed to the interpretation of the results and read and approved the submitted version.

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The Mediating Role of Health Consciousness in the Relation Between Emotional Intelligence and Health Behaviors

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The goals of this study were to identify groups of health-related behaviors among young adults ($N = 314$, $Mage = 21.94$, $SD = 6.53$), gauge the relation between emotional intelligence and health behaviors in this population, and assess health consciousness as mediator of said relation. Latent class analysis identified two mutually exclusive health behavior groups, which according to response patterns were labeled as Healthy and Unhealthy. The Healthy group (56%) was composed of individuals who had a healthy diet (i.e., low fat and high fiber), exercised regularly, and who frequently engaged in behaviors that prevent oral and skin-related diseases. In contrast, the Unhealthy group (44%) rarely engaged in these health-promoting behaviors. Using structural equation modeling we found a negative relation between emotional intelligence and unhealthy behaviors relative to health-promoting ones. Mediation analyses indicated that the mechanism explaining said relation was through increments in health consciousness, with large standardized indirect effects ranging between -0.52 and -0.78 . As health behaviors during early adulthood are salient predictors of health outcomes in old age, the results have clear implications for the inclusion of emotional intelligence training in programs seeking to raise health awareness and cultivate health promoting behaviors in young adults, in so much as to seek to reduce the risk of chronic ailments later in life.

Keywords: health consciousness, emotional intelligence, health behaviors, latent class analysis, mediation

INTRODUCTION

Studies show that prolonged participation in poor health practices such as unhealthy eating, low physical activity, and noncompliance with disease detection and prevention guidelines are salient markers of adverse physical health conditions later in life (Rimm et al., 1995; Colditz et al., 2000; Patel et al., 2010; Chiuvé et al., 2012). In particular, unhealthy eating and low physical activity promote obesity, which is a major contributor for diabetes, heart disease, and other chronic health problems in later years (Must et al., 1999; Kopelman, 2000; Bogers et al., 2007). Long-term smoking and excessive alcohol use increase the risk of developing heart and pulmonary

disease as well as multiple forms of cancer (U.S. Department of Health and Human Services, 2010). Failure to participate in disease screening and prevention practices increase the risk of developing multiple illnesses and additional health complications later in life (Ajwani et al., 2003; Yach et al., 2004; Adolph et al., 2017). Therefore, research identifying the factors related to health-promoting behaviors is vital for creating interventions aimed at reducing the risk of illness, particularly among young adults whose health behaviors are susceptible to change (Frech, 2012; Johnstone and Hooper, 2016; Daw et al., 2017) and will have important health implications in late adulthood (Anderson and Horvath, 2004; National Research Council and Institute of Medicine of the National Academies, 2009; Park et al., 2014). Two psychological concepts, emotional intelligence and health consciousness, have been identified as important predictors of health behaviors.

Emotional intelligence (EI), a concept derived from principles of social intelligence (Petrides, 2011), refers to a person's emotional competence in social interactions, particularly the perception, understanding, expression, use and regulation of feelings and emotions (Petrides and Furnham, 2001; Wong and Law, 2002; Johnson et al., 2009; Nelis et al., 2011). Substantial Meta-analytic evidence has documented EI as a positive predictor of physical and mental health (Schutte et al., 2007; Martins et al., 2010), and related studies have found EI to be correlated with health behaviors (Petrides et al., 2016). In particular, studies have shown that individuals with high EI actively participate in health-promoting behaviors, such as following a healthy diet as well as engaging in physical activity (Saklofske et al., 2007a,b; Fernández-Abascal and Martín-Díaz, 2015; Mikolajczak et al., 2015). Studies have also found that low EI is associated with the use of health-impairing substances, including alcohol, tobacco, and illicit drugs (Trinidad and Johnson, 2002; Riley and Schutte, 2003; Brackett et al., 2004; Trinidad et al., 2004). In sum, EI is a widely documented construct that relates to improved health and related behaviors.

Health consciousness corresponds to self-awareness about one's health, and the willingness to engage in health and wellness promoting behaviors (Gould, 1988, 1990; Michaelidou and Hassan, 2008). Not surprisingly, health conscious individuals actively seek for information about how to improve their health, and adhere accordingly (Iversen and Kraft, 2006; Dutta and Feng, 2007; Basu and Dutta, 2008). Hence, individuals with high health consciousness have positive attitudes about nutrition, self-care and exercise, and accordingly have healthier lifestyles than individuals with low health consciousness (Hollis et al., 1986; Kraft and Goodell, 1993; Hoek et al., 2004; Chen, 2009). Such healthier lifestyles also include frequently visiting a primary doctor, and having a lower propensity to engage in prescription drug misuse (Mesanovic et al., 2013; Lucas et al., 2017).

Despite numerous evidence highlighting EI and health consciousness independently as important markers of behaviors that promote health and well-being, to our knowledge no research has considered the interrelation between these psychological concepts in predicting health behaviors. We posit that EI relates to health behaviors indirectly through increases in health consciousness for two primary reasons. First,

high EI individuals are motivated to adjust behavior for the sake of improving their overall well-being and achieve success (Goleman, 1998). Accordingly, high-EI individuals develop high levels of self-awareness and appraisal, including awareness about behaviors that promote health (Wong and Law, 2002). Second, high EI individuals possess the capacity for emotion regulation (Dawda and Hart, 2000; Peña-Sarrionandia et al., 2015), and accordingly develop a heightened awareness of effective and healthy strategies to manage daily life stressors (Barrett et al., 2001; Peña-Sarrionandia et al., 2015). In sum, EI is a potential precursor of health consciousness, which in turn relates to actions taken to improve one's health, thus mediating the relation between EI and health behaviors.

Current Study

In this article, we test the mediating role of health consciousness in the EI to health behaviors relation. Specifically, we hypothesized that EI and health consciousness would negatively relate to unhealthy behaviors. Moreover, we hypothesized that the relation between EI and health behaviors would be indirect through changes in health consciousness.

MATERIALS AND METHODS

Procedure and Participants

Data were obtained from a large and culturally diverse public university in the Northeastern United States. Participants were prescreened for English proficiency, age, and any diagnosed physical or mental illness. A total of 314 healthy adults (18 years or older) completed self-report questionnaires in a research laboratory setting. The average participant was 21.94 ($SD = 6.53$) years old. Participants were mostly female (62.4%), and racial ethnic minority (85.0%), including Black (15.3%), Hispanic (33.4%), Asian (28.3%), and multi-racial (8.0%). The majority of participants (61.8%) reported household incomes of \$40,000 USD or lower, which falls below the median household income of the city (United States Census Bureau, 2016). The vast majority reported their physical health between excellent and fair at time of participation (97.5%), with only eight participants reporting poor physical health. The majority of the sample had a primary doctor they visited at least every 6 months (79.0%), as well as a dentist (69.1%). The Institutional Review Board of the university approved this study, and all participants provided written consent.

Measures

Emotional Intelligence

Participants answered the Wong & Law Emotional Intelligence Scale (WLEIS; Wong and Law, 2002), which is a 16-item self-report measure of EI that is based on the four-branch ability model (Salovey and Mayer, 1990; Mayer and Salovey, 1997), and which has been identified as a theoretically supported measure of EI that correlates with personality traits (Brannick et al., 2009). Specifically, the measure gauges four dimensions of emotional intelligence including, emotional appraisal and expression of one's emotions (SEA), emotional appraisal and recognition of

other's emotions (OEA), self-regulation of emotions (ROE) and use of emotions to enable performance (UOE). Combined, these dimensions provide a global measure of EI. Sample items include "I have a good sense of why I have certain feelings most of the time" and "I am a self-motivated person." Items are presented using a 7-point Likert Scale (1 = Strongly Disagree . . . 7 = Strongly Agree). The psychometric properties of the WLEIS scale have been well-documented in multiple cultures and ethnic groups within and outside the US (Law et al., 2004; Ng et al., 2008; Li et al., 2012; Carvalho et al., 2016).

Health Consciousness

Respondents also answered questions from the Health Consciousness Scale (HCS; Gould, 1988), which is a 9-item self-report global measure of one's health awareness. Sample items include "I reflect about my health a lot" and "I am alert to changes in my health." Items are presented on a 7-point Likert scale (1 = Strongly Disagree . . . 7 = Strongly Agree). The scale has been validated in studies using international as well as US-based samples (Gould, 1990; Bearden et al., 2011; Mesanovic et al., 2013).

Health Behaviors

We assessed health behaviors via the Health Behavior Schedule II (HBS-II; Heiby et al., 2005; Frank et al., 2007), a self-report measure of acquiescence to conventional health practices that has been documented to predict compliance (Frank et al., 2007). While the original scale contains 12 items, only 9 items were used in this study, as these were most relevant for our population. Individuals were asked to state the degree to which they have succeeded (1 = Not at successful . . . 7 = Very successful) in eating a healthy diet, regularly exercising, flossing teeth daily, protecting skin from sun daily, refraining from smoking and drinking alcohol, taking medications as prescribed, performing a monthly breast exam, and screening for cervical/prostate cancer every 3 years. The reliability of the scale has been assessed in the literature (Frank et al., 2007).

Covariates

Respondents provided additional information including their age in years, sex (Male or Female), and family income (1 = \$0 – \$20,000 . . . 5 = \$80,000 and above).

Analytical Strategy

Confirmatory Factor Analysis (CFA) with maximum likelihood estimation using the sample covariance matrix as input assessed the psychometric properties of the EI and health consciousness scales. Measures of absolute and relative fit, including the χ^2 statistic, root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker Lewis Index (TLI), and the standardized root mean squared residual (SRMR) determined goodness of fit. In particular, a good fitting model is determined by fit measures that adhere to the following benchmarks: p -value of χ^2 statistic > 0.05 , $RMSEA \leq 0.06$, $CFI \geq 0.95$, $TLI \geq 0.95$, and $SRMR \leq 0.09$ (Hu and Bentler, 1999). Convergent validity of each construct was determined by comparing each construct reliability (CR) estimate against a minimum benchmark value of

0.70 and by verifying that each average variance extracted (AVE) was greater than 0.50 (Fornell and Larcker, 1981; Bagozzi and Yi, 1988). In addition, for each construct, discriminant validity was determined by comparing the AVE to the constructs' squared correlation (Fornell and Larcker, 1981).

According to the literature, health behaviors are more likely to appear in groups or clusters than they are to appear independently (Vickers et al., 1990; Daw et al., 2017). However, the different types of health behavior groupings characterizing our population are unknown. Therefore, we used latent class analysis (LCA) to determine the patterns of health behaviors evident in our sample. Latent class analysis is a finite mixture model that probabilistically sorts respondents into several mutually exclusive groups with similar response patterns (McCutcheon, 1987; Hagenars and McCutcheon, 2002). Thus in this setting, LCA generated a categorical outcome variable representing different types of health behavior groups. Because each health behavior question had seven possible responses (i.e., 1 = Not at successful . . . 7 = Very successful), we employed polytomous LCA (Linzer and Lewis, 2011). The number of groups that define the best fitting LCA model corresponds to those that minimize the Bayesian Information Criterion (BIC; Nylund et al., 2007; Tein et al., 2013) and the Consistent Akaike Information Criterion (CAIC; Akaike, 1973; McCutcheon, 1987). In addition, a good fitting model will yield an entropy index close to 1, representing clear demarcation of the classes (Ramaswamy et al., 1993).

Mediation analyses using structural equation modeling assessed the relation between emotional intelligence and health behaviors through health consciousness. Goodness of fit measures as mentioned above for CFA were adhered to. The 95% confidence interval for the indirect effect via health consciousness was obtained using 5,000 bootstrapped replications. Mediation is confirmed if such confidence interval does not contain zero (Shrout and Bolger, 2002; Hayes, 2013). All models included age, sex, and family income as covariates. We report partially and completely standardized indirect effects as measures of effect size in mediation models (Preacher and Kelley, 2011).

Pearson correlations and independent samples t -tests assessed the associations between the variables. Assumptions of normality for continuous variables and residuals in the regression models were confirmed, as all skewness and kurtosis coefficients were within the limits proposed in the literature (West et al., 1995). In addition, the homoscedasticity assumption of residuals was confirmed via non-significant White tests, which also gage nonlinear forms of heteroscedasticity (White, 1980). Multicollinearity was also ruled out as a potential confound, as the variance inflation factors were lower than 1.5. Missing cases were less than 0.01% and thus not imputed. Finally, Common Method Variance was unlikely a serious confound (Podsakoff et al., 2012), as the single factor CFA model yielded a poor fit (χ^2 (434) = 2386.42, $p < 0.001$; $RMSEA = 0.12$, $p < 0.001$, 90% CI (0.11, 0.12); $CFI = 0.49$; $TLI = 0.46$; $SRMR = 0.11$). The polytomous LCA analyses were conducted via the polLCA package in R (Linzer and Lewis, 2011). All other analyses were conducted using STATA v. 15. (StataCorp, 2015).

TABLE 1 | Unstandardized and standardized loadings for confirmatory factor analysis of emotional intelligence and health consciousness scales.

Item	Standardized factor loadings	EI Subscale (Standardized loading on EI total) AVE and CR	M (SD)
<i>Emotional Intelligence Scale (EI)</i>			
I have a good sense of why I have certain feelings.	0.79***	SEA (0.68***) AVE = 0.67 CR = 0.89	5.49 (1.05)
I have a good understanding of my own emotions.	0.92***		
I really understand what I feel.	0.89***		
I always know whether or not I am happy.	0.63***	OEA (0.47***) AVE = 0.60 CR = 0.81	5.70 (0.93)
I always know my friends' emotions.	0.66***		
I am a good observer of others' emotions.	0.71***		
I am sensitive to the emotions of others ^a .		UOE (0.72***) AVE = 0.60 CR = 0.85	5.66 (1.00)
I understand the emotions of people around me.	0.92***		
I always set goals and try my best to achieve them.	0.70***		
I always tell myself I am a competent person.	0.67***	ROE (0.62***) AVE = 0.73 CR = 0.89	5.35 (1.18)
I am a self-motivated person.	0.87***		
I would always encourage myself to try my best.	0.83***		
I can control my temper and handle difficulties.	0.78***		
I am quite capable of controlling my own emotions.	0.80***		
I can calm down quickly when I am very angry ^a .			
I have good control over my own emotions.	0.97***		
$\chi^2 (70) = 88.37, p = 0.07; RMSEA = 0.03, p = 0.98, 90\% CI (0.00, 0.05); CFI = 0.99; TLI = 0.99; SRMR = 0.05.$			
<i>Health Consciousness Scale (HCS)</i>			
I reflect about my health a lot.	0.61***	AVE = 0.51 CR = 0.86	5.39 (0.98)
I am very self-conscious about my health ^a .			
I know my inner feelings about my health.	0.79***		
I am constantly examining my health.	0.70***		
I am alert to changes in my health.	0.63***		
I am usually aware of my health ^a .			
I am frequently aware of the state of my health.	0.77***		
I notice how I feel physically through the day ^a .			
I am very involved with my health.	0.77***		
$\chi^2 (4) = 7.56, p = 0.11; RMSEA = 0.05, p = 0.39, 90\% CI (0.00, 0.11); CFI = 0.99; TLI = 0.98; SRMR = 0.02.$			

^aItem was eliminated due to low factor loadings (<0.60). SE, standard error; AVE, Average Variance Extracted; CR, Construct Reliability. SEA and OEA correspond to self and others' emotional appraisal, UOE and ROE correspond to use and regulation of emotions. The measurement model including EI and HCS yielded the following goodness of fit values: $\chi^2 (148) = 174.33, p = 0.07; RMSEA = 0.02, p = 0.99, 90\% CI (0.00, 0.04); CFI = 0.99; TLI = 0.99; SRMR = 0.06$. Some items within each scale were paraphrased due to space limitations. *** $p < 0.001$.

RESULTS

Confirmatory Factor Analysis

Confirmatory Factor Analyses (CFA) verified the psychometric properties of the EI and health consciousness scales. The CFA results appear in **Table 1**.

As shown, the measurement model yielded adequate absolute and relative fit statistics. In both constructs the factor loadings per item were significant ($p < 0.001$), but a few items were excluded as their factor loadings were below the benchmark of 0.60 suggested in the literature (Comrey and Lee, 1992). Also, as shown the values for AVE and CR were larger than the recommended benchmarks of 0.50 and 0.70, respectively. In addition, as shown on the third column (**Table 1**), all subscales significantly loaded onto a higher order factor representing global or total EI. **Table 2** presents the correlations, shared variance and Cronbach's alpha estimates for each construct.

All constructs were positively correlated with each other, and the correlations between all EI subscales as well as the total EI measure and health consciousness were positive and moderate to

strong. In addition, the estimates for internal consistency were above 0.80 for all constructs and in each case, the AVEs were larger than the shared variance for each pair of constructs, thus confirming discriminant validity.

TABLE 2 | Correlations, squared correlations, and internal consistency estimates.

Item	1	2	3	4	5	6
(1) SEA	$\alpha = 0.88$	0.12	0.19	0.14	0.62	0.10
(2) OEA	0.34***	$\alpha = 0.85$	0.08	0.02	0.31	0.12
(3) UOE	0.44***	0.28***	$\alpha = 0.85$	0.19	0.61	0.17
(4) ROE	0.37***	0.13*	0.44***	$\alpha = 0.87$	0.48	0.04
(5) EI Total	0.79***	0.56***	0.78***	0.69***	$\alpha = 0.88$	0.19
(6) HCS	0.31***	0.34***	0.41***	0.21***	0.44***	$\alpha = 0.84$

SEA and OEA correspond to self and others' emotional appraisal, UOE and ROE correspond to use and regulation of emotions. Cronbach's alpha estimates of internal consistency are presented along the diagonal, Pearson correlations appear below the diagonal and the shared variances for each construct appear above the diagonal. The AVEs per construct were: SEA = 0.67, OEA = 0.60, UOE = 0.60, ROE = 0.73, and HCS = 0.51. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

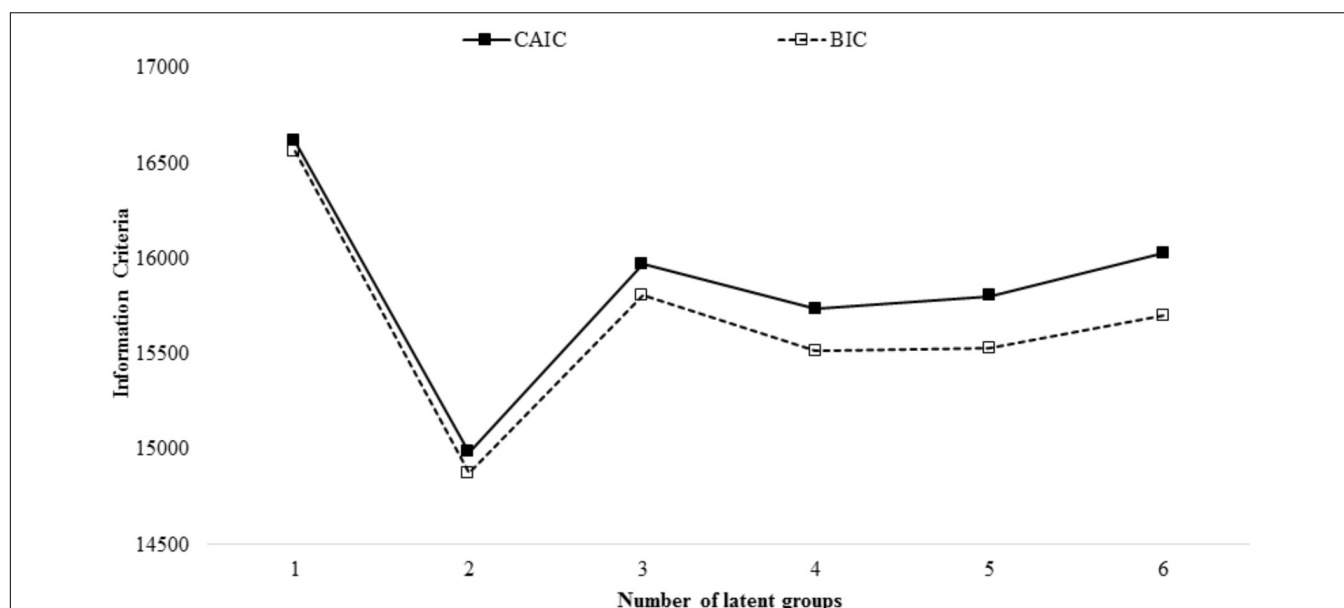


FIGURE 1 | Information criteria from latent class analysis of health behaviors plotted against number of classes. BIC, Bayesian Information Criterion; CAIC, Consistent Information Criterion. The best-fitting model yields a minimum BIC and CAIC. Entropy for the two-group solution was 0.92.

Latent Class Analysis on Health Behaviors

To determine the number of health behavior groups that characterize the population represented by the sample, we consecutively ran the LCA model increasing the number of groups at each iteration and retaining the aforementioned information criteria (i.e., BIC and CAIC). **Figure 1** presents these information criteria plotted against the respective number of LCA groups.

As shown, the two-group model minimized the information criteria and thus yielded the best-fit overall. In addition, the entropy for the two-group model was 0.92, representing clear class delineation.

Table 3 presents the probability of response for each item, conditional on group membership, as well as group comparisons in terms of sample characteristics and relevant psychometric variables.

As indicated, the first group (44.3%, $n = 139$) was characterized by individuals who reported not being often successful in engaging in health-promoting behaviors such as eating healthy, exercising regularly, flossing daily, and protecting their skin from the sun. The second group (55.7%, $n = 175$) was composed of individuals who were at least often successful in engaging in these health-promoting behaviors. Both groups were highly successful in taking medications as prescribed, limiting alcohol consumption and avoiding smoking cigarettes. Additionally, the two groups were equally unlikely to engage in regular cancer screening. Accordingly, we labeled the first group as *Unhealthy* and the second group as *Healthy*. In terms of sex, age and family income, the two groups were not statistically different from each other as presented at the bottom of **Table 3**. Yet, the *Healthy* group had higher health consciousness and EI scores than the

Unhealthy group. These differences were from moderate to large as indicated by their respective Cohen's d measure of effect size.

Mediation Analyses

Mediation analyses assessed the indirect effect of health consciousness on the relation between EI and the probability of belonging to the *Unhealthy* group, relative to the *Healthy* group. Specifically, we conducted two mediation models. The first model used the global measure of EI, and the second model used the four EI subscales (i.e., SEA, OEA, UOE, and ROE) as antecedents. Every model included sex, age, and family income as covariates, although none of them significantly related to the outcomes. The results are presented in **Table 4**, and depicted in **Figures 2, 3**.

In every instance EI was significantly related to decreases in the likelihood of belonging to the *Unhealthy* group relative to the *Healthy* group, and related to increments in health consciousness. Health consciousness was in turn related to decreases in the likelihood of belonging to the *Unhealthy* group relative to the *Healthy* group. Upon adding health consciousness to the model, the effect of EI decreased in magnitude, and was no longer significant. As indicated in the 4th column of **Table 4**, the indirect effect of health consciousness was significant, and according to both measures of effect size, the effect was large. Both models yielded sound goodness of fit statistics as indicated at the bottom of **Table 4** and **Figures 2, 3**.

DISCUSSION

This study assessed health-related behaviors within a large sample of young adults, and gaged the roles of emotional intelligence and health consciousness in predicting such. Latent class analyses identified two health-behavior groups that resemble

TABLE 3 | Item response probabilities of health behaviors and descriptives by latent group ($N = 314$).

	Group 1	Group 2	
	Unhealthy	Healthy	
Group Size % (n)	44.3 (139)	55.7 (175)	
Items (<i>I am often to always successful at ...</i>)			
Eating a healthy diet (low fat and high fiber)	0.09	0.64	
Exercising at least 20 min daily (3× week)	0.24	0.64	
Flossing teeth daily	0.15	0.56	
Protecting skin from sun	0.32	0.57	
Not smoking cigarettes	0.93	0.93	
Limiting alcohol to 1 drink per day	0.86	0.99	
Taking medication as prescribed	0.74	0.89	
Cervical/prostate cancer screening (every 3 years.)	0.16	0.38	
Performing a monthly breast exam	0.07	0.28	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>d</i>
HSC	4.89 (1.01)	5.79 (0.74)	1.02***
SEA	5.31 (1.11)	5.64 (0.98)	0.32**
OEA	5.56 (0.99)	5.82 (0.87)	0.29*
UOE	5.37 (1.11)	5.88 (0.83)	0.52***
ROE	5.09 (1.27)	5.54 (1.06)	0.38***
EI Total	5.34 (0.79)	5.73 (0.66)	0.54***
Age	21.79 (6.33)	22.07 (6.70)	0.04 ^{n.s}
Household Income	2.37 (1.37)	2.55 (1.40)	0.13 ^{n.s}
	% (n)	% (n)	χ^2 (df)
Female	62.6 (87)	62.3 (109)	0.00 (1) ^{n.s}

Probability of responding either "Often Successful," "Frequently Successful" or "Always Successful" conditional on latent class or group are presented in the first panel, and those in bold are > 0.5 . The second panel contains descriptive statistics of the sample by health behavior group. d , Cohen's d measure of effect size corresponding to independent samples t -test. HSC, Health Consciousness Scale; SEA, Self-Emotional Appraisal; OEA, Other's Emotional Appraisal; UOE, Use of Emotion; ROE, Regulation of Emotions. EI Total is the global measure of emotional intelligence. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

TABLE 4 | Direct, total, indirect effects and effect sizes of the relation between emotional intelligence and health-related behaviors mediated by health consciousness.

Antecedent	Direct effect (HSC included)	Total effect (HSC not included)	Indirect effect normal-based 95% confidence interval	Partially standardized indirect effect	Completely standardized indirect effect
EI Total	−0.03	−0.40***	−0.44 (−0.61, −0.26)*	−0.88	−0.66
SEA	0.06	−0.29***	−0.35 (−0.51, −0.19)*	−0.70	−0.74
OEA	0.15	−0.26***	−0.41 (−0.57, −0.25)*	−0.82	−0.76
UOE	−0.06	−0.45***	−0.39 (−0.54, −0.24)*	−0.78	−0.78
ROE	−0.20	−0.42***	−0.22 (−0.28, −0.06)*	−0.44	−0.52

CI, Confidence Interval; EI, Emotional Intelligence; SEA, Self-Emotional Appraisal; OEA, Other's Emotional Appraisal; UOE, Use of Emotion; ROE, Regulation of Emotions; HSC, health consciousness scale. The Healthy group is the referent health-related behavior group. EI Total is the global measure of emotional intelligence. Indirect effects and 95% CI were obtained via 5,000 bootstrapped replications. Goodness of fit statistics for the model using EI total: χ^2 (153) = 175.74, $p = 0.10$; RMSEA = 0.02, 90% CI (0.00, 0.04), $p = 0.99$, CFI = 0.99, TLI = 0.97, SRMR = 0.05. Goodness of fit statistics for the model using the four subscales for EI: χ^2 (168) = 199.08, $p = 0.05$; RMSEA = 0.02, 90% CI (0.00, 0.04), $p = 0.99$, CFI = 0.99, TLI = 0.99, SRMR = 0.05. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

the two broad dimensions of preventive and risk-taking behaviors observed elsewhere (Vickers et al., 1990) and thus highlight the external validity of the findings. Namely, our young adult sample was divided into two distinct health-behavior groupings: An unhealthy group (not successful at eating healthy, exercising regularly, flossing daily, and protecting their skin from the sun) and a healthy group (successful at eating healthy, exercising regularly, flossing daily, and protecting their skin from the sun). While the two groups were similar in terms of socio-demographic

characteristics, the healthy group endorsed on average higher levels of health consciousness than the unhealthy group; a result that is in agreement with the literature, and our first hypothesis. More specifically, studies have shown that the degree to which individuals are concerned about their health is a strong indicator of the extent to which they will engage in health promoting behaviors, such as fitness, nutrition, and others (Kraft and Goodell, 1993; Forthofer and Bryant, 2000). Accordingly, and as observed herein, individuals who engage in health-responsible

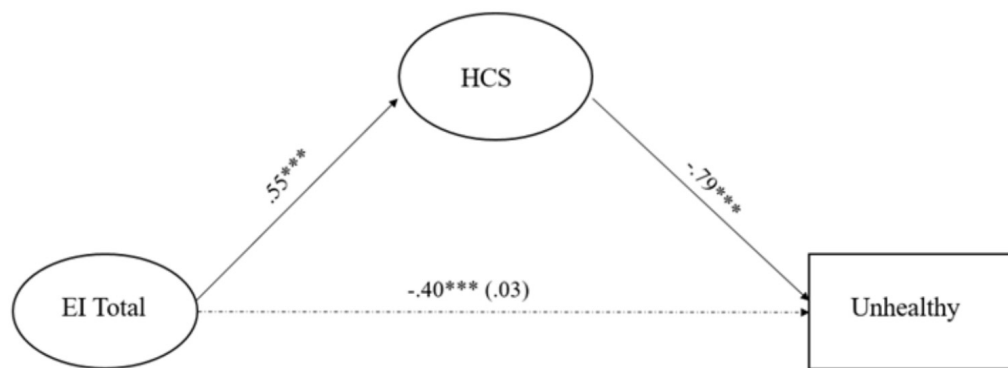


FIGURE 2 | Path diagram of the relation between EI global and health behaviors mediated by HCS. EI Total, global measure of emotional intelligence; HCS, health consciousness scale. The model's fit was $\chi^2 (153) = 175.74$, $p = 0.10$; RMSEA = 0.02, [90% CI (0.00, 0.04)], $p = 0.99$, CFI = 0.99, TLI = 0.97, SRMR = 0.05. The dotted line corresponds to total and direct effect of emotional intelligence. The total effect (HCS not included) is outside parenthesis, and the direct effect, computed when HCS was included in the model, is in parenthesis. *** $p < 0.001$.

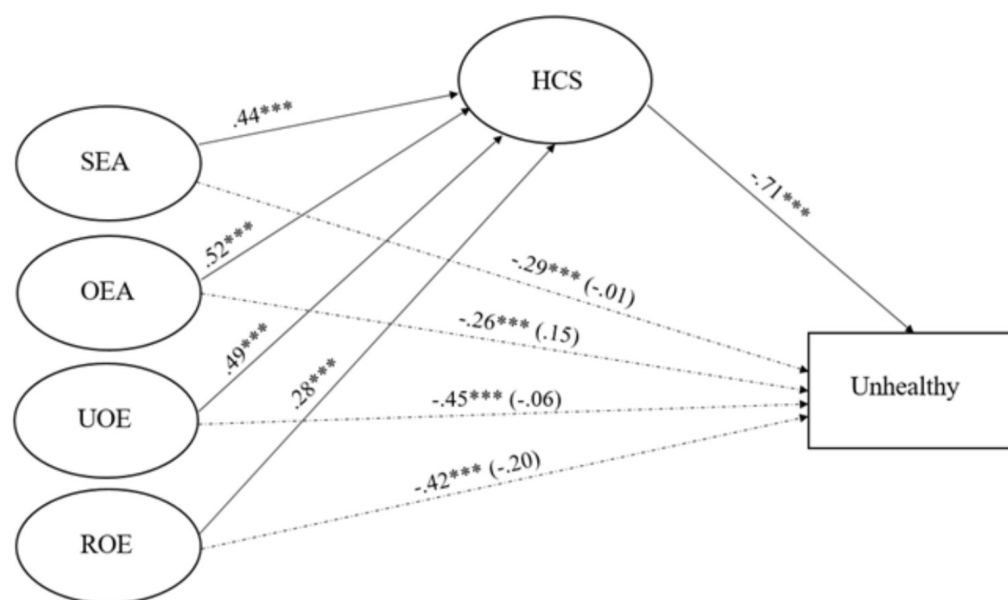


FIGURE 3 | Paths for the relation between SEA, OEA, UOE and ROE and health behaviors mediated by HCS. SEA, Self-Emotional Appraisal; OEA, Other's Emotional Appraisal; UOE, Use of Emotion; ROE, Regulation of Emotions; HCS, health consciousness scale. Model's fit was $\chi^2 (168) = 199.08$, $p = 0.05$, RMSEA = 0.02, 90% CI (0.00, 0.04), $p = 0.99$, CFI = 0.99, TLI = 0.99, SRMR = 0.05. The dotted lines correspond to total and direct effects of the four dimensions of emotional intelligence. Direct effects, computed when HCS was in the model, are in parenthesis. *** $p < 0.001$.

or promoting behaviors are expected to have higher levels of health consciousness than individuals who do not engage in such health-promoting behaviors.

Also, as hypothesized the healthy group had higher levels of emotional intelligence than the unhealthy group. These findings are consistent with prior evidence indicating that individuals with high emotional competencies have the propensity to engage in healthy behaviors (Johnson et al., 2009; Zeidner et al., 2012; Mikolajczak et al., 2015). Given the multitude of studies indicating that health behaviors are strongly connected to long-term physical health (e.g., Colditz et al., 2000; Chiuve et al., 2012), our findings provide additional insights building

on results from meta-analytic studies documenting emotional intelligence as predictor of improved physical health (Schutte et al., 2007; Martins et al., 2010), and further highlight the importance of understanding the mechanisms that explain the emotional intelligence to health behaviors relation. Specifically, in this article we confirmed health consciousness as a conduit explaining such relation, as structural equation models yielded significant indirect paths by way of health consciousness in the relations between emotional intelligence and health behaviors, holding constant age, sex, and income. These findings expand our knowledge on the well-documented positive effect of emotional intelligence on health (Schutte et al., 2007; Martins et al., 2010) by

suggesting that emotional intelligence assists in the improvement of one's health consciousness, and consequently participation in behaviors that predict long-term physical health.

Importantly, all dimensions of emotional intelligence including appraisal (self and others'), use and regulation of emotions, were relevant for reductions in the likelihood of engaging in unhealthy behaviors compared to healthy ones by way of improvements in health consciousness. These findings add to the literature seeking to identify the unique contribution of different dimensions of emotional intelligence on health-related outcomes (Fernández-Abascal and Martín-Díaz, 2015). Specifically, our findings highlight the additive value of each dimension of emotional intelligence, as operationalized by Wong and Law (2002) toward understanding the mechanism that explains the connection between emotional capabilities and health promoting behaviors among young adults. These findings suggest that emotional intelligence, in all its dimensions, is a precursor to increases in one's health awareness, resulting in acquiescence to healthy behaviors. In combination, our findings suggest that educational programs aiming to improve health behaviors among young adults should include emotional intelligence training in their curriculum, as such training may help develop intrinsic health awareness and the willingness to promote health. Yet, there is a need for additional research to investigate these claims more rigorously.

Particularly, a key feature of emotional intelligence is the capacity for emotion regulation (Mayer and Salovey, 1995; Peña-Sarrionandia et al., 2015), which concerns the process by which individuals regulate their emotions (Peña-Sarrionandia et al., 2015) and is an important predictor of engaging in effective behaviors for managing stress (Compas et al., 2014; Kober, 2014). Along these lines our findings, while in agreement with studies indicating a negative association between emotional intelligence and health-impairing coping behaviors (Mikolajczak et al., 2009; Espinosa et al., 2018), raise awareness about the need to investigate emotion regulation strategies as additional mechanisms explaining the connection between emotional intelligence and health behaviors, particularly as they relate to health consciousness. In the same vein, our study raises awareness about the need to identify the extent to which other salient predictors of health behaviors relate to emotional intelligence and health consciousness. In particular, researchers have highlighted genetic factors as important predictors of smoking, healthy eating, physical fitness and other behaviors (Bulik, 2004; Sutton, 2005; Chomistek et al., 2013). The interrelation between genetic predispositions, emotional intelligence and health consciousness in predicting health behaviors is unknown, yet necessary for developing effective and comprehensive approaches to improve health-related behaviors among young adults.

This study is not without limitations. First, due to our use of self-report measures we cannot rule out social desirability bias influencing the findings. Second, the study employed a cross-sectional design, which prevents us from making causal interpretations. Future studies should consider a longitudinal design that would allow for robust causal interpretations, and include measures of social desirability as covariates. Along these

lines, while the measure of emotional intelligence used in this study has been identified in the literature as a reliable construct of emotional self-efficacy (Pérez et al., 2005) whose first-order factors are distinct, but correlated dimensions defining the focal construct of emotional intelligence (Walter et al., 2011), future research should also include more objective measures of emotional intelligence to address any concerns related to the use of self-report measures. Third, both health groups exhibited equally poor cancer-screening behaviors, which prevents us from generalizing the findings to these specific disease prevention approaches. On a similar vein, the two groups were highly unlikely to use substances such as nicotine, and alcohol, which is atypical of college students (Center for Behavioral Health Statistics and Quality, 2015; Skidmore et al., 2016), and thus may highlight a unique aspect of our sample that limits generalization to other young adult samples. Future studies should cast a wider net to recruit participants by perhaps selecting multiple sampling units. Finally, our study did not include an exhaustive list of health behaviors, thus limiting the findings to the health behaviors gauged herein. Future studies should include additional types of behaviors such as risky sexual behaviors and illicit drug use.

Despite these limitations, our study provides new evidence highlighting the mediating role of health consciousness in the relation between emotional intelligence and health behaviors. Given the predictive role of health behaviors during early adulthood on health outcomes in old age, the results are relevant for educators and policymakers, as they present a mechanism linking young adults' personal characteristics to behaviors that reduce the risk of chronic illness later in life.

CONCLUSION

This study determined the types of health behaviors that characterize our young adult population as well as the relations between such health behaviors, health consciousness and emotional intelligence. Furthermore, this study tested health consciousness as mediator of the relation between emotional intelligence and health behaviors. The results indicate that health behaviors among young individuals can be viewed as a dichotomy of healthy and unhealthy behaviors. Individuals whose behaviors qualify as healthy tend to have higher levels of emotional intelligence than those whose behaviors are characterized as unhealthy. In our findings, health consciousness exerted an intervening pathway that explained the relation between emotional intelligence and health behaviors. Namely, individuals with low emotional intelligence also had low health consciousness, and thus a higher propensity to engage in unhealthy behaviors relative to individuals with high emotional intelligence. Accordingly, programs seeking to improve health behaviors among young adults should consider the inclusion of emotional intelligence training within the curriculum, as improvements in emotional competencies are likely to influence the development of health consciousness and accordingly improve behaviors that promote health and well-being.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Institutional Review Board of the City College of New York with written informed consent from all participants. All participants gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Institutional Review Board of the City College of New York.

DATA AVAILABILITY STATEMENT

The raw and de-identified data supporting the conclusions of the manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

AUTHOR CONTRIBUTIONS

Both authors, AE and SK-M, contributed to the project's design, administration, survey creation, interpretation of findings,

writing, and revising of the manuscript. AE contributed to the collection and analysis of data. Both authors approved the final version of this manuscript.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Emotional Intelligence and Mindfulness: Relation and Enhancement in the Classroom With Adolescents

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Emotional intelligence (EI) and mindfulness are two constructs that have been separately studied, and the relation between them still remains unclear. Research in this area has not attempted to go further into how enhancing EI and mindfulness together can achieve better improvements in this ability to attend mindfully. To bridge this knowledge gap, our research goal was to study the relationship between EI and the mindfulness competence in our study sample and to assess the impact of implementing EI and a mindfulness competence developmental program (SEA) about participants' mindfulness competence. The sample consisted of 156 students aged 11–14 years old from a Spanish public high school. One hundred and eight participants were randomly assigned to the experimental condition, and the remaining 48 were to the control condition. The instruments used to evaluate EI were the CDE-SEC, EQi-Youth Version and the General Empathy Scale. Mindfulness on the School Scope Scale was used to assess mindfulness competences. Social adaptation was evaluated by using the social abilities and adjustment questionnaire BAS3. All the instruments were answered by the participants and have been adapted to a sample of youths with such age specifications. The results showed that EI and mindfulness were related to many of the variables measured by the instruments. Showing a good mindfulness competence was particularly related to having a good general level of the EI trait, and to many of the assessed social and emotional variables. The data indicated a significant relation between the mindfulness competence and having better general empathy skills or being better socially adjusted to the school context. The data also indicated a significant effect on participants' interior and kinesthetic mindfulness competence after implementing the SEA Program. These findings corroborate the relationship between EI and mindfulness, and the possibility of enhancing mindfulness by applying a direct intervention program in the classroom.

Keywords: mindfulness, emotional intelligence, program implementation, enhancement, adolescents

INTRODUCTION

Interest in how emotional intelligence (EI) can influence academic, professional and social success in a person's development has significantly increased in recent years (Collaborative for Academic Social and Emotional Learning [CASEL], 2015). The social and emotional learning (SEL) concept has been defined as educational innovation that is justified in social needs whose purpose is to develop emotional competences that contribute to better personal and social well-being (Bisquerra, 2003). This interest has led many researchers to study the theoretical basis of the construct and its components. Another focal point for researchers in the field has been to study the best way to enhance EI through training. In this regard, assessing the advantages of enhancing EI components in the classroom has become a mayor study field. Moreover, the relation between EI and other possibly related constructs has been found to be intimately linked to emotional development. One of these constructs is mindfulness, whose relationship with EI has received little attention. As how they are related has not always been clear and so, in this paper, we study the basis of them both and the possible relation between them.

Emotional Intelligence (EI)

Emotion can be understood as an internal event that energizes human behavior so we can respond to our context by approaching or distancing, depending on whether emotions take a positive or negative hedonic tone (Ekman and Davidson, 1994). Intelligence has been explained as the ability to adapt to this context (Sternberg, 2013). By connecting them both, EI would be defined as people's ability to perceive, understand, regulate and express such emotional events in an adaptive way (Celma-Pastor and Rodríguez-Ledo, 2017). Therefore, EI is a construct that explains how emotions are perceived, regulated and expressed with more or less skill. This understanding improves by the theoretical model proposed by the trait model of Petrides et al. (2007a), which states that EI is based on some personality traits that can consequently be assessed. Such a trait model of EI has been proposed (Petrides et al., 2007a), and it indicates that EI can also be known as an emotional self-efficacy trait, which refers to a constellation of emotion-related self-perceptions and dispositions located at lower levels of personality hierarchies (Petrides et al., 2007b). Moreover, the possibility of improving EI subcomponents has also been demonstrated when the design and implementation of programs follow appropriate quality measures (Durlak et al., 2011). EI has not always been the only objective to be promoted by SEL Programs as they sometimes aim to improve other related aspects, such as mindfulness, which is addressed specially in this study.

Mindfulness

The educational psychology field is concerned about, and interested in, studying EI, and research findings support the notion that better motivation and engagement (Saeed and Zyngier, 2012), autonomy (Grolnick and Ryan, 1987) and

attention abilities (Kruschke, 2003) enhance student learning. So, educators feel that these three aspects are important and should be promoted in their classrooms (Deci and Ryan, 2008). Consequently, in different countries, many educational models have faithfully reflected this socially desirable norms. They have traditionally rewarded young people who pay attention for long time periods, who are not distracted, and who know how to control their impulses to speak or move (Rodríguez-Ledo and Orejudo-Hernández, 2017). However, this model is changing, largely due to the emergence of more restless and impulsive students, and even to an increase in developmental disorders with a strong attentional component, such as Attention Deficit Disorder and Hyperactivity (ADHD). As indicated by Pagès and Reñé (2008), one of the possible causes could be the high stimulation that today's students receive via many diverse channels, such as regular interaction with screens, especially the Internet. This overstimulation may be the consequence of tablets, computers, video games, especially mobile phone overuse, which are elements that continually require attention. Moreover, several other authors explain that it stems from the culture of immediate reinforcement and intolerance to frustration (García et al., 2011). Apart from looking for causes, it is believed that psychologists and educators should focus on interventions to improve attention and to reduce impulsivity in order to, therefore, revert this tendency. Following this goal, some interventions have attempted to improve such mindfulness competence in youngsters. For instance, Bluth and Eisenlohr-Moul (2017) have found that the implementation of the 8-week MindUp program achieves improvements in perceived stress, resilience, curiosity/exploration and gratitude, and that mindfulness covaries with perceived stress, depressive symptoms and anxiety. Other interventions in the same direction have proven that the implementation of such programs with young adolescent students is related to improvements in areas like: sustained attention (Zeidan et al., 2010), academic performance (León, 2008), reduced anxiety (Sugiura, 2004), reduced aggressiveness (Lantieri, 2009), decreased ADHD symptoms (Lantieri, 2009), lower burnout levels and enhanced motivation to the task or engagement (De La Fuente et al., 2010), and also better levels of emotional well-being (Hamilton et al., 2006). These are some of the most characteristic examples of improvements. An experienced reader can observe that many of the advantages of applying the aforementioned mindfulness techniques are related to improvements in components related to EI and their competences. In fact, other researchers have pointed out the importance of attention for developing the implicit cognitive capacities that make up EI (Mestre et al., 2009).

Following this goal, the best way to enhance attentional mechanisms has been researched in many different ways. Traditionally, the classic definition of attention by James (1890) has been taken as a valid one. He understood attention as the mind clearly and vividly taking several possible objects of thought that simultaneously appear. This attentional mechanism has been considered an essential element in the information management process as it influences the selection of information and establishes priority in processing (Laberge, 1995). In addition,

a consensus exists about the three main functions of attention in human beings (Posner et al., 2007): the alert function, the orientation function and the executive function. The first refers to the state of tonic and phasic preparation to attend to new stimuli. The second refers to the selection of which of these stimuli are salient and is, therefore, adaptive to the process. The third function is related to something more complex: i.e., the supervisory system. This system is in charge of planning the whole process, of maintaining attention during this process, and evaluating performance by correcting it for improvement on future occasions (Chica Martínez and Chica Fernández, 2015). Apart from such functions and to look further at diverse attentional mechanisms and their adaptive sense in real practice, different authors defend dichotomous categories such as (Roselló, 1998): internal *versus* external, voluntary *versus* involuntary, open *versus* covert, divided *versus* selective, visual *versus* auditory, etc. Of these categories, a specific type of voluntary attention drew our attention: mindfulness. If voluntary attention is defined as that which can be directed according to our will, and to both the outside (sensations) and the inside (ideas and emotions) (León, 2008), mindfulness is defined as the ability to focus on the present moment in an active and reflective way (Vallejo, 2006).

In order to delimit the concept, several studies have emerged to define it as conscience without judgment, which develops moment after moment by a kind of non-reactive attention that is open and without prejudices in the present time (Kabat-Zinn, 2007), and which allows the awareness of our internal and external experiences without rejecting anything and without clinging to anything (García, 2007). Even more comprehensively, Grossman et al. (2004) define mindfulness as the ability to maintain moment-to-moment attention to emotional and social events, which may be our own or others, and in a non-evaluative fashion (Grossman et al., 2004). Bishop et al. (2004) consider that mindfulness is carved by two components: (1) the self-regulation of attention that is maintained in the immediate experience, which thus allows mental events to be recognized in the present moment; (2) particular orientation toward one's experience in the present moment, characterized by curiosity, openness and acceptance. Therefore, according to Bishop et al. (2004), mindfulness skills are related to three areas of attention: sustained attention, selective attention, and the ability to direct and exchange the focus of attention from one idea to another. Shapiro et al. (2006) attempt to identify the mechanisms of action that are the basis of mindfulness by proposing two research lines: (1) studies that seek to separate and compare the various active ingredients in mindfulness interventions and their relation to other constructs, such as cognitive or emotional capacities; (2) studies that analyze the mindfulness construct itself to determine whether mindfulness development is what really leads to the positive changes that have been observed in many fields. The present study seeks both objectives, while it also attempts to base the relation between basic emotional competences and those of full attention, and to study whether it makes sense working such

competences together in the classroom to obtain satisfactory results.

EI and Mindfulness

When arguing about what EI can be like and, in some way, in relation to this ability to maintain moment-to-moment attention in a non-evaluative manner, Brown and Ryan (2003) indicate that the clarity of perception of own emotional states improves through training in mindfulness techniques. Besides, it is known that a direct relationship exists between training with mindfulness techniques and attention, clarity and emotional repair dimensions (De La Fuente et al., 2010), as well as emotional regulation (Ramos et al., 2009). Along the same lines, Davidson has conducted studies with expert Buddhist monks in mindfulness by demonstrating the primordial importance that mindfulness has when it comes to modifying emotional states voluntarily, and has directly correlated this attentional capacity and emotional regulation (Davidson, 2012). Davidson has also demonstrated how training in mindfulness helps develop more positive and adaptive emotional profiles (Goleman and Davidson, 2017). According to Schoeberlein (2012), the implementation of mindfulness techniques with teachers shows improvements in receptivity to student requirements, promotes emotional balance, contributes to stress management, favors personal relationships, improves the classroom climate and contributes to general well-being. The same author has also found that when students work with mindfulness, it favors their willingness to learn, fosters academic performance, reinforces attention and concentration, reduces anxiety about exams, improves participation in the classroom, promotes impulse control, provides tools to help reduce stress, improves emotional learning, promotes prosocial behavior and supports holistic wellness (Schoeberlein, 2012). Moreover, mixed EI and mindfulness intervention programs, such as that implemented by (Schonert-Reichl et al., 2015), typically find the improvements described in their paper, namely: greater empathy, better emotional control, increased peer acceptance, higher mindfulness competence and even better cognitive and stress control, among others (Schonert-Reichl et al., 2015).

The underlying process that explains how mindfulness achieves such advantages for EI and to enhance some of its components is still being debated. Ramos et al. (2009) explain that training in mindfulness involves exposure to negative emotions that favor habituation to them. Vallejo (2006) indicates that people can change tendencies of automatic response to certain emotional experiences thanks to training in mindfulness, which allows people to respond with other new and more positive behavioral repertoires as a result of quiet reflection. As supported by Holen and Halvor (2007), perhaps the continuous practice of such full consciousness would prepare us against adversity, while reducing tension, fears and worries through the progressive disengagement of thoughts, sensations and emotions. This would thus be a very useful and effective emotional self-regulation mechanism. Shapiro et al. (2006) indicate that mindfulness techniques make users more adaptable, flexible and suitable for the context by developing the re-perceiving mechanism to facilitate reactivity patterns. This is achieved by the fact that the impact allows us to see the current situation as it is at the present

time, which helps us to act accordingly by avoiding the thoughts, emotions and maladaptive behavior that we were used to before developing our full consciousness (Shapiro et al., 2006).

Enhancing Mindfulness Through the SEA Program

After considering the potential of implementing mindfulness in the classroom, the authors of this study decided to design a program to enhance mindfulness, along with some competences based on participants' EI. The SEA Program to develop emotional and mindfulness competences was designed (Celma-Pastor and Rodríguez-Ledo, 2017) in an attempt to fulfill the best conditions (Durlak et al., 2011) and to promote the development of EI, understood as the capacity to perceive, understand, regulate and express one's own and others' emotional events adaptively (Celma-Pastor and Rodríguez-Ledo, 2017). It also aimed to enhance mindfulness, or the ability to maintain moment-to-moment attention on emotional and social events, either our own or those of others, and in a non-evaluative manner (Grossman et al., 2004). Such a program is meant to be implemented for 1 h/week throughout an academic year (9 months) by following the 18 sessions that compose it. These sessions have been designed to develop such EI and mindfulness by reflecting on participants' current level and by actively working to improve subcomponents according to the described constructs. Mindfulness capacity is specifically developed by following 10 short body scanning and meditation sessions to address external or internal events, as well as other activities, to enhance youngster's awareness or to maintain attention to specific inputs.

According to this twofold objective, which is exploratory before and becomes experimental later, we studied the relation between the relationship between EI and mindfulness in a first phase to discover whether both were related in our sample, and if it made sense to implement them both at the same time. Afterward, the program was implemented in a second phase and any improvement in the mindfulness competence of the participants in the present study was analyzed experimentally by comparing pre/post-test measures. In this way, the first hypothesis that guided our research in the first phase was: mindfulness and EI are closely related constructs. The second hypothesis, which was characteristic of the second phase and related to the improved ability of mindfulness, was proposed: applying the SEA Program for one academic year will improve the mindfulness of the participants in this implementation.

MATERIALS AND METHODS

Participants

Our study sample consisted in 156 adolescents aged 11–14 years, distributed into the six class groups of the first grade of Compulsory Secondary Education (ESO in the Spanish education system) at a public high school in a working-class neighborhood in the city of Zaragoza (Spain). Four of these class groups were randomly assigned to the experimental condition (108 participants) and the others to the control (48 students). In gender terms, 86 were male (55.1%) and 70 were female (44.9%).

Of the 108 experimental participants, 58 were male (53.7%) and 50 were female (46.3%). Of the 48 control participants, 28 were male (58.3%) and 20 female (41.7%). The gender distribution for the two conditions was statistically and significantly equivalent ($X^2 = 0.592$ and $p > 0.05$). From the original number of participants (156), the study lost four of the participants, being 152 the final number of participants in the post-test. The sample's socio-economic and cultural status was medium. The parents, mothers and legal guardians of the participants were informed about the research characteristics in writing and during a meeting. They all received explicit consent to carry out this study. The anonymity of the answers and scores of all the participants were guaranteed and respected.

Instruments

The instruments used to evaluate the relationship between EI and mindfulness, and the effects of intervention on mindfulness, were chosen from among the many possible options by considering the study sample's age, the model that lies behind such instruments and, of course, the validity of tests. Since our study participants were Spanish youngsters aged 11–14 years old, and according to the model of EI behind the SEA program, the selected instruments were the following:

The emotional development questionnaire for secondary CDE-SEC (Álvarez et al., 2001). This self-report questionnaire consists of 35 items that must be answered according to the degree of agreement or disagreement, 0 meaning completely disagree and 10 completely agree. The EI dimensions assessed by this questionnaire were: (1) Emotional awareness: Ability to become aware of one's own emotions, including the ability to understand the emotional climate of a given context; (2) Emotional regulation: Ability to use emotions appropriately and have good "coping" strategies, ability to self-generate positive emotions; (3) Emotional autonomy: characteristics related to emotional self-management, such as self-esteem, positive attitude in life, responsibility, ability to critically analyze social norms, ability to seek help and resources, and personal self-efficacy; (4) Social competences: ability to maintain good relationships with other people and to master basic social skills, effective communication, respect, pro-social attitudes, assertiveness, etc.; (5) Competences for life and well-being: Ability to adopt appropriate and responsible behavior to solve personal, family, professional and social problems, oriented toward improving the well-being of personal and social life. A total emotional competence score can also be obtained, which results from the average of all the assessed variables. Test reliability varied between $\alpha = 0.79$ and $\alpha = 0.82$ for each dimension (Escoda, 2016) and it has been designed and tested for a sample of Spanish youths.

The emotional intelligence questionnaire, youth version EQi-YV (Ferrándiz et al., 2012). The EQi-YV is a self-report questionnaire designed to measure the EI of children and adolescents aged from 7 to 18 years. It is based on the original EQ test (Bar-On, 1997) and has been adapted to Spanish samples. It is a Likert scale whose 60 items give rise to five large EI dimensions that allow subjects' following emotional and social characteristics to be studied: (1) Intrapersonal ability: ability to understand their own emotions and their communication with others; (2)

Interpersonal ability: ability to understand and appreciate others' emotions; (3) Managing emotions: ability to direct and control one's emotions; (4) Adaptability: flexibility and effectiveness to adapt to the social environment and to solve conflicts; (5) General mood: ability to take a positive attitude toward life. It is a wide inventory that provides information about emotional and social competences, and it allows to draw a total social and affective profile known as the total emotional quotient. The validation in the Spanish sample obtains a reliability that oscillates between $\alpha = 0.63$ (intrapersonal competence) and $\alpha = 0.80$ (mood) for all five dimensions (Ferrández et al., 2012).

The BAS3 socialization battery (Silva and Martorell, 2001). BAS3 consists of 75 items in this self-application version designed for Spanish samples. It evaluates five dimensions that allow us to obtain participants' social behavior profile and their social adjustment, namely: (1) Consideration with others: it detects social sensitivity or preoccupation of others, in particular of those with problems and who are rejected or postponed; (2) Self-control in social relations: it includes a clearly bipolar dimension that represents, on its positive pole, compliance with social rules and norms that facilitates coexistence in mutual respect, and on its negative pole, aggressive and stubborn behavior and indiscipline; (3) Social withdrawal: it detects both passive and active withdrawal from others, until it arrives at a clear isolation (external); (4) Social Anxiety/Shyness: different manifestations of anxiety are detected together with reactions of shyness in social relationships; (5) Leadership: ascendancy, popularity, initiative, self-confidence and service spirit are detected. It is a highly reliable test that presents an average internal consistency of $\alpha = 0.75$ and a test-retest stability of $\alpha = 0.57$ measured with Cronbach's alpha (Silva and Martorell, 2001).

The empathy scale for children and adolescents (ESCA) (Bryant, 1982; Mestre et al., 1999). This scale consists of 22 items of yes-no responses that evaluates general cognitive and affective empathy according to participants' agreement or disagreement in 22 situations. It is an adaptation of the infantile and adolescent population (from 11 years of age) of the scale for adults by Mehrabian and Epstein (1972) carried out by Bryant (1982). Specifically, it is a scale that provides a general empathy index, whose internal consistency of the original scale is 0.67 (Bryant, 1982). With the Spanish sample, the scale presents a test-retest reliability between $\alpha = 0.75$ and $\alpha = 0.77$, depending on the sample used by the Spanish research from which it was obtained (Mestre et al., 1999).

The mindfulness scale for school scope (León, 2008). This self-report scale is designed especially for young high school students aged 11–15 years. It must be answered in a Likert format with five intervals from 1 to 5, which represent a continuum that goes from "never" to "always" by evaluating three mindfulness dimensions: (a) kinesthetic mindfulness, which refers to the ability to notice movement and motor actions; (b) external mindfulness, which refers to the ability to direct attention to external elements, attention for observation; (c) interior mindfulness, which refers to the ability to direct attention to the intellectual, to the world of ideas, emotions and feelings, which would be attention for introspection. It also offers a total score in the mindfulness product of the sum of the previous

three variables. This questionnaire's general internal consistency is $\alpha = 0.84$. For each component, the author reports a consistency of $\alpha = 0.74$ for the kinesthetic mindfulness dimension, $\alpha = 0.60$ for the external mindfulness dimension and $\alpha = 0.66$ for the interior mindfulness dimension. Test-retest reliability is $r = 0.78$ at 4 weeks. The exploratory factorial analysis reports that the three factors explain almost 53% of total variance as follows: 35.20% for kinesthetic mindfulness, 9.50% for external mindfulness and 8.10% for internal mindfulness.

Procedure

First of all, the relationship between EI and mindfulness was studied to look further at how both are related, and to thus determine the suitability of working with them together in implementing the program. In a second phase, a quasi-experimental pre-/post-test design was used with a control group to evaluate the effectiveness of the intervention program for participants' mindfulness. Those who applied the program (applicators) in the four class groups that make up the experimental group were the tutors of these class groups, who implemented the program sessions. Sessions were always held at the same time in the morning as part of the tutorial subject (the Spanish education system includes 1 h/week designed to work many different non-academic aspects). The times to apply the experimental groups and controls were balanced so that the application hours were distributed equally during teaching hours. It took 9 months to complete this educational intervention with the participants, during which 55-min sessions were held when the SEA Program was organized. Concretely, the 18 sessions of the SEA program were implemented during October 2014 and June 2015. The diagram of the flow of the study shows in detail dates of the educative intervention accomplished (see Table 1).

During 10 of the SEA Program sessions, mindfulness was implemented in the first 10–15 min of the session. The mindfulness techniques, which formed part of the program, were designed to be useful in the participants' real world by seeking their real practical use and attempting to transfer them to their real lives. These mindfulness techniques used meditation techniques to improve internal and external attention. Specific techniques were also used to improve the studied mindfulness subcomponents by seeking improvements in sustained attention through frets and matrices, in the association of students' life spaces to a higher level of attention and a lower level of activation, and by reducing students' activation tone prior to lessons (see Celma-Pastor and Rodríguez-Ledo, 2017). Half of these sessions involved mindfulness meditation. Thus, the ability to maintain attention openly, both inside and outside, according

TABLE 1 | Diagram of the flow of the study.

Period	Implementation
14th October 2014 – 13th November 2014	Tutors training and pretest assessment
17th November 2014 – 22nd May 2015	SEA Program implementation
25th May 2015 – 12th June 2015	Post-test assessment

to what the CD instructions expected, used to guide this activity, was enhanced by anchoring to different aspects: breathing, association of words, body scanner, etc.

Implementing the program's activities was preceded by training given of the tutors who would hold the sessions. This training was carried out by external experts in the area and dealt with the importance of enhancing EI and mindfulness in the classroom, the program's basic theoretical model and the specific application techniques for the different sessions and activities. A weekly follow-up was also carried out during formal and informal meetings, held with experts and applicators to verify if the program was being correctly implemented, to offer help and advice based on specific activities.

The instruments used to collect the data from both phases were administered by the tutors of the class groups under all the experimental conditions. All the instruments were applied twice, one pretest before implementation commenced and a post-test once all the program sessions had finished. Written informed consent to collect data was obtained from the parents/legal guardians of all the participants. The data analyzed herein were those collected by the pretest measurement.

Data Analysis

Given the normal distribution of errors and the linear relationship of the dependent and independent variables, the reported results about EI and mindfulness competences were examined by a general linear model analysis. To study the relationship between the EI and the mindfulness scores in the first phase, the analysis used bivariate correlations by employing Pearson's r -statistics, where the correlations between 0 and 0.3 were low, those between 0.3 and 0.6 were the medium, and those between 0.6 and 0.9 were high (Field, 2013). In all cases, the pretest measures of the different tests were used so that the implementation effects could be controlled.

In the second phase, the ANCOVA univariate model was applied per measure, where the dependent variable was the post-test measure, the covariate was the pretest measure and the fixed factor was the experimental condition. The statistics used to measure the effect were Pillai's trace (F) and η_p^2 , which measure the effect size, where $\eta_p^2 < 0.06$ was small, $\eta_p^2 > 0.06$ to < 0.14 was medium and $\eta_p^2 > 0.14$ was high (Field, 2013).

RESULTS

In order to verify or refute the research hypotheses, the obtained results were analyzed, first in relation to the link between the EI and mindfulness competences, which were characteristic of the study phase 1, and to then look further at the improvements found after applying the program in phase 2.

Phase 1: The Relation Between EI and Mindfulness

Table 2 shows the bivariate correlation scores, measured with Pearson's r , between the EI variables and the mindfulness variables. All the sample participants (both the control and experimental ones) were analyzed, where $N = 152$.

By analyzing the statistically significant correlations according to the different study dimensions, we noted that for the EI variables, the external mindfulness dimension positively correlated only with the variable competences for life and well-being ($r_{152} = 0.189$ and $p < 0.05$). The internal mindfulness variable correlated positively with a variety of EI-related variables: emotional awareness ($r_{152} = 0.305$ and $p < 0.01$), emotional autonomy ($r_{152} = 0.165$ and $p < 0.05$), competences for life and well-being ($r_{152} = 0.310$ and $p < 0.01$), intrapersonal ability ($r_{152} = 0.240$ and $p < 0.01$) and general mood ($r_{152} = 0.221$ and $p < 0.01$). This correlated with both the total EI score ($r_{152} = 0.278$ and $p < 0.01$) and the total emotional quotient ($r_{152} = 0.198$ and $p < 0.01$). Finally, kinesthetic mindfulness correlated positively with the variables of emotional regulation ($r_{152} = 0.185$ and $p < 0.05$) and general mood ($r_{152} = 0.196$ and $p < 0.05$). This also correlated with both the total emotional competence score ($r_{152} = 0.168$ and $p < 0.05$) and the total emotional quotient ($r_{152} = 0.220$ and $p < 0.05$). We also noted that the total mindfulness score correlated positively with the EI variables competences for life and well-being ($r_{152} = 0.233$ and $p < 0.01$), interpersonal ability ($r_{152} = 0.217$ and $p < 0.05$) and general mood ($r_{152} = 0.208$ and $p < 0.05$). It also correlated with both the total EI scores: total emotional competence ($r_{152} = 0.188$ and $p < 0.05$) and the total emotional quotient ($r_{152} = 0.232$ and $p < 0.05$).

We also observed a positive and statistically significant correlation between the variable empathy and the external ($r_{152} = 0.205$ and $p < 0.05$) and internal ($r_{152} = 0.231$ and $p < 0.01$) mindfulness dimensions, and with the total mindfulness score ($r_{152} = 0.165$ and $p < 0.05$).

Finally, after analyzing the statistically significant correlations for the variables of social abilities and social adjustment, we saw that the external mindfulness dimension correlated positively with the self-control variables in social relations ($r_{152} = 0.224$ and $p < 0.01$) and with social anxiety/shyness ($r_{152} = 0.215$ and $p < 0.01$). The internal mindfulness variable correlated positively with the variable consideration with others ($r_{152} = 0.207$ and $p < 0.05$). The kinesthetic mindfulness dimension correlated positively with the variable self-control in social relations ($r_{152} = 0.202$ and $p < 0.05$), whereas the variable total mindfulness correlated only with the socialization dimension assessed in the variable self-control in social relations ($r_{152} = 0.235$ and $p < 0.01$).

Phase 2: Effects of the Implementation on Mindfulness

In order to support or refute the second hypothesis, the changes found in the mindfulness competence after implementing the SEA Program were analyzed. Table 3 shows the descriptive statistics scores of the different factors of the variable mindfulness measured herein with its pretest and post-test measures for each experimental condition.

After presenting the descriptive data, the results obtained after applying the ANCOVA univariate general linear model analysis are shown in Table 4. In it, the pre/post-test changes, presumably through educational intervention, introduced into the mindfulness competences of the participants were

TABLE 2 | Bivariate correlation scores.

	External mindfulness	Internal mindfulness	Kinesthetic mindfulness	Total of mindfulness
Emotional Intelligence (CDE-SEC)				
Emotional awareness	−0.073	0.305**	0.121	0.129
Emotional regulation	−0.015	0.111	0.185*	0.116
Emotional autonomy	0.041	0.165*	0.142	0.138
Social competences	−0.023	0.126	0.024	0.045
Competences for life and well-being	0.189*	0.310**	0.107	0.233**
Total score of EI	0.040	0.278**	0.168*	0.188*
Emotional Intelligence (EQi-YV)				
Intrapersonal ability	0.015	0.240**	0.098	0.134
Interpersonal ability	0.138	0.144	0.079	0.144
Managing emotions	0.116	0.054	0.175	0.148
Adaptability	0.090	0.029	0.136	0.110
General mood	0.100	0.221*	0.196*	0.208*
Total emotional quotient	0.151	0.198*	0.220*	0.232*
Empathy (ESCA)				
General empathy	0.205*	0.231**	0.004	0.165*
Social adjustment and abilities (BAS3)				
Consideration with others	0.096	0.207*	−0.035	0.095
Self-control in social relations	0.224**	0.145	0.202*	0.235**
Social withdrawal	0.141	−0.157	−0.025	−0.006
Social anxiety/shyness	0.215**	−0.054	0.005	0.074
Leadership	0.096	0.118	0.019	0.089

*The correlation is significant at the 0.05 level (two tails). **The correlation is significant at the 0.01 level (two tails).

observed. They were measured by Pillai's trace (F), and always with 1 degree of freedom, and their effect size (η_p^2) and their statistical significance (p). Note $N = 108$ for the participants of the experimental group and $N = 48$ for the controls.

As noted, the results offered significant differences in two of the three measured mindfulness variables. Specifically, effects were observed in the experimental group on those in the control group for kinesthetic mindfulness ($F_{156} = 4.326$, $\eta_p^2 = 0.029$ and $p < 0.05$) and internal mindfulness ($F_{156} = 4.979$, $\eta_p^2 = 0.033$ and $p < 0.05$).

TABLE 3 | Descriptive statistics scores.

	Pretest		Post-test	
	Mean	SD	Mean	SD
Experimental condition				
Kinesthetic mindfulness	13.76	3.955	13.81	4.426
External mindfulness	15.31	3.670	14.46	3.601
Internal mindfulness	15.76	3.257	16.50	2.686
Total of mindfulness	44.84	8.766	44.07	9.841
Control condition				
Kinesthetic mindfulness	12.81	5.037	11.93	3.963
External mindfulness	13.94	4.508	13.78	4.005
Internal mindfulness	16.30	3.230	15.74	3.593
Total of mindfulness	43.04	11.055	41.22	9.867

Experimental group $N = 108$ and control group $N = 48$.

TABLE 4 | General linear model scores (ANCOVA).

	F	η_p^2	p
Kinesthetic mindfulness	4.326*	0.029*	0.039
External mindfulness	0.000	0.000	0.987
Internal mindfulness	4.979*	0.033*	0.027
Total of mindfulness	1.813	0.012	0.180

*The effect is significant with a level of significance of <0.05 .

Regarding gender differences, statistical differences were observed between the male and female participants in the pretest of some variables: empathy and social shyness, where the female participants obtained better marks; kinesthetic mindfulness, where the male participants obtained higher scores. However, the data analysis did not find any interaction between gender and the experimental condition. So, we concluded that such gender differences are distributed equally in both the control and experimental conditions. Nor were any statistically significant differences found in improvement between males or females according to the pre/post-tests of their mindfulness capacity as the male and female participants showed similar improvements after the program.

DISCUSSION

The objective of the present paper was twofold: an exploratory study in a first phase of the relation between the EI construct and the mindfulness construct; in a second phase, to assess the impact

on the participants' mindfulness competences of implementing the Emotional Competency Development SEA Program.

Regarding the first objective, typical of phase 1, we detected that EI and mindfulness are related in many of the variables measured by the instruments. In particular, we suggested that having a good mindfulness competence is related to having a good general EI level and a higher total emotional quotient. This finding is consistent with those studies that have found a relationship between maturing attentional abilities in children and a greater capacity to manage one's emotional states (Mestre et al., 2009; Davidson, 2012; Eisenberg, 2013).

A relation of this type of full attention or mindfulness and EI was found to be more profound according to the results provided herein. According to them, the participants with better capacities to fully pay attention to external events are those with better skills for life and well-being. They are also more empathetic and are better regulated socially, although they may be too shy sometimes. Those participants with better competences to fully pay attention to internal events are more aware of their emotions, are more emotionally autonomous, and are more competent to deal with personal and social problematic situations with better intrapersonal skills and a better overall mood. They are also more empathetic and consider the opinions and wishes of others more, which are important social aspects in any educational environment. In addition, those who better attend to personal and internal events obtain better overall EI scores and can benefit from the traits related to such intelligence.

Finally, and having taken into account the general ability to attend with mindfulness of an external origin, of an internal cognitive origin, or one that is even body-kinesthetic related, a relation with EI was shown. The young participants in our sample who enjoy having more mindfulness competences are people with better skills for life and well-being, and they are more empathetic and better regulated socially, which make them youngsters with better total EI and a higher emotional quotient. This demonstrates a relation between mindfulness and EI, which leads us to wonder whether enhancing both together in the classroom can, in fact, be more positive and effective.

According to this second objective of phase 2 (i.e., implementing the SEA Program with its 18 sessions to enhance some component based on EI and mindfulness), we obtained interesting results. The pre-post evaluation made with the Mindfulness Scale for the School Scope (León, 2008) informed us about the significant effect on the experimental participants compared with the controls for the ability to mindfully attend the interior or the ability to pay attention to the intellectual, to the world of ideas, emotions and feelings. This effect also came over in the capacity of participants' kinesthetic attention or their capacity to make movement and motor actions. Rather than acting as an enhancer, this effect was protective because, according to the obtained data, the ability to fully attend seemed to deteriorate which, in turn, deteriorated this competence. The implemented program was predictably the main aspect to work as a protective factor by absorbing or cushioning this deterioration. The deterioration detected in teenagers' ability to fully attend was consistent with the tendency to worsen, as consistently observed and reported by teachers and educators informally since they

started year 1 of secondary education to even higher grades, such as high school year 3 (Greenberg et al., 2003). If aspects such as self-esteem have been found to decrease in adolescence, especially in early stages (Sanchez, 2009), and as EI also seems to do so (Greenberg et al., 2003), attentional aspects may deteriorate, which may be recovered throughout the adolescent stage. This has been confirmed by several studies which have found precisely this attentional worsening in adolescents compared to children and adults (Santos Cela, 2013). If general attention worsens, probably the ability to mindfulness also does, so educational interventions to curb this worsening could act as protective factors from this decline. Thus, the SEA Program proved successful in achieving this in the assessed sample.

The results obtained about the effect of the program support the program itself, as a properly designed one that obtains results which encourage educators to continue implementing it in the classroom so they can continue strengthening attention abilities or can stop typical deterioration in teenager stages. It has also been discovered that a program which works the EI subcomponents together with brief mindfulness techniques can obtain results that improve the latter. Findings by different researchers confirm that by improving mindfulness in the classroom, students' EI (Brown and Ryan, 2003; Ramos et al., 2009; Arias, 2010) and their mindfulness ability (De La Fuente et al., 2010) also improve.

It should be noted that this study contains certain limitations which future researchers are encouraged to overcome. One is related to our sample size and the studied age range. Larger samples may provide more conclusive data. Likewise, we encourage discovering possible improvements in implementing such aspects with other sample types with different ages or idiosyncratic characteristics, such as young people with ADHD. In addition to new and expanded samples, we also encourage researchers to implement the 10 SEA Program sessions that work mindfulness separately by evaluating if the obtained results can be replicated. Although conclusive results were found, it is the students themselves who report their level of competence by using self-report tests. Future researchers are encouraged to use objective measures to evaluate participants' level of mindfulness. As no such objective test was used with the assessed sample, the authors of this study chose the test as it was thought to be best for our sample evaluation, which was that used herein. It is noteworthy that although the found results could appear encouraging considering the brief intervention made, the improvements obtained a small effect size and low correlations, which is something to be considered by future applicators. Perhaps longer and more cross-sectional implementations may obtain higher scores. We therefore encourage interventions in developing EI-mindfulness during longer interventions that are longitudinal to check whether this protector effect remains over time.

CONCLUSION

Beyond possible future improvements in research terms, the main objective of all experts in Education and Developmental Psychology is to improve the education system of their respective

countries as it is capital to develop people with a good set of competences for life, including mindfulness. It is known that young people with better competence to mindfully attend will be predictably more attentive, less anxious, will better control their impulses (Sugiura, 2004; Zeidan et al., 2010; Schoeberlein, 2012) and display better academic performance (León, 2008), with lower burnout levels and will feel more motivated by the task (De La Fuente et al., 2010), more prosocial and less aggressive (Lantieri, 2009). They will also have better emotional well-being levels (Hamilton et al., 2006; Schoeberlein, 2012). It has been suggested that such a mindfulness competence can be enhanced by direct intervention in the classroom, which is relatively short and seeks to promote emotional aspects, together with the ability to fully attend time after time. It has been shown how EI correlates with mindfulness and, thus, by working both, we will perhaps further enhance them both. Following Shakir et al. (2017), we also thought about extending training in mindfulness and/or EI techniques to other fields where professionals can easily benefit from it, such as medical professionals and in health care environments. However, we must set a short-term to mid-term goal to continue improving future adults' competences. Therefore, and by considering that if our obligation as psychologists and educators is to train for personal development, the SEA Program can be a successful option to achieve this goal as it becomes an intervention proposal to join many others who seek the long-awaited goal that every educational system yearns for: developing competent people for all the scopes of their lives.

ETHICS APPROVAL

The authors hereby state that they have not received any payment for this submitted work and have no financial relationship with any organization that could be perceived to influence or give the

appearance of potentially influencing what we have written in the submitted work.

The SEA intervention program has been published in TEA Editorial (see Celma-Pastor and Rodríguez-Ledo, 2017) for the interest of possible applicators, but no data have been published in it. Besides this, we have no other relationships or activities that readers could perceive to have influenced or to give the appearance of potentially influencing we have written in the submitted work.

No ethics approval was required for this research since the Spanish public education system and national regulations require no such approval.

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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Putting ‘Emotional Intelligences’ in Their Place: Introducing the Integrated Model of Affect-Related Individual Differences

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Numerous individual differences, models, and measures have been associated with the ‘emotional intelligence’ (EI) label. This paper discusses one of the most pervasive problems regarding EI-related individual differences, namely, the lack of a meaningful theoretical framework. First, drawing upon existing theoretical frameworks, we argue that EI-related characteristics can be considered constituents of existing models of cognitive ability (ability EI), personality (trait EI), and emotion regulation (EI competencies). Second, having differentiated between these perspectives (ability, personality, and emotion regulation), we draw upon existing theory and research to build the Integrated Model of Affect-related Individual Differences (IMAIID), which provides an initial mechanistic representation that explains how the different EI-related constructs are likely to interrelate and coalesce to influence affective outcomes. In essence, the IMAIID is an integrated mediation model in which emotion regulation mediates the effects of ability EI and affect-related personality traits upon outcomes. Viewing EI-related constructs as interrelated extensions of well-established individual difference frameworks clarifies some pervasive misconceptions regarding EI-related characteristics and provides scholars and practitioners with a clear and useful theoretical framework ripe for exploration. We conclude by using the IMAIID to suggest a theoretically driven agenda for future research.

Keywords: emotional intelligence, individual differences, emotion, intelligence, personality, emotion regulation

INTRODUCTION

Emotional intelligence (EI) is a label assigned to a wide array of individual differences that has been widely adopted by scholars and practitioners. Despite this popularity, numerous concerns regarding the theoretical nature of EI-related constructs remain. Taken literally, EI should be a combination of emotion and intelligence. Emotions are considered affective episodes with a perceptual or intellectual component (e.g., perception and appraisal of emotional cues) that hold the property of intentionality (e.g., jealousy *toward* another or shame *toward* oneself; Mulligan and Scherer, 2012). Emotions are often triggered and guided by at least one appraisal of a stimulus (e.g., an impending exam) and are associated with physiological and/or cognitive change(s) (e.g., increased heart rate and self-doubting thoughts; Mulligan and Scherer, 2012). Intelligence is

defined as a “mental capability that... involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience” (Gottfredson, 1997, p. 13). Adopting this emotion plus intelligence (or cognitive ability) perspective, Salovey and Mayer (1990, p. 189) defined EI as the cognitive abilities required 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”. Salovey and Mayer’s (1990) conceptualization of EI was discussed within academic circles but a more generalized version of EI was rapidly adopted following the publication of Goleman (1995) “Emotional Intelligence: Why it can matter more than IQ”. **Figure 1** shows this surge in interest in terms of the prevalence of the term ‘EI’ within journal articles.

The popularized notion of EI included constructs not captured by Salovey and Mayer’s (1990) cognitive ability model, including motivation, empathy, social skills, happiness, and achievement-orientation, amongst others (Goleman, 1995; Baron-On, 1997). In response, EI researchers diversified, developing a myriad of substantively different definitions and measures – all under the EI label (Locke, 2005). The rapid and piecemeal development of EI measures outstripped meaningful theoretical advancements and the commercialization of EI tools exacerbated inconsistencies in terminology, measurement, and empirical findings (Locke, 2005; Zeidner et al., 2008).

It is not uncommon for newly proposed constructs to outstrip meaningful theoretical development (Shaffer et al., 2016), partly because producing construct labels, definitions, and measures is easier than developing meaningful theory, and partly because the latter is based upon the former. Thus, the fact that we now have many conceptualizations and operationalizations of EI is not necessarily a problem. Indeed, it is argued that

“when authors begin to map out the conceptual landscape of a topic they should err in favor of including too many factors, recognizing that over time their ideas will be refined” (Whetten, 1989, p. 490). The numerous conceptualizations of EI each have their merits but growing concerns regarding their theoretical status can no longer be left unchecked (Locke, 2005; Zeidner et al., 2008). Paramount amongst these concerns are questions regarding what EI actually is, the extent to which the different EI-related constructs are distinct, and which constructs, if any, are redundant manifestations of ‘old wine in new bottles’ (Locke, 2005; Zeidner et al., 2008).

The lack of clarity surrounding EI has led some to dismiss certain elements of the EI literature, and some to dismiss EI completely (Ashkanasy and Daus, 2005; Locke, 2005). We too are skeptical of EI but believe that calls for complete rejection are premature. Before we can confidently reject or retain the various conceptualizations of EI, we need two things: clear and concise definitions that provide clear boundaries for each EI-related construct, and a theoretical framework that describes how they relate to each other and to the broader individual differences arena. Only with such an integrative theoretical framework can we determine whether EI has any scientific value.

Previous papers have provided taxonomies of EI-related constructs aimed to prevent researchers and practitioners from generalizing across the different ‘types of EI’ (e.g., Ashkanasy and Daus, 2005; Van Rooy et al., 2005; Zeidner et al., 2008). Typically, these taxonomies have been based upon measurement tools, measurement approaches (e.g., maximal performance vs. self-report), or have focused on differentiating ability EI from other models (e.g., Ashkanasy and Daus, 2005; Zeidner et al., 2008; Joseph et al., 2015). Each of these approaches has been useful, but none has yet developed into a meaningful theoretical framework that can be used to rigorously evaluate the full range of EI-related constructs or prevent conceptual confusion. Indeed, some classifications, such as the ‘mixed model’ grouping, which is atheoretical by definition, is confusing, of little scientific utility and arguably exacerbates rather than reduces conceptual confusion and false claims (e.g., Joseph et al., 2015). In contrast, we aim to proffer a framework that draws not from the inherent quirks of EI measures but from the wider individual differences literature. Specifically, in the first part of the paper we argue that EI-related constructs can be accommodated within well-established theoretical frameworks that describe cognitive ability, personality, and emotion regulation. In doing so, we remove the need for terms such as ‘mixed EI,’ and provide a simple but powerful framework to classify EI-related constructs. Having introduced this theoretically informed classification, the second contribution of the paper is to present the Integrated Model of Affect-related Individual Differences. This model provides an initial mechanistic representation that explains how the different EI-related constructs are likely to interrelate and coalesce to influence affective outcomes. By differentiating and integrating EI-related individual differences, we hope to provide scholars and practitioners with a clear and useful framework that will provide a platform for theoretical refinement, measure development, and future research.

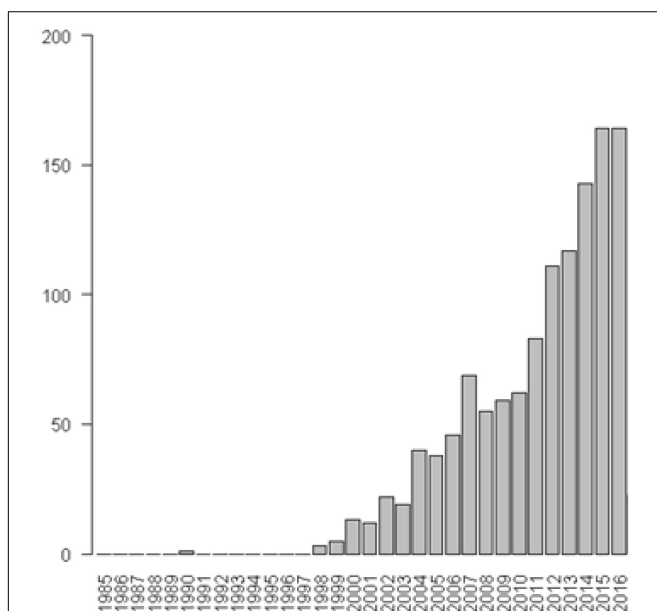


FIGURE 1 | Prevalence of the term ‘emotional intelligence’ in journal articles hosted in the PubMed database between 1985 and 2016.

PERSPECTIVE 1: EMOTIONAL INTELLIGENCE AS COGNITIVE ABILITIES

The theoretical backdrop to ability EI research is synonymous to that of general cognitive abilities, essentially, that individuals differ in their cognitive capacity to recognize, comprehend, and manage emotions in much the same way as individuals vary in their capacity for numerical reasoning or spatial awareness (Mayer et al., 2001). However, the existence of ability EI as a form of *intelligence* has been the subject of contentious debate (Mayer et al., 2001; Locke, 2005). The two major criticisms have been philosophical (e.g., are emotions rational/logical processes?) and measurement-based (e.g., can a question on emotion have an objectively ‘correct/incorrect’ answer?). These two points of debate have been fiercely argued elsewhere and so we do not revisit them here (c.f. Bowman et al., 2002; Locke, 2005; Zeidner et al., 2008; Mestre et al., 2016). Instead, we examine the empirical evidence for considering ability EI as a constituent of broader models of cognitive ability, such as the Cattell–Horn–Carroll model (Schneider and McGrew, 2018).

Ability EI research has drawn predominantly on the Salovey and Mayer (1990) model and operationalized the construct using the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., 2002; formerly the MEIS; Mayer et al., 1999). This model proposes four emotion-related abilities, namely, the *perception* (accurately perceiving emotions), *facilitation* (using emotions to aid performance), *understanding* (comprehending how emotions arise and develop), and *management* (regulating one’s own or others’ emotions) of emotions (Mayer and Salovey, 1997).

The MSCEIT has been the most popular measure of ability EI and the measure and construct are often considered synonymous. Researchers have recently acknowledged that additional measures of ability EI are needed, in part because a single measure is unlikely to provide sufficient evidence for the existence of the construct (Mestre et al., 2016) and also because there have been a number of notable critiques regarding the psychometric properties of the MSCEIT (e.g., Matthews et al., 2004; Maul, 2012). For example, the perception factor has demonstrated inconsistent correlations with other measures of emotion recognition (e.g., Matthews et al., 2003; Roberts et al., 2006) and the facilitation branch does not hold in factor analyses, with facilitation measures loading on to the perception and management factors (e.g., Roberts et al., 2006; Fan et al., 2010). Indeed, numerous studies now provide support for a hierarchical three-factor model, with emotion perception, understanding, and management correlating highly and loading onto a single higher-order ability EI factor (Fan et al., 2010; MacCann et al., 2014).

Despite the measurement problems, evidence in favor of an affect-related strand of intelligence is mounting. There is clear evidence that individuals consistently differ in their ability to perceive and understand emotions (Mestre et al., 2016). Further, both the general ability EI factor and the three sub-factors are strongly correlated with measures of cognitive ability but

remain somewhat distinct (Van Rooy and Viswesvaran, 2004; MacCann, 2010; MacCann et al., 2014). The most robust investigation of ability EI within the cognitive ability domain comes from MacCann et al. (2014) who tested various factor models examining the structural relations of ability EI tests and tests of general cognitive ability. The best fitting models all situated ability EI-loaded by tests of emotion perception, understanding and management – as a second-stratum factor of general intelligence alongside fluid intelligence, crystallized intelligence, quantitative reasoning, visual processing, and broad retrieval ability. Across the different factor models, ability EI typically loaded onto *g* at around 0.80, a similar magnitude to the other broad domains of cognitive ability tested (MacCann et al., 2014: Table 6). MacCann et al. (2014) concluded that ability EI was best considered as a sub-domain of general cognitive ability within a broad Cattell–Horn–Carroll (CHC) model of intelligence (Schneider and McGrew, 2018). Further, emerging data suggests that the various EI branches have developmental trajectories similar to closely related cognitive abilities. For example, emotion perception decreases in adulthood as do to other sensory-modality abilities, and emotion understanding/management continues to increase across the lifespan akin to other knowledge-like abilities (Mestre et al., 2016).

Although ability EI can be considered a sub-factor of existing general cognitive ability models, that does not mean it is redundant or lacking in utility. Indeed, evidence suggests that ability EI predicts a number of important outcomes when controlling for general cognitive ability and other individual differences (e.g., Van Rooy and Viswesvaran, 2004; Newman et al., 2010), with the incremental prediction most pronounced when the outcomes examined are emotion-laden (e.g., job performance in roles requiring high emotional labor; Joseph and Newman, 2010).

In sum, ability EI, or individual differences in the ability to recognize, understand, and (knowledge of how to) manage emotions appear to exist and fit within a broader cognitive ability framework (MacCann et al., 2014; Mestre et al., 2016). Ability EI shares numerous features with other elements of cognitive ability and provides useful information in explaining emotion-laden outcomes (Mayer et al., 2001; Van Rooy and Viswesvaran, 2004; Joseph and Newman, 2010). The evidence summarized here supports a conclusion that ability EI can be considered a sub-factor of general cognitive ability.

PERSPECTIVE 2: EMOTIONAL INTELLIGENCE AS PERSONALITY TRAITS

The second perspective on EI was pioneered by Petrides and colleagues and is termed ‘trait EI.’ The definition of trait EI has evolved over time, from a construct that represents “behavioral dispositions and self-perceived abilities” (Petrides and Furnham, 2001, p. 426), to “emotion-related dispositions” (Petrides et al., 2007b, p. 273), and most recently to the “constellation of emotional self-perceptions located at the

lower levels of personality hierarchies” (Petrides, 2010, p. 137). A large body of evidence demonstrates that trait EI is unrelated to ability EI (correlations are often near-zero; Van Rooy et al., 2005; Petrides et al., 2007a). Thus, we can say that trait EI and ability EI represent two distinct perspectives on EI, with ability EI linked to individual differences in intelligence and trait EI linked to individual differences in personality. However, there remains uncertainty regarding the extent to which trait EI replicates traits within existing personality models or captures a new dimension of personality.

Personality refers to the relatively stable traits that influence a person’s typical pattern of thinking, feeling, and behaving (Hughes and Batey, 2017). Given this, trait EI should refer exclusively to typical affective tendencies and not self-perceived abilities, which are distinct from personality (Chamorro-Premuzic and Furnham, 2004). However, as noted above, trait EI has shifted over time from a mixed construct (dispositions and self-perceived abilities) to a personality construct and it seems that current measures of trait EI still contain questions concerning self-perceived abilities (e.g., I would describe myself as a good negotiator; I believe I am full of personal strengths). This is not surprising given that the trait EI program did not start out to identify the “comprehensive representation of the affective aspects of personality” (Petrides et al., 2016, p. 336) that it now claims to capture. Nevertheless, future research needs to refine trait EI measures so that they focus exclusively on personality.

The most popular measure of trait EI, the TEIQue (Petrides, 2009), has a general factor that can be broken into four sub-factors and a further 15 facets, two of which are considered auxiliary facets that do not load onto any of the four sub-factors (see **Table 1**). Early exploratory factor analytic evidence showing that some trait EI facets formed a factor separate to the Big Five (Petrides and Furnham, 2001; Petrides et al., 2007b), combined with evidence of modest incremental prediction (beyond short measures of the Big Five; Petrides et al., 2007a), was interpreted as indicating the discovery of a major new personality dimension (Petrides et al., 2007b; Pérez-González and Sanchez-Ruiz, 2014).

However, later research demonstrated substantial overlap between existing personality measures and trait EI measures (e.g., 57% of trait EI variance is accounted for by the Big Five factors), suggesting that trait EI was not that new or that major (Pérez-González and Sanchez-Ruiz, 2014). Indeed, when examining Petrides et al.’s (2007b, Table 4) joint factor analysis of the TEIQue and a measure of the Big Five, there is substantial overlap. Five trait EI facets had no substantial loading on the trait EI factor but did load substantially on other Big Five factors. Six trait EI facets either had their primary loading on a Big Five factor or had substantial loadings on both trait EI and one of the Big Five. Four trait EI facets loaded primarily onto the trait EI factor and had no meaningful cross-loadings. So, of the fifteen TEIQue facets, five are best considered markers of the current Big Five, and a further six can quite easily be incorporated within the Big Five model. What this analysis reveals is that the vast majority of trait EI facets are best considered markers of the Big Five, not as markers of a new trait construct. Indeed, based on a qualitative review of item

TABLE 1 | TEIQue facets and similarities to the Big Five.

TEIQue sub-factor and facets	Similar constructs found within the NEO PI-R
Emotionality	
Emotion perception	Feelings (O)
Trait empathy	Tender-mindedness (A)
Emotion expression	Hostility (N), anxiety (N)
Relationships	–
Self-control	
Emotion regulation	–
Stress management	Vulnerability (N), anxiety (N)
Impulsiveness	Impulsiveness (N)
Sociability	
Assertiveness	Assertiveness (E)
Emotion management	–
Social awareness	–
Self-esteem	Competence (C)
Well-being	
Trait happiness	Positive emotions (E), depression (N)
Trait optimism	–
Auxiliary facets	
Adaptability	–
Self-motivation	Achievement striving (C)

content, we have illustrated further overlap between trait EI and the Big Five within **Table 1**.

Despite the substantial overlap between trait EI models and the Big Five, Petrides et al.’s (2007b) analyses suggest that four facets (social awareness, emotion management, emotion expression, and trait empathy) are unique from the Big Five. In addition, our qualitative review suggests that some facets do not have direct equivalents in extant models. Thus, it is possible that trait EI research has identified meaningful personality traits that can inform and expand existing personality models. This is especially useful given that current omnibus models of personality (e.g., the Big Five) are not comprehensive in their coverage of the personality sphere (Hughes and Batey, 2017), and this is particularly true for tendencies relating to positive affect (e.g., Pytlik Zillig et al., 2002). Indeed, a number of the ‘unique’ trait EI facets, representing positive affect or low neuroticism, are not currently captured by the Big Five (e.g., emotion regulation, adaptability, and optimism). This might explain why the factors of well-being and self-control, which subsume these facets, often provide incremental prediction when examined alongside existing personality measures (Andrei et al., 2016).

So, trait EI measures capture a number of affect-related or affect-laden personality traits that span the whole spectrum of personality (i.e., facets from each of the Big Five and seemingly beyond). Having measures that provide a “comprehensive representation of the affective aspects of personality” (Petrides et al., 2016, p. 336) is undoubtedly useful for both research and practice (i.e., identifying which facets to measure during employee selection, Hughes and Batey, 2017). However, whether existing trait EI measures achieve this is debatable. The research that is now needed to achieve comprehensive coverage of

affect-related personality facets involves two major steps. First, research must identify which facets of trait EI models and measures are unique and which are redundant. Second, existing personality measures (i.e., Big Five measures) need to be examined in order to identify other affect-related facets (e.g., anxiety and warmth) that are currently absent from trait EI models.

In sum, whilst trait EI research is not as clear-cut as ability EI research, we can draw several important conclusions, namely that trait EI is distinct from ability EI and that trait EI is, in essence, a collection of affect-related personality traits. In order to make this overlap and theoretical perspective explicit, from this point, we refer to this perspective without using the term ‘intelligence.’ Instead, we refer to this perspective as ‘affect-related personality.’ Using a unique label was not a lightly taken decision because whenever novel terminologies are introduced the risk of confusing matters increases. We considered the term ‘personality trait EI’ or retaining ‘trait EI.’ However, on reflection, we considered that it would be more confusing to use term ‘intelligence’ when referring to a collection of personality traits.

PERSPECTIVE 3: EMOTIONAL INTELLIGENCE AS EMOTION REGULATION

The third broad grouping of EI-related constructs commonly discussed pertains to Emotional and Social Competencies (e.g., Goleman, 1995; Boyatzis, 2009). EI competencies are “observed when a person demonstrates... self-awareness, self-management, social awareness and social skills at appropriate times and ways in sufficient frequency to be effective in the situation” (Boyatzis et al., 2000, p. 344). This definition is so broad that almost any intrapersonal or interpersonal behavior could be classified under this definition, and many have been. Indeed, EI competency models include constructs synonymous with personality (e.g., conscientiousness, optimism; Joseph et al., 2015), constructs concerning the regulation of one’s own and others’ emotions (e.g., emotional self-control, empathy, and conflict management) and a broad array of performance outcomes (e.g., teamwork, service orientation, innovativeness, social responsibility, leadership; Bar-On, 1997; Boyatzis et al., 2000; Boyatzis, 2009).

The varied nature of these models has led numerous authors to refer to them as ‘mixed models’ (e.g., Joseph et al., 2015), with mixed models frequently and justifiably criticized for their lack of theoretical clarity (Mayer et al., 2000; Daus and Ashkanasy, 2003; Ashkanasy and Daus, 2005; Locke, 2005; Zeidner et al., 2008). Indeed, when a construct is so broad that it can reasonably accommodate almost everything it is essentially protean and thus meaningless (Hughes, 2018). ‘Valid’ constructs have clear definitions, clearly defined content, and clear boundaries (Hughes, 2018). Competency EI models have none of these features (Locke, 2005; Zeidner et al., 2008). In addition, competency measures share larger correlations with measures of other constructs than each other (Brackett and Mayer, 2003), have low internal consistency and test–retest reliability (Zeidner et al., 2008), incoherent and

inconsistent factor structures (Livingstone and Day, 2005), and when considered alongside personality, intelligence, and self-perceptions, have little predictive value (Joseph et al., 2015). Given the lack of supporting evidence (and quite damning critical evidence), we concur with the previously espoused views that EI competencies represent a proportion of the EI literature that could be abandoned (e.g., Mayer et al., 2000; Brackett and Mayer, 2003; Daus and Ashkanasy, 2003; Zeidner et al., 2004, 2008; Ashkanasy and Daus, 2005; Locke, 2005). Indeed, the continued use of EI competency models is likely to do “much more harm than good” (Daus and Ashkanasy, 2003, p. 70) when seeking to build coherent theoretical accounts of affective processes and related individual differences.

Although we see no meaningful future for current EI competency models, we do see that the general aim of assessing emotional competence and integrating it within a broad framework of emotion-related individual differences is of value. As noted above, the constructs included within competency models span three domains: personality, broad performance outcomes, and emotion regulation. Within the delineation of emotion-related constructs we present, the personality component is captured under the ‘affect-related personality’ (e.g., trait EI) banner, so any personality constructs here would represent construct proliferation, and the broad performance outcomes cannot reasonably be considered affect-related individual differences. However, we would argue that the elements related to emotion regulation do have a place within the broad domain of affect-related individual differences. Thus, we would prefer to see such work move away from EI competencies and focus instead on emotion regulation, which represents ‘the use of strategic cognitions or behaviors to improve or worsen [one’s] own feelings and those of other people, in the pursuit of hedonic, relational and instrumental goals’ (Niven et al., 2011, p. 71). In essence, emotional competence and emotion regulation are aiming to address the same phenomenon, namely, using emotions to facilitate goal attainment. In **Table 2**, we have noted some clear areas of overlap between emotion regulation models and EI competencies.

Given that EI competencies and emotion regulation are both concerned with the same phenomena and the clear overlap in core constructs (see **Table 2**), it makes sense to consolidate the two fields to avoid construct proliferation (i.e., the proposition and marketing of multiple ostensibly unique but actually largely overlapping constructs). This consolidation is likely, in our view, to lead to the abandonment of EI competencies in favor of emotion regulation for three main reasons:

First, emotion regulation has well-developed theories such as the process model of emotion regulation (Gross, 1998, 2015). According to this model, there are five classes of emotion regulation: (i) choosing situations to engage with or avoid (situation selection), (ii) modifying that situation (situation modification), (iii) directing attention within the situation (attentional deployment), (iv) attributing a meaning to the situation (cognitive change), or (v) altering the response to the situation (response modulation). At all five stages, different emotion regulation strategies can be adopted and if implemented successfully can facilitate goal-attainment (Gross, 2015). Some

example strategies are displayed in **Table 2**. The process model of emotion regulation has recently been extended to consider a significant gap noted by the model's author, namely, how individuals come to choose which emotion regulation strategy to adopt. Specifically, Gross proposed three key antecedents to the enacting of emotion regulation, namely, identification, selection, and implementation (Gross, 2015). As we will discuss later, we see a prominent role for ability EI and affect-related personality traits in explaining individual differences in identification (i.e., how capable/prepared people are to pay attention to emotions), selection (i.e., the ability to identify an appropriate emotion regulation class), and implementation (i.e., the specific behavioral nuances with which people enact their regulation).

At this point, it is worth noting how emotion regulation differs from ability EI and in particular the management branch, which is sometimes referred to as the regulation branch (Joseph and Newman, 2010, 2015). Emotion regulation as we have noted above refers to processes and behaviors regarding the up-regulation and down-regulation of emotions. The emotion management branch of ability EI refers to crystallized knowledge regarding these processes and behaviors. In other words, the difference between knowing that consuming alcohol will not improve one's mood, and drinking it regardless. The two are interrelated, but they are not synonymous, one is knowledge and the other is action.

Second, although EI competency models refer to broad outcomes (e.g., optimism or influence), emotion regulation models focus on the specific strategies utilized (see **Table 2**). For example, optimism can be obtained and maintained through positive reappraisal and the use of self-enhancing humor (Scheier and Carver, 1987), whilst influence can be gained in a number of ways, including appropriate displays of anger (e.g., Sy et al., 2005; Côté and Hideg, 2011). This focus on specific strategies provides a greater insight into the processes behind affective phenomena (Mestre et al., 2016) and thus can lead to more specific theories and useful practical guidance (i.e., training programs).

Third, emotion regulation measures are superior to EI competency measures in terms of theoretical coherence and psychometric properties (c.f., Matthews et al., 2003; Bridges et al., 2004). For example, one of the most widely used measures, the Emotion Regulation Questionnaire (ERQ; Gross and John, 2003)

differentiates between re-appraisal and suppression strategies guided by theoretical models (Gross, 1998; Gross and John, 2003). In addition, the ERQ scales demonstrate adequate reliability, a stable factor structure, and provide prediction of numerous socially important outcomes (e.g., depression, anxiety, stress, interpersonal functioning, well-being, social adjustment, and decision-making; see Spaapen et al., 2014).

In sum, both emotional competence and emotion regulation are attempting to address the same phenomenon: using emotions to facilitate goal attainment. However, only emotion regulation actually achieves this. Compared with EI competency models, emotion regulation models are built on stronger theory, contain more specific construct identification, inspire better measures, and show better predictive properties. Thus, we believe that researchers interested in emotional competence or skill should avoid EI competency/mixed models and instead focus on models of emotion regulation. The integration of EI research with emotion regulation echoes a call from Mestre et al. (2016, p. 327) who recently stated that, 'studying EI through the theoretical framework of emotion regulation may produce greater understanding of the mechanisms by which EI capacities influence valued outcomes.' We agree with Mestre et al. (2016) and see great value in the integration of EI and emotion regulation (see also Hughes and Evans, 2016). In the next section, we expand upon these claims by building an integrative model that combines ability EI, affect-related personality traits, and emotion regulation.

AN INTEGRATED MODEL OF AFFECT-RELATED INDIVIDUAL DIFFERENCES

Using the aforementioned theoretically informed classification, the second major goal of this paper is to introduce the Integrated Model of Affect-related Individual Differences. This model aims to provide an initial mechanistic representation that explains how the different EI-related constructs are likely to interrelate and coalesce to influence affective outcomes. By differentiating and integrating EI-related individual differences, the current paper aims to provide scholars and practitioners with a clear and useful

TABLE 2 | Overlaps between emotion regulation classes, emotion regulation strategies, and outcomes currently considered to be emotional intelligence competencies.

Emotion regulation class (Gross, 2015)	Example emotion regulation strategies (Peña-Sarrionandia et al., 2015)	Example emotional intelligence competency (Boyatzis, 2009)
Situation selection	Avoidant-coping Forecast accuracy	Emotional self-awareness Empathy
Situation modification	Conflict resolution Social support search	Conflict management Influence
Attentional deployment	Rumination Distraction	
Cognitive change	Positive reappraisal Humor	Optimism/positive outlook
Response modulation	Venting/suppression Substance use	Emotional self-control

framework that will provide a platform for theoretical refinement, measure development, and future research.

Previous influential models or classifications of EI-related constructs (e.g., trait vs. ability; stream 1, 2, and 3; ability vs. mixed) have typically been based on sub-optimal definitions or measurement tools (e.g., Ashkanasy and Daus, 2005; Zeidner et al., 2008; Joseph et al., 2015). For example, Ashkanasy and Daus (2005) influential classification proposed three streams each based on a certain measurement approach, namely, ability EI tests, self- or other-reported ability EI, and EI competency measures. Whilst such groupings have utility in distinguishing among measures, they are, by nature, atheoretical and fail to provide a solid platform for theoretical development. Equally, previous reviews have tended to adopt an ability EI vs. others (mixed models, trait EI, competency) approach and as a result, researchers have tended to treat the different EI-related constructs as competitors. Indeed, there have been numerous papers pitting the different EI models against each other with a view to identifying which EI is the 'correct' or 'best' EI (e.g., Mayer et al., 2000; Zeidner et al., 2008).

In contrast, we have used the broader individual differences literature as the basis for our classification of EI-related constructs and were not bound by existing measurement tools or deficient definitions (e.g., mixed models). As a result, our classification addresses calls to provide clear boundaries, aligned with traditional individual differences theory, for each of the major EI-related constructs (Zeidner et al., 2004). Importantly, this means that these different EI-related constructs are no longer in direct competition but can instead be viewed as complementary. Rather than conducting predictive validity competitions, pitting different EI measures against each other and other individual differences, we can instead focus on building and testing meaningful theoretical models that explain how individual differences in ability EI, affect-related personality, and emotion regulation interrelate to influence affective behavior (e.g., Seal and Andrews-Brown, 2010; Hughes and Evans, 2016; Mestre et al., 2016). Accordingly, we now propose a model that integrates the three perspectives.

The key principles of the Integrated Model of Affect-related Individual Differences are as follows. We propose that ability EI (a sub-factor of cognitive ability) and affect-related personality traits (a collection of affect-related personality traits) drive the identification, selection, and successful implementation of various emotion regulation strategies. In turn, emotion regulation influences important outcomes. A visual representation of the Integrated Model of Affect-related Individual Differences is presented in **Figure 2**. In essence, this is an integrated mediation model in which emotion regulation mediates the effects of ability EI and affect-related personality traits upon outcomes (Joseph and Newman, 2010; Côté et al., 2011; Hughes and Evans, 2016; Mestre et al., 2016; Szczygiel and Mikolajczak, 2017). The model is inspired by and builds upon previous integrations of personality, intelligence, and skills that have proven successful in explaining behavior in other domains (e.g., McClelland, 1973; Zeidner, 1995; Chamorro-Premuzic and Furnham, 2004). Perhaps the key strength of

the model is that it provides a testable framework that has the potential to explain how individual differences in ability EI and affect-related personality manifest in diverse behavior and differential outcomes. The model goes beyond simple descriptive correlations and direct effects that have dominated previous research and instead seeks to explain how affective outcomes arise through the dynamic interactions between affect-related individual differences. As a result, the Integrated Model of Affect-related Individual Differences focuses not simply on *what* is predicted by EI-related constructs but *how* these constructs influence outcomes. A greater understanding of how EI-related constructs interact and the nature of the mechanisms by which they influence outcomes stands to inform future theory, measurement, and intervention design.

A few previous papers have proposed and/or partially tested models that integrate some EI-related constructs (e.g., Joseph and Newman, 2010; Seal and Andrews-Brown, 2010; Peña-Sarrionandia et al., 2015; Mestre et al., 2016). However, none of these models have included all unique elements of the EI literature, all have been bound by existing measurement tools and poorly defined constructs (e.g., mixed models), and most have not considered EI-related constructs within the broader individual differences literature. For example, Seal and Andrews-Brown (2010) posit mediated and moderated relationships between three measures, which they label emotional ability (Salovey and Mayer, 1990), emotional quotient (Bar-On, 1997) and emotional competence (Goleman, 1995). The latter two are considered 'mixed models,' overlap substantially, and as discussed above have been heavily criticized from theoretical and empirical standpoints. This model also fails to provide theoretically meaningful links to the broader literature or draw clear boundaries separating these constructs. As a result, its utility for theory building is limited. In contrast, Mestre et al. (2016) present compelling evidence supporting the positioning of ability EI as a sub-factor of general cognitive ability. They go on to argue that emotion regulation could be the process by which ability EI influences outcomes. This link was supported by a previous meta-analysis demonstrating associations between ability EI scores and emotion regulation (Peña-Sarrionandia et al., 2015). The Integrated Model of Affect-related Individual Differences builds upon this paper positing emotion regulation as the mechanism through which EI-related constructs influence outcomes. However, it extends this discussion beyond ability EI to include affect related personality traits. Further, as we discuss in more detail below, the model also posits that individual differences in emotion regulation are most likely driven by both ability EI and affect-related personality traits (Hughes and Evans, 2016).

Overall, the Integrated Model of Affect-related Individual Differences makes several key contributions to the literature. First, by tying each EI-related construct to existing models of individual differences it provides a clear, theoretically coherent, and parsimonious description of the three key perspectives. Second, the model posits EI-related constructs not as competitors but as complementary constructs that are meaningfully entwined and which coalesce to produce emotion-relevant behavior. Third, through this integration, the model provides a framework that

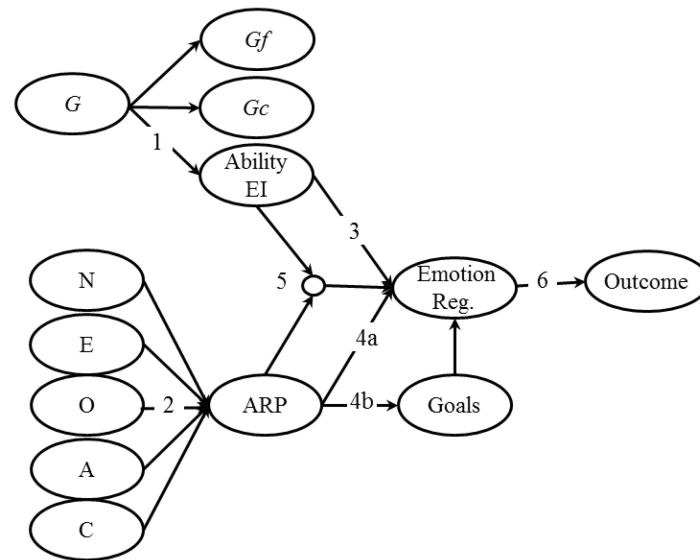


FIGURE 2 | Integrated model of affect-related individual differences. G, general factor of intelligence; Gf, fluid intelligence; Gc, crystallized intelligence; N, neuroticism; E, extraversion; O, openness; A, agreeableness; C, conscientiousness; ARP, affect-related personality traits; Emotion reg., emotion regulation.

can explain how individual differences in ability EI and affect related personality traits influence patterns of emotion regulation and subsequently socially important outcomes. In the following sections, we discuss integration further and review extant empirical evidence in support of the key pathways hypothesized. The Integrated Model of Affect-related Individual Differences is inherently causal but most EI research is cross-sectional and correlational in design. Because such designs do not model data in a manner that is appropriate for determining causal relationships (Antonakis et al., 2010; Hughes et al., 2018), where available, studies adopting experimental designs, which are better suited to examining causality, are noted (Antonakis et al., 2010).

PATHWAY 1: G → ABILITY EI

As discussed above, ability EI satisfies a number of important criteria to be considered a cognitive ability (Van Rooy and Viswesvaran, 2004; MacCann et al., 2014; Mestre et al., 2016). More specifically, current evidence suggests that ability EI is best conceived of as a second-order factor of cognitive ability that is hierarchically structured, consisting of a general factor and three sub-factors, namely, the ability to perceive, understand, and manage emotions (Fan et al., 2010; MacCann et al., 2014). Essentially, ability EI reflects the cognitive capacity to process emotion-laden information (Mayer et al., 2016).

PATHWAY 2: BIG FIVE → AFFECT-RELATED PERSONALITY TRAITS

Trait EI represents a compound construct containing affect-related personality traits (Petrides et al., 2007b; Petrides, 2010).

Given the pervasiveness of the Big Five and Five Factor Model (FFM) within personality research, and the significant overlap between trait EI and FFM facets (see **Table 1**), it is appropriate to seat the affect-related personality traits perspective within this model (van der Zee and Wabeke, 2004). Historically, most affect-related personality research has focussed on global factors (e.g., total trait EI scores). However, we suggest that this is sub-optimal and potentially misleading, for two main reasons. First, compared to facets, broad factors lead to underestimates and/or distorted estimates of construct relationships (i.e., reduced predictive validity, Hughes and Batey, 2017). This is especially true when facet content is diverse (Hughes and Batey, 2017), like it is with affect-related personality traits, which span all of the Big Five. Second, factors created from a selective subset of traits (e.g., TEIQue) might well be misleading due to data pre-structuring. Briefly, factor solutions are only as strong as the variables that are entered for factoring, and factors identified can only be considered to 'exist' or be 'accurate' if they are derived from the entire domain of possible variables (i.e., all affect-related personality facets/items). Given that this was not the case for measures such as the TEIQue (which was developed based on a competency EI model), it is perhaps questionable what the global trait EI and 4 sub-factors really represent. Indeed, as we discussed, a number of TEIQue facets do not load on the general factor. Thus, we think that targeted, theory driven, facet-level analyses are the way forward (Hughes and Batey, 2017). That is, researchers should measure the affect-related personality facets that are relevant to their study. Although for slightly different reasons, this recommendation echoes recent calls from the pioneers of the personality based approach to EI (Petrides et al., 2016).

PATHWAY 3: ABILITY EI → EMOTION REGULATION

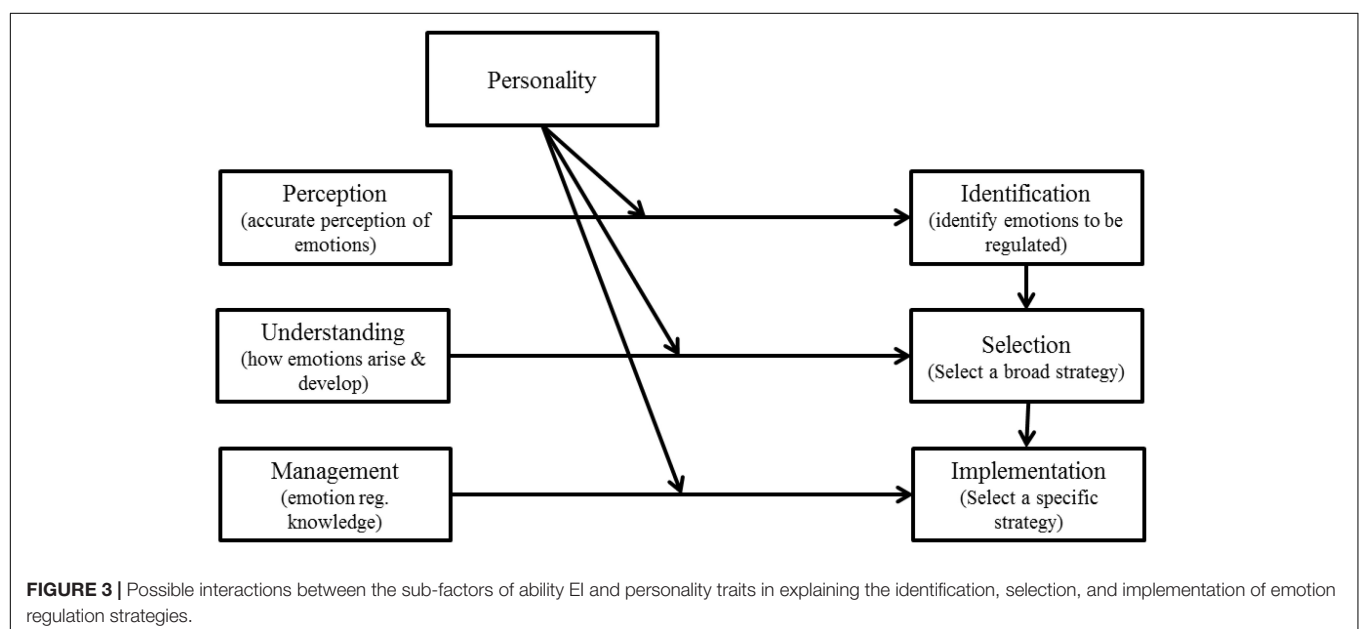
Emotion regulation refers to the strategies used to adapt emotions (e.g., suppress or exacerbate) experienced by the self and others in order to facilitate goal-attainment (Niven et al., 2009, 2011; Gross, 2015). If you want to achieve the goal of increasing your positive emotions, you might tell yourself a funny joke. If you want to reduce someone else's anxiety before a test, you might reassure them. Emotion regulation consists of three main decisions (Gross, 2015). First, a person must select if/which emotions need to be regulated in any given situation (identification). Next, the person must choose when regulation strategies (i.e., which of the emotion regulation classes, see **Table 1**), should be utilized (selection). Finally, in the implementation phase, the person must enact the regulation by translating the broad emotion regulation strategy (e.g., cognitive change or situation modification) into specific cognitive or behavioral strategies (e.g., positive reappraisal or conflict resolution). The identification, selection, and implementation stages were recently espoused and understanding them is likely to help explain the existence of consistent individual differences in the frequency and style of emotion regulation (Gross, 2015).

The recency with which the identification, selection, and implementation phases were espoused means that no specific theory, model, or empirical evidence describes relationships between the two. However, there is mounting evidence and increasing theoretical rationale to support a reliable link between ability EI and the use of emotion regulation strategies (e.g., Joseph and Newman, 2010; Peña-Sarrionandia et al., 2015; Hughes and Evans, 2016; Mestre et al., 2016). For example, a recent meta-analysis found a number of moderate-strong relationships between ability EI and emotion regulation strategies spanning the five major emotion regulation classes (Peña-Sarrionandia

et al., 2015). As an indication of the degree of the relationship, ability EI reliably predicted the use of nineteen of the 22 emotion regulation strategies investigated (i.e., 95% confidence intervals not crossing 0). Importantly, the strength and direction of the relationships was not uniform, that is, those high in ability EI do not simply regulate more and/or use a greater number of strategies. The pattern of relationships suggests that individuals high in ability EI regulate emotions earlier (which is typically adaptive), adopt more of the strategies typically seen as adaptive (e.g., social support seeking), and fewer of those typically seen as maladaptive (e.g., rumination; Peña-Sarrionandia et al., 2015). These theoretical and empirical arguments suggest that ability EI (the cognitive capacity to process emotion-laden information) is likely to be one of the key determinants of the characteristic patterns of emotion regulation displayed by individuals (Mestre et al., 2016).

Experimental research in the field is mostly convergent, with ability EI linked to effective mood maintenance and repair following mood induction via film clips (positive and negative, respectively; Ciarrochi et al., 2000). Similarly, ability EI has been associated with lower worry and avoidant coping during stressful tasks (Matthews et al., 2006). Furthermore, using eye-tracking equipment during an experimental protocol, Davis (2018) found a general orienting preference whereby emotion management was associated with avoidance of negative emotion (anger). However, higher levels of ability EI are not always considered positive, with some relationships with higher cortisol reactivity and thus slower recovery from stress (Bechtoldt and Schneider, 2016).

In sum, whilst experimental studies are rare, those available are broadly consistent with survey studies and support the notion that ability EI is likely to be one antecedent of emotion regulation style. Indeed, it would be surprising if an individual's ability and knowledge pertaining to the perception, understanding, and



management of emotions were unrelated to emotion regulation. Although speculative here, it might be expected that meaningful relationships will emerge between the perception factor of ability EI and the identification stage of emotion regulation, between understanding and selection, and between management and implementation (see **Figure 3**, discussed below).

PATHWAY 4A AND 4B: AFFECT-RELATED PERSONALITY → EMOTION REGULATION

Whilst ability EI correlates with emotion regulation, it alone does not explain emotion regulation (Mayer et al., 2016). There is a well-documented gap between ability and behavior; individuals with similar levels of ability EI adopt diverse emotion regulation strategies, some of which can be unproductive (e.g., Côté et al., 2011). Both theoretical rationale and empirical evidence suggest that personality also plays a role in guiding individual's emotion regulation (Côté et al., 2011; Davis and Humphrey, 2014; Fiori, 2015; Peña-Sarrionandia et al., 2015; Hughes and Evans, 2016). Personality traits shape individuals' preferences, attentional focus, and interpersonal behavior, all of which are likely to influence one's choice of emotion regulation strategy (e.g., Côté et al., 2011; Peña-Sarrionandia et al., 2015). Indeed, meta-analytic estimates suggest that affect-related personality traits are associated with emotion regulation in a similar fashion to ability EI. That is, there is a consistent relationship (i.e., 35 of 37 effect sizes calculated presenting 95% confidence intervals not including 0; Peña-Sarrionandia et al., 2015). The nature of these associations suggest that those who score higher on measures of trait EI tend to regulate earlier and use regulatory strategies typically considered adaptive more often than strategies typically considered maladaptive. In addition, effect sizes are, on average, larger than those reported for ability EI (Peña-Sarrionandia et al., 2015). Perhaps this is not hugely surprising, in fact, it would be more surprising if personality did not shape emotion regulation style, for instance, if those high in trait optimism did not frequently use positive reappraisals and those high in trait anxiety did not frequently ruminate.

Experimental results also support a causal relationship between affect-related personality and emotion regulation. For example, trait EI was negatively related to psychological and physiological reactivity when exposed to a stressor (Mikolajczak et al., 2007) and positively related to exhibition of self-efficacy and appraising stressful situations as challenges rather than threats (Mikolajczak and Luminet, 2008). Similarly, affect-related personality traits have been associated with greater susceptibility to mood induction, moderating the effect of experimental stressors on subsequent mood deterioration (Petrides and Furnham, 2003; Mikolajczak et al., 2009).

Above, we hypothesized that there might be meaningful relationships between the three primary EI abilities (perception, understanding, and management) and the identification, selection, and implementation phases of emotion regulation. It is also likely that certain affect-related personality traits will predispose individuals to think and act in specific ways within

these phases. For example, certain traits (e.g., emotion perception and empathy) might predispose individuals to invest more effort in monitoring one's own and others' emotions (the *identification* phase). Other traits (e.g., anxiety or optimism or emotional expression) might predispose individuals to *select* certain classes of emotion regulation (e.g., situation selection or cognitive change or response modulation) and to *implement* them using specific strategies (e.g., avoidant coping or positive reappraisal or venting). It is also likely that intrapersonal affect-related personality traits (e.g., stress management) will predict the regulation of one's own emotions, whilst the interpersonal traits (e.g., social awareness) will predict the regulation of others' emotions.

One of the major mechanisms through which affect-related personality traits are likely to influence patterns of emotion regulation, is goals and motives (**Figure 2**, path 4b). Emotion regulation is often, if not always, goal-driven (Gross, 2015) and personality shapes values, goals, and motives (Grant and Mayer, 2009; Parks-Leduc et al., 2015), with affect-related personality traits likely to influence motives and goals within affect-related settings (John and Gross, 2004; Hughes and Evans, 2016). It has been argued that the general goal of emotion-regulation should be to 'feel good' and thus personality is perhaps not that key (e.g., Larsen, 2000; Tice et al., 2004). However, empirical evidence does not support this assertion. Individuals demonstrate considerable variation in how they want to feel and in the direction in which they regulate their emotions (e.g., Gross et al., 2006; Tamir, 2016). For example, Heimpel et al. (2002) found that participants who were low in self-esteem and had recently experienced a failure/loss did not want to feel immediately better. In contrast, those high in self-esteem did seek to make themselves feel better. This multi-study paper showed that the varying regulatory goals were not due to differences in knowledge or expected affect changes but reflected dispositional and stylistic preferences that are almost certainly shaped, to some degree, by personality (e.g., Grant and Mayer, 2009; Augustine et al., 2010; Hughes and Evans, 2016).

We believe that a systematic empirical effort to examine the relationships between affect-related personality and emotion-regulation goals/motives would be hugely useful for theoretical development and explaining consistent individual differences within emotion regulation. A recently published taxonomy (Tamir, 2016), provides a particularly useful framework for guiding examinations between personality, goals, and emotion regulation. The framework consists of two higher-order classes of motives namely, hedonic and instrumental, which subsume six lower-order classes (see Tamir, 2016, **Figure 1**). These lower-order classes lend themselves to a number of hypotheses regarding affect-related personality traits. For example, trait sociability (contained within the TEIQue and most other personality models) is likely to generate goals and motives that are aligned with the social-instrumental class identified by Tamir (2016). Accordingly, one might hypothesize that those high in trait sociability will frequently be motivated to regulate emotions in a social-instrumental manner through the use of emotion regulation strategies such as social support seeking and humor use. Similarly, links between trait optimism

and prohedonic motives (i.e., the motive to feel good) or trait achievement striving and performance-instrumental motives could easily be theorized.

In addition, most previous examinations of EI-related constructs and emotion regulation have focussed almost exclusively upon on self-regulation (e.g., Peña-Sarrionandia et al., 2015; Mestre et al., 2016; Tamir, 2016). We believe this to be an oversight and expect that affect related personality traits will be of (equal, perhaps even greater) importance to the approaches adopted when attempting to regulate others' emotions (Niven et al., 2011). For example, many affect-related personality traits (e.g., empathy, social awareness) drive an outward focus that is likely to produce motivations aimed at appeasing or pleasing others. Such goals are likely to affect the choices of emotion regulation strategies. For example, although venting (i.e., verbally complaining about a negative event) can be a productive self-regulation strategy, it can be counterproductive for those who receive the venting. It is possible that those high in empathy or social awareness may be more likely to consider the consequences of venting for others and thus suppress their desire to vent in order to regulate the emotions of others (Hughes and Evans, 2016). Currently, however, there is a dearth of research exploring why people engage in other-focused emotion regulation and the different styles with which they do so (Niven, 2016). Another recent taxonomy might be of use in guiding future research is Niven's (2016) work-specific motives framework of interpersonal emotion regulation. The framework identifies eight specific motives which are subsumed under the three major needs proposed in self-determination theory. The framework shares a number of commonalities with that proposed by Tamir (2016). For example, there are different manifestations of motives depending on whether the broad goal is hedonic/pleasure or instrumental/performance focussed, these motives are hierarchically structured, and the lowest-level of abstraction provides a classification system that would lend itself to building logical hypotheses positing personality traits as antecedents of these motives.

PATHWAY 5: INTERACTION BETWEEN PERSONALITY AND ABILITY → EMOTION REGULATION

In addition to independent effects, it is also possible that ability EI and affect-related personality interact in explaining emotion regulation (Côté et al., 2011; Fiori, 2015; Hughes and Evans, 2016). For example, Côté et al. (2011) found that when individuals were high in both ability EI and moral identity, they were more likely to behave in a prosocial manner, but if they were high in ability EI and Machiavellianism, they were more likely to display interpersonal deviance. Importantly here, higher ability EI was associated with greater performance but the direction of the performance (prosociality or deviance) was explained by personality traits. Similarly, Fiori (2015) found that ability EI interacted with the personality trait of emotionality (similar to neuroticism, marked by fearfulness,

anxiety, sentimentality and a dependence on social support) to predict interpersonal effectiveness as assessed through a presentation task. Here, those high in ability EI and low in emotionality (i.e., emotionally stable) were the best performers, whilst those high in ability EI and emotionality were average performers.

The above evidence demonstrates that both ability EI and affect-related personality traits are needed to explain performance. However, all of these studies omit the important mediating mechanism of emotion regulation and thus likely underestimate the effects of EI-related constructs and reduce their ability to explain how the EI-related constructs influenced the outcomes. As noted above, we also expect that ability EI and affect-related personality traits will interact to drive both the selection and implementation of differing emotion regulation strategies. For example, two individuals equally high in ability EI with differing levels of trait optimism (a facet of trait EI; Petrides et al., 2007b) might differ in the speed and frequency with which they engage in positive interpretations (see Hughes and Evans, 2016 for further discussion). Some preliminary evidence for this comes from Davis and Humphrey (2012) who found that ability EI moderated the effects of stressors upon coping strategies and that trait EI moderated the effects of coping strategies upon depression. Although not a direct test of the interactions proposed here, the results suggested that EI-related constructs do interact with some emotion regulation strategies and showed that being high in both ability EI and trait EI facilitated effective coping whereas being high in one or the other was insufficient. Essentially, there are well-established ability and stylistic elements to individuals' patterns of emotion regulation and it is also possible that these two components can be complementary or at odds at any given stage of the emotion regulation process (Izard et al., 2008). If we consider these potential interactions further, what we might expect to see is a pattern whereby ability EI accounts for differences in knowledge/ability related to emotion regulation, personality accounts for differences in style, and the interaction between these two elements provides a meaningful insight into individual differences in emotion regulation. A graphical representation of the main proposed interaction is contained in **Figure 3**.

Thus, the Integrated Model of Affect-related Individual Differences presented here provides a framework to begin address numerous important questions facing emotion regulation:

"What leads a person to use one rather than another of the various emotion regulation strategies described by the process model? ... the model is silent as to how these various emotion regulation strategies are actually started or stopped. What initiates emotion regulation? What directs specific emotion regulation strategies? And why do some people regulate emotions successfully while others fail to regulate emotions as they should?" (Gross, 2015, p. 9).

One interesting additional question concerns the extent to which the identification, selection, and implementation of emotion regulation strategies occurs via conscious or implicit (automatic) processes (Fiori, 2009). The Integrated Model of Affect-related Individual Differences provides a framework that could guide initial examinations into the relationships between

different elements of EI and emotion regulation and the nature of the cognitive processes underlying them (Fiori, 2009).

PATHWAY 6: EMOTION REGULATION → OUTCOMES

Finally, we argue that emotion regulation influences meaningful intrapersonal (i.e., calming oneself before an exam) and interpersonal (i.e., conflict resolution within a team) outcomes. There is a wealth of empirical evidence to support this claim (c.f., Gross, 2015), with emotion regulation playing “a core role in everyday social life” (Niven et al., 2012, p. 247) with utility demonstrated across social, health, educational, and occupational outcomes (Gross, 2002; Peña-Sarrionandia et al., 2015). Indeed, robust links to outcomes have been established using emotion regulation, EI competency and regulation-competency hybrid scales (e.g., Austin et al., 2010). Thus, this pathway is well supported by previous evidence. The novelty here is that we are arguing that emotion regulation does not simply occur (Gross, 2015), there are drivers of emotion regulation and those drivers are affect-related abilities and personality traits. From this perspective, we can say that emotion regulation represents the principal mediating mechanism through which ability EI and affect-related personality traits influence outcomes (Joseph and Newman, 2010; Hughes and Evans, 2016; Mestre et al., 2016).

IMPLICATIONS AND FUTURE RESEARCH

The first key contribution of this article was to present a simple theoretical framework that clearly states what each EI-related construct is and is not. Specifically, that ability EI represents an extension to existing cognitive ability models, affect-related personality (e.g., trait EI) represents a collection of affective personality traits, and interest in emotional competence should focus on emotion regulation. To some researching at the cutting-edge of EI, this might seem a relatively modest extension of the extant literature. However, our reading of the EI literature suggests that it is a much-needed clarification, that explicitly demonstrates that the myriad of EI-related constructs can be accommodated within well-established individual difference frameworks, and in doing so, provides a clear theoretical base and boundaries for each. Our framework negates the need for atheoretical terms such as ‘mixed EI,’ is falsifiable, is more descriptive and explanatory in nature than previously published classifications (e.g., streams 1, 2, and 3), and is less adversarial because it does not set the different perspectives as competitors. The second notable contribution from this paper, the Integrated Model of Affect-related Individual Differences, comes from adopting these three perspectives and in drawing the different EI-related constructs together in a complementary manner. This model provides an initial mechanistic representation that explains how the different EI-related constructs are likely

to interrelate and coalesce to influence important emotion-relevant outcomes through the identification, selection, and implementation of emotion regulation strategies. Accordingly, the model also provides a solid platform for empirical exploration, theoretical refinement, measure development, and possibly practical application.

Despite its promise, the Integrated Model of Affect-related Individual Differences is clearly exploratory, and needs systematic, rigorous, and detailed empirical scrutiny. For example, some of the pathways proposed (e.g., interaction between ability and personality vs. separate pathways) could be argued to represent competing explanations for the same empirical effect. Hopefully, future research will examine these competing pathways and provide evidence regarding if/when each pathway is most pertinent. Nevertheless, the evidence discussed strongly supports the major premise of the model, namely, that both ability EI and affect-related personality traits influence the selection and implementation of emotion regulation strategies (Côté et al., 2011; Davis and Humphrey, 2014; Fiori, 2015; Peña-Sarrionandia et al., 2015; Hughes and Evans, 2016). Accordingly, the review presented and the model proposed lead to a number of implications for future research.

First, calls to completely abandon all EI research (e.g., Locke, 2005) seem misguided. However, concerns regarding construct proliferation and redundancy do hold merit. Equally, no aspect of EI is the magical silver bullet often claimed (Goleman, 1995), instead, elements of the EI literature can be seen as extensions of existing ability, personality, and emotion regulation frameworks.

Second, our review of research surrounding the Integrated Model of Affect-related Individual Differences suggests that piecemeal assessment of EI related constructs will give misleading findings. Future research interested in explaining emotion regulation or broader outcomes needs to incorporate measures of ability *and* personality, and consider the interactions between these variables. Equally, studies which estimate direct effects between outcomes and ability EI or affect-related personality traits are likely to underestimate the relations due to the omission of emotion regulation as a mediator.

Third, the research reviewed and the hypotheses made in this paper suggest that focussing upon global ability EI, broad factors containing multiple affect-related personality traits, and/or broad emotion regulation measures is likely to hide important nuanced relationships. Accordingly, we suggest that future researchers adopt a more specific approach measuring theoretically relevant abilities, personality traits (or facets), and regulation strategies. This call echoes similar calls in other applied domains (e.g., individual differences at work, Hughes and Batey, 2017) and calls made from prominent EI and emotion regulation researchers (e.g., Gross, 2015; Mestre et al., 2016; Petrides et al., 2016).

Fourth, although our focus in this paper is not on measurement tools, our review has several implications for the nature of the constructs referred to under the EI banner and how they are operationalized. With regard to ability EI, we noted a number of psychometric misgivings with existing measures (i.e., lack of reliability, inconsistent factor structure, etc.) that need to be addressed through future measure development. We would urge interested readers to see the thoughtful critiques and

guidance offered by Mestre et al. (2016) in their recent review on this subject (see Hughes, 2018; Irwing and Hughes, 2018 for guidance concerning measure development).

Regarding affect-related personality traits, there is an important need for further measure refinements. Our review of item level content combined with a number of empirical studies shows clear overlap between existing personality measures and personality trait EI measures. What we now need is a systematic study from the facet level that can identify which trait EI facets are unique and which are redundant duplications. In addition, it would be of interest to know which affect-related facets, if any, currently included within broad measures of personality (e.g., the NEO-PI-R) have been missed by specific measures (e.g., the TEIQue). These two lines of research would allow for the identification of much more comprehensive list of affect-related personality facets (see also Laborde and Allen, 2016; Petrides et al., 2016), which would be of great use to researchers and practitioners. The concept of EI competencies (e.g., Boyatzis, 2009) is redundant. Models and measures stemming from this perspective capture personality traits already accounted for, self-estimates of ability that are not relevant, and some broad emotion regulation strategies which are better considered within existing emotion regulation frameworks. Thus, we suggest that researchers interested in emotional skill or competence adopt measures of emotion regulation rather than problematic measures of social and emotional competence.

Fifth, the clear delineation of constructs raises the issue of nomenclature. We noted at the outset of this paper that logically speaking any construct labeled EI should consist of both emotion and intelligence. Currently, only the ability EI perspective meets this criterion and thus we would recommend that the label 'EI' is reserved exclusively for this perspective. We are far from the first authors to make such recommendations (e.g., Gignac, 2010),

yet, despite previous calls, other EI-related characteristics have been resistant to change. Nevertheless, appropriate nomenclature is crucial for effective scientific communication and for reducing misconceptions. Thus we suggest that from now on, authors refer to ability EI (for affect-related intelligence), affect-related personality traits (for affect-laden personality measures such as those currently referred to as trait EI), and emotion regulation (for measures that concern goal-oriented use of emotions).

CONCLUSION

In this review, we have outlined three theoretical perspectives on EI and proposed the theoretically driven Integrated Model of Affect-related Individual Differences as a stepping-stone toward building a greater understanding of EI-related individual differences and subsequent affective phenomena. This model posits that despite often being pitted against each other, the different perspectives are actually meaningfully entwined and coalesce to produce emotion-relevant behavior. We hope that our review and model will serve to guide future research and theoretical development. Although we should continue to be skeptical of EI, and actively criticize overblown claims based on atheoretical models and measures, we hope that this review demonstrates that all is not lost with regards to EI-related constructs.

AUTHOR CONTRIBUTIONS

Both authors contributed equally to the work and made a substantial, direct and intellectual contribution to the work. Both authors approved this manuscript for publication.

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The Assertive Resolution of Conflicts in School With a Gamified Emotion Education Program

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Coexistence in schools inevitably carries a higher risk of conflicts among peers. This fact can be detrimental to the well-being and academic achievement of the students. In many developed countries, about 90% of the pupils in compulsory secondary education report witnessing assaults among peers. In this regard, recognizing, controlling and managing emotions is key to ensure a healthy and effective interaction with others. Negative emotions, such as anger, can trigger conflicts or even episodes of violence if not regulated properly. Interactive tools, such as specialized software's, have shown high rates of efficacy for the training of different kinds of competences like the regulation of emotions. The aim of the present work is to describe the *Happy Emotional Education Program* and its effects over a sample of secondary school students. This software focuses in the training of emotional competences of the students with the objective of solving conflicts in a more assertive way. The design employed in the present work was a quasiexperimental design with pretest and posttest with a control group. Results show that *Happy Emotional Education Program* contributes to the management of emotions and the absence of negative affect or anxiety in a significant way. Additionally, the constant use of this interactive tool enhances motivation and the learning process of students. Results also indicate the importance of assessing the effects of the program in the long term. This would enable researchers to further assess the effects of the program over those emotional competences that are more resistant to change given its stable nature.

Keywords: emotion regulation, gamified program, coexistence, conflicts, adolescence

INTRODUCTION

The improvement of coexistence and the prevention of bullying and aggression in schools have become subjects of high interest in the international arena. The attention that these topics have received during the latest decades responds to the need to face the high rates of violent episodes and aggression in our scholar centers. For example, latest reports show that one out of four children has experimented bullying in school (Gabarda, 2014; Save the Children, 2015) and that up to a 45% of the students can be identified as victims of a violent situation in their school environment (Kasen et al., 2004; Dinkes et al., 2009).

The scientific community has emphasized that this kind of phenomena inevitably involve negative consequences for the general well-being and affective states of the students, simultaneously

hindering and challenging a correct and healthy learning process. Wolke et al. (2012) for instance, proved in 2012 with a study with 6050 mothers and their children that those individuals who had received intentional harm inflicted by peers also showed precursors or markers on the trajectory toward the development of symptomatology of Borderline Personality Disorder in childhood. Additionally, evidence shows that when the classroom climate and, by extension, coexistence among peers, is negative, the scholar center becomes more vulnerable to situations of bullying (Wang et al., 2014). Thus, results of the latest evidence unquestionably state that suffering abusive situations by peers has a detrimental effect in the academic results of the pupils, as well as the personal development of the victim, who becomes highly prone to an unhealthy state of mind and to the perception of the center as threatening and violent (Cerezo, 2008; Martorell et al., 2009; Caballo et al., 2011; Pérez-Fuentes et al., 2011). In the opposite manner, when coexistence in school is adequate and positive, there is a clear improvement in the participation and motivation of the students, and ultimately, in the learning process. This is reinforced by an adequate self-esteem of the students, prosocial skills and a healthy environment (Álvarez-García et al., 2013).

Related to the relationship among peers and its grounds, it is well established among the scientific community that many of the disruptive behaviors or aggressions that occur among peers are not due to an excess of hostility. Rather than being a problem of violence *per se*, they can better be attributed to a lack of skills and strategies to manage emotions and solve the social problems in an effective way (Ortega, 2010). This can be given a positive reading, since a number of studies show that although a poor management of emotions can bring to conflict situations, aggressions and intimidation, a systematic training of these skills can facilitate an important decrease in this kind of behaviors (Extremera and Fernández-Berrocal, 2003; Pérez-Escoda et al., 2013; Romera et al., 2015; Filella et al., 2016; among others).

Evidence so far widely recognizes that all the emotional responses are necessary and useful (Öhman and Mineka, 2001). However, when emotions are mismatched to our needs and become disrupted, it is of the foremost importance to use strategies in order to regulate our emotional state (Gross and John, 2003; Aldao et al., 2010). Empirical evidence shows that an effective management of emotions leads to several important outcomes, such as mental health (Gross and Muñoz, 1995), subjective and psychological wellbeing (Balzarotti et al., 2016), and relationship satisfaction (Murray, 2005). On the contrary, emotion dysregulation may lead to certain forms of psychopathology (Aldao et al., 2010) and maladaptive behaviors (Harrison et al., 2010). Studies in this direction, thus, show the need for action and the urge to develop efficient training programs. This would help improving emotional competencies in scholar centers, at the same time that there is an enhancement of the positive climate and a prevention of aggressive manifestations among peers (Extremera and Fernández-Berrocal, 2003; Ortega, 2006; Pena and Repetto, 2008; Pérez-Escoda et al., 2012; Miñaca-Laprida et al., 2013; Blair and Raver, 2015).

The design and implementation of programs that train certain socioemotional skills is not altogether new. Researchers

and professionals have sought to find adequate socioemotional programs that improve the learning process of the students for over a decade (for example, Pascual and Cuadrado, 2001; Filella et al., 2002; Güell and Muñoz, 2003; Renom, 2003; López-Cassà et al., 2005; Greenberg and Kusché, 2006). One of the pioneers in the approach of social and emotional skills was the Collaborative for Academic, Social and Emotional Learning (CASEL), which started applying programs in the North American schools on the premise that those problems that have an impact during childhood and adolescence in schools are mainly explained by difficulties in the social and emotional field. Thus, these programs have the final objective of fostering these kind of skills since a very early age, promoting a positive and motivating environment for the child through novel methodologies (Greenberg et al., 2003).

Benefits stemming from this type of interventions in emotional education have rapidly spread in the scientific field, proving that there have been significant improvements in the prosocial behavior and an important decrease of negative and disruptive behaviors (Eisenberg et al., 2004; Pérez-González, 2008). These results are also consistent with previous studies carried out in the neuroeducational field (Davidson, 2012), which show that the benefits obtained by well-designed socioemotional programs go beyond momentary changes and that they bring long-term beneficial effects at a biological, psychological and social levels.

Ultimately, the development of socioemotional skills in the scholar context has proved to be an important enhancer of a healthy development of any human being. The promotion of a stable self-esteem, the fostering of motivation for learning, and the promotion of mental health are just a few examples that can be explained by a solid and efficient set of socioemotional competences (Jiménez, 2009). Additionally, those interventions that enhance the management of negative emotional states have also proved to increase academic achievement in children in the short and also in the long-term (Extremera and Fernández-Berrocal, 2003, 2004; Pérez-Escoda et al., 2012, 2014).

In view of these findings, we can state that there is a need to train and enhance emotion education in school. To achieve this objective, researchers need to seek and implement novel methodologies that ensure the improvement and the engagement from the educative community. In this sense, authors and professionals have started developing and exploring new lines of intervention and programs, such as virtual platforms. Among the virtual mediated experiences, videogames are becoming increasingly popular and they are attracting the interest of researchers about their opportunities for positive individual functioning, increased motivation and learning enhancers in schools (e.g., Gaggioli et al., 2014; Villani et al., 2018). For this reason, in the present work we aim to show the evaluation of an educative gamified program underpinned in the model of emotional competences developed by the Group of Psychopedagogical Orientation (Bisquerra Alzina and Pérez Escoda, 2007) which focuses in five dimensions: emotional awareness, emotional regulation, autonomy, social competences, and life's competences (Bisquerra Alzina and Pérez Escoda, 2007).

Happy software's. Happy 12–16.

Happy 12–16 is a gamified program which is part of the Happy software's. Happy 12–16 is specifically designed to help adolescents aged from 12 to 16 improving the management of their emotions by training their emotional competencies. As mentioned above, evidence has proved that those individuals that display a successful management of emotions can give a better answer to those conflicts that they encounter during their daily life (Webster-Stratton and Reid, 2004).

This program is structured in 25 conflicts, 15 of which take place in the scholar context and the other 10 take place among siblings in the household or family context. Three examples of the conflicts that students can encounter in the software are the following:

In the scholar context: *"You stain with chalk your classmate of sub-Saharan origin while you insult him telling him he looks better like this,"* or *"You observe how your classmates have erased Robert from the Whatsapp group of the class because the group administrator does not like him."*

In the family context: *"Your brother needs to focus in order to study for an exam but you put on very loud music."*

The student will have to choose among different answer possibilities (assertive answer, passive answer, or aggressive answer) for each conflict. However, only the assertive response is considered correct. Every time the student chooses the assertive answer, he will receive bonus points.

It is important to note that the student does not always have the same role when playing the videogame. The participant can be the bully, the victim or the observer or bystander. This helps promoting the number of possibilities and strategies that the students will have to display and learn in order to select a proper answer.

Happy software's stem from the Psychopedagogical Orientation Group (GROP) theory of emotional competences. The GROP takes into account the orientations of the developmental psychology, cognitive and linguistic skills and the development of the six moral stages developed by Piaget-Kohlberg to build the foundation of the gamified programs. Also, the strategies of emotion regulation used in the programs draw from the model of Gross (2007), which points out three strategies of regulation that are applied in the Happy software's: attention deployment, reappraisal and situation selection.

The resolution of the conflict situations follows the scheme described in the following figure:

Taking into account all this information, the main aim of the present work is describing the intervention and the results of the program Happy 12–16 in a group of students in Spain. Specifically, we intend to assess the effects of the Happy 12–16 software on the emotional competencies and other important correlates, such as the levels of anxiety of students, the climate in the classroom and the academic achievement of the students.

MATERIALS AND METHODS

Participants

The sample of the present study was composed of a group of students of secondary education schools in the regions of Lleida

and Huesca (Spain). Among the participant schools, there were those schools which underwent the experimental condition and other schools which constituted the control group.

The final sample consisted of a total number of 903 students. 471 of them were males (52.2%) while 432 (47.8%) were females. All the students of this group were in 1st ($n = 440$; 48.7%) and 2nd ($n = 463$; 51.3%) grades of compulsory secondary education. The average age of the students was 12.63, with a standard deviation of 0.608.

The experimental group included 472 students of 7 different high-schools (52.3% of the total) and the control group was constituted by 431 students of 4 voluntary centers (47.7% of the total). In the analyses, no statistically significant differences among groups were found.

Instruments

The instruments to tackle the variables included in the study were:

Emotional Development Questionnaire for secondary school (QDE SEC; Bisquerra Alzina and Pérez Escoda, 2007). This instrument has two versions, one for elementary school students and another for adolescents. In the version for adolescents, there are 35 items. It is possible to obtain a global score or a score for each one of the subscales described by the Group of Psychopedagogical Orientation (GROP): Emotional Awareness, Emotion Regulation, Emotional Autonomy, Social Competences and Life's Competences (Bisquerra Alzina and Pérez Escoda, 2007). In the present work, we used the global score for being more informative regarding the objectives of the study and showing a higher internal consistency. In fact, when psychometrically analyzed, the instrument showed an adequate internal consistency, with an Alpha coefficient of 0.83 for the total score, and 0.70–0.80 for the different subscales.

Stait-Trait Anxiety Inventory (STAI; Spielberger, 1973; Seisdedos, 1982). This instrument was created by Spielberger (1973). Later, it was adapted to the Spanish population by Seisdedos (1982) and it kept its original two scales with 20 items each that assess Anxiety-State (A-E) and Anxiety-Treat (A-T). In this case, the instrument showed an excellent internal consistency with an Alpha of Cronbach of 0.93. For the purposes of the present work, only the A-E scale (Alpha coefficient of 0.94) was administered, since the main interest regarding anxiety was to explore the anxiety levels of the individuals in the moment of the study.

Happy 12–16 gamified software, described in the previous section, was administered to students of the experimental group during their weekly hours of tutoring (2 h per week), as part as their curricula. Administration of Happy software was always under the supervision of a trained teacher who guided and supervised the sessions.

Finally, *academic performance* was evaluated with the average marks of all the subjects: Biology and Geology, Geography and History, Spanish Literature, English Literature, Physical Education, Ethics, and three different subjects that students could choose during the academic course. The gathering of data regarding academic performance was carried out in December

(first evaluation of the academic year) and in June (third and last evaluation of the academic year).

Procedure

Before the study took place and in order to ensure that the project would be implemented in an optimal way, the research team contacted the Department of Education in Spain. The present research was introduced to all the professionals of the Department in different meetings. Also, the research plan was studied in detail by the Department of Education and the management teams of each scholar center, achieving the consent of the Government's Department of Education.

It is also important to note that this study was exempt of ethics approval beyond the approval of ethics committee of the University of Lleida itself, since it was considered non-invasive and school related. However, given the young age of the students, both parents and students were thoroughly informed about the research. Parents were informed in the first meeting of the academic course with the management team. Those who did not want to participate from the beginning were given the option to leave. Those who showed interest had the opportunity to ask investigators and teachers and only those who were 100% sure of their participation were included in the study. Parents gave oral consent to the schools to enable their children to undergo the study. Once the students filled out the questionnaires, they also gave consent of their participation. This consent procedure was approved by the Committee that approved the study itself.

Thereupon, there was a first contact with those schools that showed their willingness to participate with the objective of explaining them the research project associated with the existent software's (Happy 8–12 and Happy 12–16), and most specifically Happy 12–16. Given the novelty of the software's and the interest in an extensive analysis of its effects, two researchers of the team oriented, guided and trained the teachers

and management teams of each one of the experimental schools participating for the administration of the software's. The training on Happy 12–16 took over 30 h distributed in sessions of 1 h. Only after completing the training, the posttest protocol was administered. Subsequently, those centers of the experimental condition followed the 12–16 Happy training program and, finally, all the remaining data of the students was collected with the posttest protocol. The design of the present research was a quasi-experimental design with pretest and posttest and a control group.

Data Analysis

In order to assess the effect of the Happy 12–16 software in the experimental group a General Linear Model (GLM) for repeated measures was carried out for each subscale and for the total QDE SEC, STAI-E and Academic achievement. Group was the between factor, and phase (Pre vs. Post) the within factor. *P*-values were adjusted according to the stepwise Holm procedure to correct the familywise error rate with correlated scores (Bender and Lange, 2001). Data was processed using the SPSS 20.0 software package.

RESULTS

Descriptive data of the quantitative variables with the analysis of the comparison pretest and posttest of both subsamples of the study can be seen in **Table 1**. Descriptive statistics of the demographic variables were obtained in the very beginning of the study for both groups (control and experimental) in order to analyze and compare the homogeneity of the sample.

At the time of data collection, students completed QDE-SEC for the global scale and for its subscales. As **Table 1** shows, these results show that QDE-SEC scores of those students who underwent the intervention with Happy software

TABLE 1 | Average values of the results of the tests for the control ($n = 432$) and experimental ($n = 472$) groups of secondary school students.

Test	Group	Pre Happy 8–12 score	Post Happy 8–12 score	Average change pre/post	Average change F; <i>p</i> -value*	Effect size (d)
QDE SEC total	Experimental	6.09	6.05	0.04	3.77; 0.52	0.13
	Control	6.26	6.18	0.08		
QDE SEC emotional awareness	Experimental	7.38	7.57	0.19	7.71; .04	0.19
	Control	7.24	7.32	0.07		
QDE SEC emotion regulation	Experimental	5.12	5.06	0.06	0.17; 0.68	0.03
	Control	5.22	5.25	0.03		
QDE SEC autonomy	Experimental	5.82	6.01	0.19	6.02; 0.03	0.16
	Control	5.96	6.02	0.06		
QDE SEC social competence	Experimental	5.96	5.97	0.01	0.20; 0.65	0.03
	Control	6.13	6.03	0.10		
QDE SEC life's competences	Experimental	6.30	6.54	0.24	26.25; 0.005	0.34
	Control	6.50	6.77	0.17		
STAI-E	Experimental	43.71	44.70	0.99	5.02; 0.02	0.15
	Control	42.67	43.22	0.55		
Academic achievement	Experimental	5.89	6.07	0.18	33.08; < 0.001	0.38
	Control	5.87	5.98	0.11		

*Adjusted by Holm procedure.

in the experimental group significantly improved. The students composing the control group did not show that same improvement in their scores. However, it is important to strike the fact that the global score of QDE-SEC, although it showed a great tendency, it did not become statistically significant. Additionally, the effect size was smaller than 0.15 ($d = 0.13$), suggesting that there may not be any effect (Hattie, 2009). For this reason, it was highly important to study in an individual fashion each one of the subscales of the instrument. In this second part of the analysis, as it is shown in **Table 1**, three scales showed a statistically significant difference among the experimental and the control group after the implementation of the program: emotional awareness [$F(7.71)$; $p < 0.01$], emotional autonomy [$F(6.02)$; $p < 0.01$] and life's competences [$F(26.25)$; $p < 0.001$]. However, size effects remained small ranging from 0.17 to 0.34).

Regarding social competences and emotion regulation subscales, no statistically significant changes were observed, although a small effect size was observed (see **Table 1**), which may explain the fact that the global scale did not result statistically significant.

As it was explained above, anxiety was also a relevant variable measured in the study for all students. The outcome obtained shows that there is a statistically significant increase in the levels of anxiety of those students that composed the experimental group [$F(5.02)$; $p = 0.002$; $d = 0.15$], which is an unexpected result which may require an adjustment in the author's approach.

Differently, academic results showed an important and statistically significant increase as well as a medium size effect in the experimental group after the students benefited from the training program with Happy 12–16. This important improvement was not observed in the control group.

DISCUSSION

Contrary to popular belief, evidence shows that those conflict situations that arise in the school context are closely related to the ability of the students to manage and control their emotions (e.g., Webster-Stratton and Reid, 2004). That is, those students who have more difficulties regulating their emotional states and being assertive will also show a greater involvement in conflicts

(Bisquerra, 2014; Filella, 2014). Also, a poor management of emotions and social skills has also been linked to a worsened academic achievement. Additionally, difficulties in regulating emotions can increase the vulnerability of the individual to develop symptoms of pathology or even full-blown anxiety or depression (Extremera and Fernández-Berrocal, 2004; Spinrad et al., 2004; Wolke et al., 2012).

For the last several years, there has been an important rise of programs specifically designed to improve social and emotional skills. This fact has greatly helped the development of new interventions and methods that have proved to be every time more promising for children and adolescents, both at the academic field and at the personal and social scopes (Greenberg et al., 2003).

The goal of this present work was to explore the effects that a gamified program of social-emotional competencies may have among adolescents aged 12–16. The implementation of this method comes after several studies pointing out that the motivation of the students, who are very connected with interactive formats and technological advances, significantly increased when this type of programs are applied (for example, Deterding, 2012). At the same time, higher motivation levels improve the learning processes of the students and help teachers to carry out their professional tasks with greater ease (e.g., McGonigal, 2011; Gaggioli et al., 2014).

The results of the present research show that, as it was expected, those individuals that received training with the gamified program showed a higher and significant tendency to improve their emotional competencies. Differently, the control group did not show important changes in their levels of emotional competencies. However, it is important to note that the effect of the learning process in emotional skills was modest and that effect sizes were small for all the scales except of anxiety. This can be explained by the fact that variables such as the emotional competencies, which involve a certain amount of stability, require a long time to its total change and training.

It is also important to emphasize that there was a more clear and significant effect for emotional awareness than for other competencies. Far from being surprising, this effect is only understandable since it unquestionably constitutes a reflection of the natural acquisition of the emotional competences and its

CONFLICT SITUATION	EMOTIONAL REGULATION PROCESS			
	1 ST STEP	2 ND STEP	3 RD STEP	4 TH STEP
	EMOTIONAL AWARENESS	TRAFFIC LIGHT	REGULATION STRATEGIES	ASSERTIVE RESPONSE
Become aware of what you are feeling		STOP - BREATH - THINK	1. Behavioural and Cognitive Distraction 2. Show the Emotions: Talk to a friend, write to your friends... 3. Ask for help 4. Change your thoughts 5. Find a solution 6. Ask for help to an adult	N (Name) - E (Emotion) - M (Motive) - O (Objective)

FIGURE 1 | Steps followed in the Happy software's following the emotional regulation process (GROP). All participants have to follow this steps when facing a conflict during the game. If the process is successfully completed, the participant will get a high score. Contrary to that, if the participant obtains a low score, the need of training the process will arise.

training, which first requires or becoming aware of one's emotions (see **Figure 1**; Gross and John, 2003).

Regarding the regulating process, our results showed a slower and more difficult pace for the acquisition of this particular skill, which can be explained by the traditional cognitive view that points out the difficulty of transformation in those beliefs or emotional processes that are very substantial in our core of thoughts (Beck et al., 1979). Despite this fact, results showed a high percentage of improvement in the *post hoc* questionnaire of CDE-SEC.

In a complementary manner, life competencies and autonomy also increased in a significant way in the experimental group and showed slightly higher effect sizes. These competencies, related to variables such as self-esteem and the capacity of the individual to independently managing oneself among different facets of life, responded in the expected way to the implemented program. As explained in the case of emotional awareness, these competencies are crucial in the development and improvement of the other skills, which are more complex and have a more stable nature, such as emotion regulation or social competencies (Spear and Kulbok, 2004).

On the other hand, the levels of anxiety-state that the students presented showed a tendency to grow in both groups. This fact, although not expected, is coincident with the previous evidence that indicates that anxiety can be a crucial factor during the development period of adolescence and that it can be attributed to this phase of the vital development (Boyd et al., 2000; Öhman and Mineka, 2001; Neil and Christensen, 2009). Additionally, recent data indicates that anxiety disorders are among the most commonly experienced and diagnosed conditions of childhood and early adolescence (Grills-Taquechel and Ollendick, 2012). Given this circumstance, it is important to take into account that, although there are different ways to appraise emotions among individuals, there is also an undeniable tight connection between emotion regulation and anxiety (e.g., Amstadter, 2008). Thus, there is a critical need to prevent the anxiety that students may

feel since childhood by the development and enhancement of a proper management of emotional competences when possible (Davidson, 2012; Pérez-Escoda et al., 2014).

In a different manner, among the variables of academic achievement, the tendency of improvement was significantly different in the experimental group and effect size was medium. Although previous studies point out the importance of social and emotional levels for the improvement of academic achievement, especially when mediated by variables such as engagement (for example, Dotterer and Lowe, 2011), these results are probably explained by the fact that the marks were gathered right after the training with the software at the end of the academic course. In this sense, a reassessment in the long term could yield more detailed results.

In future studies, the possibility of an assessment or a follow-up in the long term would be highly beneficial, bringing the possibility to study the durability of the effects of the training. Moreover, we believe that effect sizes can improve if intervention continues for a longer period of time. Due to the stable nature of certain variables, such as the competencies of emotion regulation or anxiety trait, which can have an effect in anxiety-state, research that embraces more than one academic course could possibly bring substantial evidence regarding the changes in the long term. In addition, future investigations should consider using other kind of measures that complement the subjective vision of psychometric assessment, such as social measures or even biological markers.

AUTHOR CONTRIBUTIONS

GF designed, created, and participated in the process and creation of the study and the manuscript. AR-M was involved in the writing and creation of the manuscript. XO and JM-L contributed to the revision of the methodological aspects and helped in the creation of the article.

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A Multilevel Model of Teachers' Job Performance: Understanding the Effects of Trait Emotional Intelligence, Job Satisfaction, and Organizational Trust

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Research on the role of trait emotional intelligence (trait EI; Petrides, 2001) relating to teaching performance has emerged as an important topic. The present study proposes a multilevel model of teachers' trait EI in relation to their job performance, which simultaneously addresses the mediating role of job satisfaction and the influences of school-level factors (i.e., organizational trust and principals' trait EI). Results from a sample of 881 teachers and 37 principals in Chinese primary schools showed that job satisfaction partially mediated the positive relationship between teachers' trait EI and their job performance. In addition, the findings demonstrated a cross-level moderated mediating effect, with the indirect effect of teachers' trait EI on job performance (via job satisfaction) becoming stronger for teachers working in schools with lower levels of organizational trust. The hypothesized role of principals' trait EI on teachers' job performance was not supported. The theoretical and practical implications of these findings are discussed.

Keywords: trait EI, job performance, job satisfaction, organizational trust, school, mediation, moderation, TEIQue

INTRODUCTION

Teaching is generally recognized as one of the most important and challenging occupations in contemporary society (Vesely et al., 2013). These professionals are regarded to be responsible for their students' academic achievement as well as social and emotional development (Elias and Arnold, 2006). Given the heavy demands and expectations in terms of students' development, teachers' job performance, which is tied to students' outcomes (Hwang et al., 2017), is of crucial concern for a variety of stakeholders, including principals, parents, policymakers, and society at large (Alrajhi et al., 2017).

In recent years, a growing body of literature has highlighted the importance of emotional intelligence (EI) as a predictor for job performance, generally arguing that employees with higher levels of EI are likely to perform better (O'Boyle et al., 2011). In school settings, teachers are dependent on their interactions with many other school members to achieve their teaching goals (cf. Van Maele and Van Houtte, 2012). Teaching itself is also a form of emotional practice: emotion

is at the heart of the teaching job (Hargreaves, 1998). It is, therefore, insufficient for school teachers to have only academic knowledge and instructional skills (Hosotani and Imai-Matsumura, 2011). There has been an increasing call for a greater focus on teachers' EI to enhance performance (e.g., Collie et al., 2012; Corcoran and Tormey, 2012). However, research directly addressing the EI-job performance relationship among teachers is relatively scarce. Accordingly, the first goal of the present study is to investigate the association between trait EI and job performance in the teaching profession.

The existing literature concerning teachers' trait EI has mainly focused on its effects on attitudinal outcomes, such as job satisfaction, burnout, and organizational commitment, among others (e.g., Chan, 2006; Wong et al., 2010; Anari, 2012). These variables may act as mediators in the relationship between teachers' trait EI and job performance, building on previous claims that attitudes toward the job influence behaviors (Ajzen, 1987; Riketta, 2008). Among these variables, the current study focuses on the role of job satisfaction because the research on the relationship between satisfaction and performance is one of the most prominent in the literature. A number of studies have indicated that the focal attitude about one's job (job satisfaction), is closely associated with job performance (e.g., Judge et al., 2001). Meanwhile, trait EI (Petrides, 2001) has been proposed as an important determinant of job satisfaction: employees with high trait EI are likely to have higher levels of job satisfaction than their low trait EI peers (e.g., Petrides and Furnham, 2006). Thus, it seems that job satisfaction could mediate the effect of teachers' trait EI on their job performance.

In the occupational context, besides individual resources, leader and organizational resources have been shown to have strong associations with employees' attitudinal and behavioral outcomes (Wayne et al., 1997). Thus, in addition to examining the above relationships at the individual level, the current research extends to the investigation of multilevel effects. First, current theories and findings indicate that the trait EI of leaders has a positive effect on followers' job performance (e.g., Wong and Law, 2002; Miao et al., 2018). However, scholars in the educational context have rarely considered the role of principals' trait EI when discussing teachers' job performance. Second, researchers have noted that the effects of employees' EI may depend on organizational contextual factors (e.g., Côté, 2014), which serve as boundary conditions that moderate the extent to which EI promotes work outcomes. Organizational trust is a key characteristic of contextual resources, which has been proved to influence teachers' job outcomes (e.g., Van Maele and Van Houtte, 2012; Liu et al., 2016). However, existing studies on the effects of teachers' EI are confined to the individual level and have resulted in a limited understanding of the complex ways in which it combines with organizational factors to influence job outcomes. We anticipated that principals' trait EI would influence teachers' job performance. Moreover, the relationship between teachers' trait EI and job outcomes may be different in schools with different levels of organizational trust.

Although there has been increased recognition of the importance of trait EI in teachers' work, research is only at the beginning stage. The present study is intended to contribute to

the existing literature in several ways. First, our research focuses on the effect of teachers' trait EI on their job performance. Although the link between teachers' trait EI and some attitudinal outcomes has been studied, the evidence of its impact on behavioral outcomes is quite limited in the teaching profession. Second, the study seeks to examine the mediating role of teachers' job satisfaction on the expected relationship between teachers' trait EI and job performance. This could advance our understanding of the process by which teachers' trait EI affects their job performance. Third, to overcome the limitation of focusing only at the individual level, we develop a multilevel model in which the predictive effect of principals' trait EI and the moderating role of organizational trust are tested at the school level. In this way, the influence of principals' trait EI and the interactive effect between teachers' trait EI and organizational trust at the school level could be revealed in order to enable a clearer illustration of the mechanisms behind these relationships.

LITERATURE REVIEW

Trait EI and Job Performance

Trait EI (or trait emotional self-efficacy) is conceptualized as a constellation of emotional perceptions assessed through questionnaires and rating scales (Petrides et al., 2007b). Although being cognitively intelligent is still considered as an important attribute (Schmidt et al., 2008), EI has been increasingly regarded as a vital predictor of adaptation and success in the workplace (e.g., Wong and Law, 2002; Petrides and Furnham, 2006; Sy et al., 2006).

Job performance, defined as the set of behaviors an individual performs toward achieving the goals of an organization (Motowidlo and Van Scotter, 1994), is the focal outcome in the workplace. Studies utilizing both trait and ability EI measures have reported converging results in terms of their effects on job performance. For example, a large-scale meta-analysis conducted by O'Boyle et al. (2011) showed that employees' EI exhibited substantial relative importance even when the Five Factor Model (FFM) and cognitive intelligence were controlled for. The different measures of EI showed corrected correlations with job performance ranging from 0.24 to 0.30. The ability model of EI using maximum-performance measurements was more closely related to cognitive intelligence, resulting in lower incremental validity compared to the trait model in terms of predicting job performance (O'Boyle et al., 2011). Thus, while both ability EI and trait EI are relevant to job performance, the focus of the current study is on the latter.

In the educational context, schools are recognized as key organizations for developing the academic, social, and emotional competence of students (Roeser et al., 2000). Teachers' job performance can be defined as the actions they perform in schools in order to achieve educational goals (Hwang et al., 2017). The job role of the teacher is highly emotion-driven (Hargreaves, 1998) and largely dependent on interactions with other members of the school community (Van Maele and Van Houtte, 2012), thus highlighting the role of teachers' trait EI in generating good teaching performance (Alrajhi et al., 2017). Teachers'

trait EI could be beneficial to their job performance in two ways. Intrapersonally, better awareness of their own emotions can help teachers to build more confidence and control over their teaching tasks, which, in turn, enables better performance. Interpersonally, by allowing them to understand and manage the emotions of others (e.g., colleagues and students), teachers' trait EI may contribute to positive social interactions and, thus, more effective teaching. Results from a limited number of studies have shown a positive correlation between teachers' trait EI and job performance, indicating that teachers with high trait EI are likely to perform better. For example, by adapting several previous trait EI measurements, Myint and Aung (2016) categorized teachers' trait EI into four factors: utilization of emotion, optimism/mood regulation, expression/appraisal of emotion, and emotional resilience. Based on a sample of 1,006 school teachers, their results revealed that 8.1% of the variance in teachers' job performance was explained by "optimism/mood regulation" and "expression/appraisal of emotion". Similarly, Naqvi et al. (2016) conducted a study among 3,168 teachers using the TEIQue-SF (Petrides, 2009), discovering that teachers' trait EI had a positive relationship with their job performance ($r = 0.11, p < 0.01$).

Hypothesis 1: Teachers' trait EI positively predicts their job performance.

The Mediating Role of Job Satisfaction

The attitudinal approach to defining job satisfaction, which concerns the evaluative judgments people make about their jobs (Weiss, 2002), is prevalent in the literature. Numerous meta-analyses (e.g., Petty et al., 1984; Judge et al., 2001) have established a robust correlation between job satisfaction and job performance. According to the human relations theory, satisfaction causes performance (cf. Petty et al., 1984): employees who are more satisfied with their work tend to perform better than their less satisfied peers in the workplace.

Teachers' job satisfaction can be conceptualized as teachers' affective reactions to their work (Skaalvik and Skaalvik, 2011). Due to its predictive effect on performance-related variables, research in several different cultures indicates that teachers' job satisfaction is of central interest in the educational literature (e.g., Bogler, 2001; Crossman and Harris, 2006). Teachers who are satisfied with their job are more involved in it (Weiqi, 2007), more likely to take on extra-role activities (Somech and Drach-Zahavy, 2000), and less likely to leave the teaching profession (Skaalvik and Skaalvik, 2011). Moreover, teachers' job satisfaction may contribute to students' optimal development and overall school effectiveness, which are indicators of teaching performance (e.g., Ostroff, 1992; Caprara et al., 2006).

In an eye-tracking study, Lea et al. (2018) found that higher trait EI was associated with more attention to positive emotional stimuli, relative to negative and neutral stimuli. Such an attentional preference may be one way that trait EI affords protection from stressors, thus promoting job satisfaction in the workplace (Yin et al., 2013; Lea et al., 2018). Indeed, many studies have reported a positive relationship between employees' trait EI and job satisfaction (e.g., Carmeli, 2003; Petrides and Furnham, 2006). In addition, Miao et al. (2017a,b) confirmed in

two meta-analyses that trait EI predicts job satisfaction directly as well as incrementally beyond cognitive ability and the Big Five personality traits (see also Andrei et al., 2016).

Anari (2012), using an adaptation of Schutte et al.'s (1998) scale, found a positive correlation between trait EI and job satisfaction among high school teachers ($r = 0.23, p < 0.05$). Using the WLEIS (Wong and Law, 2002), Wong et al. (2010) reported a similar correlation between trait EI and job satisfaction among 3,866 teachers in Hong Kong ($r = 0.30, p < 0.01$). Also using the WLEIS, Yin et al. (2013) conducted a survey among 1,281 Chinese school teachers and SEM results indicated that a second-order trait EI factor was a significant positive predictor of teaching satisfaction (estimate = 0.30, $p < 0.01$).

Based on the relationships between teachers' trait EI, job satisfaction, and job performance, we expect that job satisfaction will act as a mediator of the impact of teachers' trait EI on job performance. Indeed, considerable research has shown that personality traits can influence job performance through the mediating effects of attitudinal processes (e.g., Barrick et al., 2002; Mount et al., 2006). Moreover, there is also evidence supporting the specific mediating role of job satisfaction in the relationship between employees' trait EI and performance-related variables. For example, using the WLEIS (Wong and Law, 2002; Brunetto et al., 2012) found that employees' trait EI positively predicted job satisfaction, which, in turn, promoted employee engagement. Based on this literature, we propose in the current study that job satisfaction acts as a mediator of the relationship between teachers' trait EI and job performance.

Hypothesis 2: Job satisfaction mediates the relationship between teachers' trait EI and job performance.

The Moderating Role of Organizational Trust

Research has demonstrated that employees' trait EI is related to job attitudes and behaviors, however, its impact may vary across different organizations. According to the principles of trait activation theory (Tett and Burnett, 2003), personality traits require trait-relevant situations for expression. Specifically, a trait is more likely to be activated in amenable situations signaling to individuals that expressing it is both important and appropriate (Tett and Burnett, 2003). Accordingly, the relationship between employees' trait EI and job outcomes may differ depending on contextual factors. Indeed, emerging literature relating employees' EI to job outcomes demonstrates the importance of contextual factors, which should be considered as important moderators (e.g., Cherniss, 2010; Côté, 2014).

One key contextual factor within all organizations is trust (Dirks and Ferrin, 2001). Organizational trust is defined as "the willingness of a party to be vulnerable to the actions of another party" (Mayer et al., 1995, p. 712). In the educational literature, Hoy and Tschannen-Moran (1999) defined trust as "a teacher's willingness to be vulnerable to another party based on the confidence that the latter is benevolent, reliable, competent, honest, and open" (p. 189). In the current study, we operationalized trust at the organizational level, rather than the individual level. This focus on school-level trust is consistent with

previous research showing that individual teachers' perceptions of trust can merge to form a collective state at the school level (e.g., Forsyth et al., 2011; Van Maele and Van Houtte, 2012). Teachers in the same school are supervised by the same leader(s) and work with the same group of colleagues, thus involved in similar social interactions. Based on the experience of these shared social interactions, teachers within the same school are likely to share similar perceptions of organizational trust (Salancik and Pfeffer, 1978). In the current study, organizational trust was conceptualized as teachers' perceptions of other school members' trustworthiness (Van Maele and Van Houtte, 2012).

Across organizational settings, employees feel safer, more positive, and less insecure when they believe that their leaders and peers are trustworthy (Dirks and Ferrin, 2002). In contrast, low levels of trust lead to self-estrangement, powerlessness, and conflict (Hoy and Tschannen-Moran, 1999). Studies have indicated that trust promotes employee satisfaction in organization settings (e.g., Shockley-Zalabak et al., 2000; Dirks and Ferrin, 2001). However, in the educational literature, research on the relationship between teachers' trust relationships and their job satisfaction is limited. One important study was conducted by Van Maele and Van Houtte (2012). Using multilevel analyses, they related trust, at the level of both the individual teacher and the collective faculty, to teachers' job satisfaction. The results confirmed a positive effect of individual perceptions of trust on teachers' job satisfaction and found that only 2.72% of the variance in teachers' job satisfaction was situated at the school level. Despite the small number of studies focusing directly on the role of trust in generating job satisfaction, its importance can be interpreted from other perspectives. In particular, the social capital approach has been frequently used in the educational literature to investigate trust relationships in school settings (cf. Van Maele and Van Houtte, 2012). Trust among teachers is a component of the relational dimension of social capital in schools (Nahapiet and Ghoshal, 2000), which indicates the quality of social relationships. According to Dinham and Scott (1998), school-based positive relationships are regarded as an important source of teachers' job satisfaction. For example, by using SEM analyses, Skaalvik and Skaalvik (2011) found that teachers' positive relationships with principals and colleagues were predictive of job satisfaction through the feeling of belonging. In light of the foregoing, it is reasonable to expect that teachers in schools with higher levels of organizational trust will experience higher levels of job satisfaction.

Organizational trust at the school level could influence the relationship between teachers' trait EI and job satisfaction differently across different schools. A multilevel model was, therefore, developed to investigate possible cross-level moderation effects. Specifically, in line with the trait activation theory (Tett and Burnett, 2003), we propose that a low level of organizational trust increases the salience of trait-relevant cues and representative situations pertinent to trait EI. In such schools, teachers are required to skillfully interpret and regulate emotions internally and externally, as this helps them to overcome a climate of low trust and maintain job satisfaction. It follows that the positive relationship between teachers' trait EI and job satisfaction may be strengthened in schools with low

levels of organizational trust. Conversely, teachers in schools with high levels of organizational trust may be more easily satisfied, reducing the necessity of emotionally intelligent behaviors. Thus, a high level of organizational trust is likely to weaken the positive relationship between teachers' trait EI and job satisfaction. Although we are not aware of any prior empirical research addressing the moderating effect of organizational trust in this relationship, the theoretical rationale above leads us to our third hypothesis:

Hypothesis 3: Organizational trust moderates the relationship between teachers' trait EI and job satisfaction.

The arguments above form an integrated framework in which job satisfaction mediates the relationship between teachers' trait EI and job performance, while organizational trust moderates the relationship between teachers' trait EI and job satisfaction. Taken together, these hypotheses give rise to a multilevel moderated mediation model (Edwards and Lambert, 2007), in which the indirect effect of teachers' trait EI on job performance through job satisfaction varies as a function of the cross-level moderator, viz, organizational trust. Hence, organizational trust, due to its moderating power on the relationship between teachers' trait EI and job satisfaction, has the potential to moderate the indirect (i.e., mediated) effect of teachers' trait EI on job performance via job satisfaction.

Hypothesis 4: Organizational trust moderates the mediating effect of job satisfaction in the relationship between teachers' trait EI and job performance.

The Role of Principals' Trait EI

Although the impact of leaders' EI on the work outcomes of their employees has been extensively studied (Prati et al., 2003; Kerr et al., 2006; Miao et al., 2016), the specific role of principals' trait EI in the educational field is sparsely documented.

Leadership theories suggest that EI is crucial for leaders because of their interactions with employees. EI is typically linked to effective leadership styles (Palmer et al., 2001), which are positive predictors of followers' work outcomes (Dvir et al., 2002). For example, Barling et al. (2000) found that managers' trait EI significantly predicted three aspects of transformational leadership (i.e., idealized influence, inspirational motivation, and individualized consideration) based on multivariate analyses of covariance. Similarly, Schlechter and Strauss (2008) tested a SEM model in a manufacturing company finding that team-leaders' EI was positively correlated with transformational leadership behaviors. Sieglings et al. (2014), studied the trait EI of 128 managers using the TEIQue-SF (Petrides, 2009), and found that it was significantly higher than normative data would predict, suggesting that high trait EI is a common characteristic among leaders. In addition, Mikolajczak et al. (2012) discovered that managers with low trait EI had difficulties putting their emotions aside compared to their average and high trait EI peers based on a sample of over 200 managers.

The literature also supports the direct relationship between leaders' EI and subordinates' attitudinal and behavioral work outcomes. For example, Wong and Law (2002) conducted a

survey among 146 middle-level administrators in the Hong Kong government and found that the EI of leaders was positively related to the job satisfaction and extra-role behaviors of their followers. Using the WLEIS (Wong and Law, 2002; Sy et al., 2006) collected data from 187 food service workers and their 62 managers and similarly found that managers' EI was positively related to employees' job satisfaction and job performance. Clarke and Mahadi (2017), using the EIS (Schutte et al., 1998), found that the trait EI of both managers and subordinates were positively associated with mutual recognition respect, which, in turn, predicted subordinates' job satisfaction and affective commitment. Last, Miao et al. (2018) showed in a meta-analysis that leaders' trait EI significantly predicted subordinates' job performance (operationalized as task performance and organizational citizenship behavior).

The importance of EI for educational leadership in the school context has also been highlighted in the literature (Brinia et al., 2014). Existing studies have related leaders' trait EI to teachers' attitudinal outcomes. For example, Wong et al. (2010) studied the role of trait EI, using the WLEIS (Wong and Law, 2002), in a large sample of teachers and middle-level leaders in Hong Kong. They discovered that the trait EI of middle-level leaders had a significant impact on the job satisfaction of ordinary frontline teachers, even after controlling for the job satisfaction of leaders and the base trait EI of frontline teachers. However, empirical evidence concerning the relationship between principals' trait EI and the focal behavioral outcome of teachers remains scarce.

Hypothesis 5: Principals' trait EI positively predicts teachers' job performance.

To summarize, we have proposed that (a) teachers' trait EI is positively associated with job performance via job satisfaction (Hypotheses 1 and 2); (b) teachers' trait EI is more strongly related to job satisfaction and, in turn, to job performance when the level of organizational trust is low (Hypotheses 3 and 4); and (c) principals' trait EI positively predicts teachers' job performance (Hypothesis 5). The integrated model is outlined in **Figure 1**.

MATERIALS AND METHODS

Participants

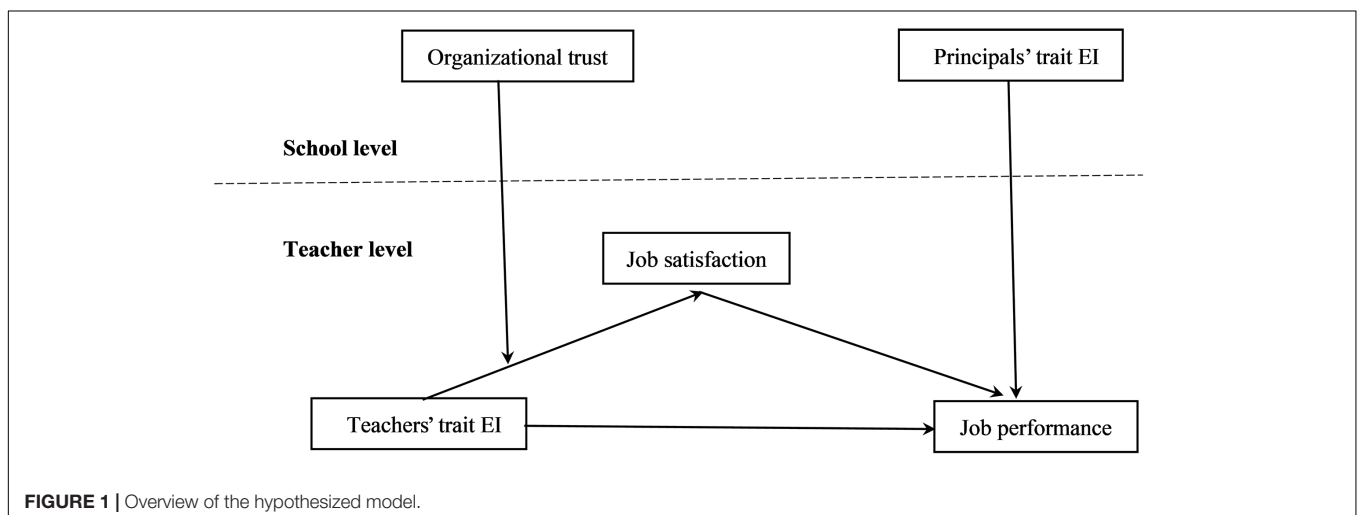
Thirty-seven principals (94.6% male) and 881 primary school teachers (73.3% female) were drawn from 37 public primary schools in the Hubei Province in mainland China. Eight schools were located in cities and the remainder in rural areas. A minimum of 40% of the teachers in each school participated in the study.

Teachers' Demographics

Most teachers were in their early-to-middle adulthood ($M_{age} = 37.57$ years, $SD_{age} = 10.15$, $Minimum = 18$, $Maximum = 63$). Teaching experience was substantial at $M = 16.93$ years and $SD = 11.80$. Teaching experience at the current school was also considerable ($M = 9.77$, $SD = 9.53$). Most teachers worked directly in the classroom ($fo = 684$, 78%), while a smaller percentage assumed leading positions, where mid-level leaders represented 17% of the sample ($fo = 154$), and school-level leaders 4% ($fo = 34$). Finally, 1% performed other functions in the schools. Regarding educational background, 58% ($fo = 507$) held a bachelor-degree, 36% ($fo = 313$) a college-degree and 7% ($fo = 59$) a high-school degree or below. Finally, the percentage of teachers with a Master degree or above was below 1%.

Principals' Demographics

Most principals were in their mid-adulthood ($M = 46.16$ years, $SD = 4.79$). They had been leading their current schools for a minimum of 1 and a maximum of 14 years ($M = 4.20$ years, $SD = 3.25$, $Q1 = 2$, $Q2 = 3$, $Q3 = 6.5$). On average, for the 37 schools that took part in the study, each principal accounted for 43 teachers ($SD = 40.85$). The large dispersion can be explained by the size of the schools, such that some had only a handful of teachers, while others had well over 200. Regarding educational background, 97% of the principals held either a college or a bachelor-degree. Noteworthy, none held postgraduate degrees, which reflects the fact that experience is more highly regarded than postgraduate qualifications in the Chinese system.



Measures

Trait Emotional Intelligence

The Chinese adaptation of the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF; Petrides, 2009) was employed to assess teachers' and principals' trait EI. The 30-item short form was specifically designed as an efficient measure of global trait EI. A sample item is "I'm usually able to find ways to control my emotions when I want to." For teachers, the level of analysis was the individual. For principals, trait EI was modeled as a top-down factor in our model and was analyzed at the school level. The internal consistency reliability of the scale was 0.86 and 0.87 for teachers and principals, respectively. The instrument has been extensively validated in Europe (Petrides et al., 2007a) and in China (Shao et al., 2013; Gökçen et al., 2014).

Job Performance

The Chinese version of job performance scale (Xingchun and Dajun, 2011) was adopted from the scale originally developed by Motowidlo and Van Scotter (1994). The 14-item instrument measures self-rated job performance. A sample item is "I work overtime to complete a task." Teachers responded to the items on a 6-point Likert scale. Item responses were summed up and averaged to derive a total scale score, whose internal consistency reliability was 0.95. The scale has been widely used in previous studies with high reliability and validity (e.g., Kiker and Motowidlo, 1999; Hou et al., 2014).

Job Satisfaction

We measured job satisfaction using Zhi-yong and Zhi-hong's (2012) 10-item scale. Items were responded to on a 5-point Likert scale. A sample item is "I am pleased with the welfare benefits provided by the school." Item responses were summed up and averaged to derive a total scale score. Higher scores indicate higher levels of teacher job satisfaction. In our study, the internal consistency reliability was 0.93.

Organizational Trust

The Chinese adaptation (Jia et al., 2006) of the organizational trust scale (Robinson, 1996; Romano, 2003, Unpublished) was used. The 6-item instrument measures the extent to which teachers trust other members in their school. Items were responded to on a 5-point Likert scale. A sample item is "I believe my school will protect my interest." Scale scores were derived by summing up and averaging the responses to the items. Higher scores indicate higher levels of organizational trust. In this study, the internal consistency reliability was 0.96. The instrument's validity has been supported by previous research (Ying and Xi, 2014).

Control Variables

We also included several individual demographic characteristics in the analyses because these variables may potentially impact the relationships of interest (e.g., Chan, 2004; Petrides and Furnham, 2006; Ju et al., 2015). Specifically, gender, age, teaching tenure and educational background were added as control variables. However, gender, age, and educational background were not

significantly related to the dependent variable in the current study and were, accordingly, removed.

Procedure

Before conducting the survey, the researchers were granted permission from the Department of Education of the Hubei Province in China. Subsequently, invitation letters were sent to the principals and teachers of the sampled 37 schools. In the invitation letters, the nature, purpose, and method of the survey were clearly stated. Principals and teachers were asked to complete the questionnaires either in their offices or in conference rooms in their own schools. Both principals and teachers completed the TEIQue-SF, while teachers also completed the job performance, job satisfaction, and organizational trust questionnaires.

All participants were informed that their participation in the research was on a voluntary basis and their responses would be kept anonymous and confidential. Written informed consent was obtained from all participants in the study. The study protocol was approved by the Ethics Committee of Beijing Normal University, China.

Aggregation of Organizational Trust

In our study, organizational trust was operationalized as an aggregate of individual responses at the school level. It has been proposed by researchers (e.g., Bliese, 2000) that there are three steps to determine the viability of aggregation: "sufficient within-group homogeneity, sufficient between-group heterogeneity, and that the group is naturally occurring" (cf. Wallace et al., 2016). In the current study, the grouping variable (i.e., schools) does occur naturally, thus, establishing sufficient within-group homogeneity and between-group heterogeneity were required to justify aggregation. The $r_{wg(j)}$ statistic (James et al., 1993) was calculated as an indicator of agreement within schools. The median $r_{wg(j)}$ across the schools was 0.90, ranging from 0.70 to 0.98, suggesting that in all schools, teachers shared common perceptions regarding organizational trust. Additional support for aggregating organizational trust at the school level was provided by interrater reliability indexes (intraclass correlation $ICC [1] = 0.10$ and reliability of team means $ICC [2] = 0.63$). Moreover, the between-groups variance was tested to indicate whether perceptions of organizational trust varied across different schools. The result was $F(36,844) = 3.14, p < 0.001$, which justified the use of the aggregate organizational trust score for the purposes of the school-level analyses.

Strategy of Analysis

In the current study, teachers were nested within their schools, which forms a hierarchical structure. Furthermore, certain hypotheses (i.e., Hypotheses 3, 4, and 5) involved multilevel relationships between school-level variables and individual-level variables. Therefore, multilevel modeling was used to simultaneously estimate the hypothesized relationships using Mplus 7 (Muthén and Muthén, 2012). Before analysing cross-level effects, the variables were centered, according to the recommendations in Enders and Tofighi (2007). Specifically, Level 1 variables were group-centered to ensure that there was no

conflation of the individual and school-level effects, in order to obtain an unbiased estimate. In addition, Level 2 variables were grand-centered to help with interpretations of the interaction effects.

RESULTS

Preliminary Analyses

The distribution was analyzed taking the variable job performance as criterion with the original 890 collected observations. For accuracy, eight cases were removed from the analysis, as they were considered outliers according to normality analyses and Quantile-Quantile and Steam-Leaf plots. After removing these outliers, the following descriptive statistics were obtained: $M_{jp} = 5.15$, $SD = 0.59$, $C.I.$ lower bound = 5.11, $C.I.$ upper bound = 5.19, Skewness = -0.314 with $SE = 0.082$ and Kurtosis = -0.704 with $SE = 0.165$.

Table 1 shows the descriptive statistics and correlation matrix for the key variables in the study. Teachers' trait EI was positively correlated with teachers' job performance ($r = 0.45$, $p < 0.01$), job satisfaction ($r = 0.30$, $p < 0.01$) and teachers' organizational trust ($r = 0.26$, $p < 0.01$). In addition, teachers' job satisfaction was positively correlated with job performance ($r = 0.44$, $p < 0.01$) and organizational trust ($r = 0.69$, $p < 0.01$). Last, teachers' organizational trust was positively correlated with teachers' job performance ($r = 0.34$, $p < 0.01$).

Main Analyses

Before testing the multilevel model, we examined relationships at the individual level. We followed Preacher et al.'s (2010) guidelines and tested a path model, in which the indirect effect of teachers' trait EI on job performance through job satisfaction was assessed, while the direct effect and the nesting of teachers within schools (i.e., the inclusion of random intercepts and slopes) were simultaneously specified. In addition, teaching tenure was included as a control variable with a fixed effect on job performance. This analysis allows incorporating Preacher and Hayes's (2004) simultaneous estimation method of testing mediation effects, rather than relying on stepwise procedures as previously recommended by Baron and Kenny (1986). Moreover, it allows an estimation of the variability in the effects over Level 2 units (i.e., schools) in order to justify the need for investigating cross-level moderation effects (Bauer et al., 2006).

Results showed that teachers' trait EI was positively related to job performance ($\gamma = 0.33$, $p < 0.001$), thus supporting Hypothesis 1. In addition, job satisfaction was positively related to job performance ($\gamma = 0.24$, $p < 0.001$), and teachers' trait EI was positively related to job satisfaction ($\gamma = 0.36$, $p < 0.001$). To provide a test of the indirect effect (Hypothesis 2), we used a parametric bootstrap procedure to estimate a confidence interval (CI) around the indirect effect (Preacher et al., 2010). With 20,000 Monte Carlo replications, results showed that there was a positive indirect relationship between teachers' trait EI and job performance via job satisfaction (indirect effect = 0.06, 95% bias-corrected bootstrap CI [0.018–0.105]). These results provided support for Hypothesis 2. Meanwhile, for the individual-level analysis, we also found significant random effects for teachers' trait EI ($p < 0.05$), indicating that there could be school-level moderators which can explain this variability (Kenny et al., 2003). The goodness of fit statistics for this model with 23 degrees of freedom and $N = 881$ were: $-2LL = 3060.74$, $Akaike (AIC) = 3106.74$, $BIC = 3216.63$ and $saBIC = 3143.58$.

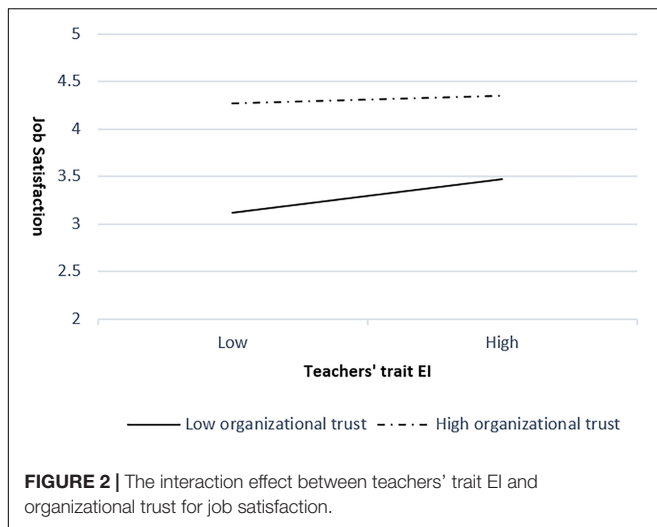
At the school level, organizational trust was hypothesized to moderate the relationship between teachers' trait EI and job satisfaction. To estimate the cross-level effect, we tested a model with teachers' trait EI on job satisfaction, including a random slope from organizational trust as moderator. The multilevel modeling results indicated a negative effect of organizational trust on the random slope linking teachers' trait EI and job satisfaction ($\gamma = -0.64$, $p < 0.001$), which represents a cross-level interaction. Therefore, Hypothesis 3 was borne out by the data, providing necessary initial support for the first stage of testing the moderated mediation model (Edwards and Lambert, 2007), proposed in Hypothesis 4. Following Aiken and West's (1991) procedures, we plotted the interaction at higher (1 SD above the mean) and lower (1 SD below the mean) levels of organizational trust. As shown in **Figure 2**, the positive relationship between teachers' trait EI and job satisfaction is stronger when organizational trust is low (solid line) than when it is high (dashed line). The goodness of fit statistics for this model with eight degrees of freedom and $N = 881$ were: $-2LL = 1865.26$, $Akaike (AIC) = 1881.26$, $BIC = 1919.48$ and $saBIC = 1894.07$.

To overcome limitations associated with a stepwise approach to testing a conceptual model in which there is both mediation and moderation, we independently examined our results utilizing an integrative approach. We followed the method outlined by Bauer et al. (2006) for determining the significance of conditional indirect effects in the context of multilevel regression

TABLE 1 | Descriptive statistics and correlations between variables.

Variables	<i>M</i>	<i>Maximum</i>	<i>Minimum</i>	<i>SD</i>	1	2	3	4
1. Teachers' trait EI	4.86	6.80	3.10	0.65				
2. Teachers' job performance	5.15	6.00	3.64	0.58	0.45**			
3. Teachers' job satisfaction	3.78	5.00	1.10	0.78	0.30**	0.44**		
4. Teachers' organizational trust	4.09	5.00	1.00	0.83	0.26**	0.34**	0.69**	—
5. Teaching tenure	—	—	—	—	0.04	0.12***	0.005	−0.08*
6. Principals' trait EI	4.80	5.67	4.03	0.44				

$N = 881$ for teachers. $N = 37$ for principals. Organizational trust values are for individual perceptions before aggregation at the school level. ** $p < 0.01$, *** $p < 0.001$.



by estimating the indirect effect of teachers' trait EI on job performance via job satisfaction at higher (1 SD above the mean) and lower (1 SD below the mean) levels of organizational trust. The results revealed that the indirect effect of teachers' trait EI on job performance via job satisfaction differed as a function of organizational trust. Specifically, the indirect effect of teachers' trait EI was stronger when organizational trust was lower (estimate = 0.13, $SE = 0.03$, $p < 0.001$) and weaker when organizational trust was higher (estimate = 0.04, $SE = 0.02$, $p < 0.05$) in the schools, which was in line with Hypothesis 4. The goodness of fit statistics for this model with 33 degrees of freedom and $N = 881$ were: $-2LL = 6392.90$, $Akaike (AIC) = 6458.91$, $BIC = 6616.57$ and $saBIC = 6511.77$.

Next, the predictive role of principals' trait EI on teachers' job performance was included in the model. As shown in **Figure 3**, all relationships in the proposed model were significant ($p < 0.01$) except the direct effect from principals' trait EI ($\gamma = -0.08$, $p > 0.05$) on job performance. Thus, Hypothesis 5 was not borne out by the data. The goodness of fit statistics for the full model with 32 degrees of freedom and $N = 881$ were: $-2LL = 6347.95$, $Akaike (AIC) = 6411.95$, $BIC = 6564.84$ and $saBIC = 6463.21$. This last multilevel model was significantly better than the previous one, with a -2 Log-Likelihood change of 44.95 ($\Delta df = 1$, $p < 0.001$).

Finally, we calculated Snijders and Bosker's (1999) overall pseudo R^2 ($\sim R^2$) for the model, which is based on the proportional reduction of Level 1 and Level 2 errors due to the predictors in the model. The predictors accounted for 15% of the total variance in job performance, suggesting that teachers' trait EI, job satisfaction and organizational trust in their schools were indeed important in predicting job performance.

DISCUSSION

Theoretical Implications

Our results have several theoretical implications. First, they supported the positive relationship between teachers' trait EI

and job performance. The finding is consistent with prior research indicating the positive effect of employees' trait EI on job performance within and beyond the teaching profession (e.g., Petrides and Furnham, 2006; Myint and Aung, 2016). According to O'Boyle et al.'s (2011) meta-analysis in the industrial psychology literature, there is a positive link between employees' EI and job performance, ranging from 0.24 to 0.30. In our study, the correlation coefficient between teachers' trait EI and job performance was quite higher at $r = 0.45$. As has been noted in previous research, EI is likely to be more important for jobs involving frequent social interactions or significant levels of stress (Cherniss, 2010). This high correlation coefficient might thus be a natural result of the intrinsic nature of the teaching job, which involves high levels of social interaction (e.g., with students and colleagues; Van Maele and Van Houtte, 2012) and serious stress-related challenges (Chan, 2006). "Understanding, negotiating and monitoring the intense emotionality" (Intrator, 2006) in themselves and others is a primary dimension of their work, which renders teachers' trait EI central to their job performance.

Additionally, the current study found that job satisfaction partially mediated the relationship between teachers' trait EI and job performance (indirect effect = 0.06). This effect helps us understand the process through which teachers' trait EI improves job performance. Previous theories and studies have considered the direct relationships between trait EI, job satisfaction, and job performance among teachers (e.g., Skaalvik and Skaalvik, 2011; Yin et al., 2013). It has also been argued that personality traits can influence behaviors through the mediating effects of attitudinal processes (e.g., Barrick et al., 2002; Mount et al., 2006). However, few studies have examined job satisfaction as the mediator of the relationship between teachers' trait EI and job performance. Our results suggest that teachers with higher trait EI perform better than those with lower trait EI, partially because they are more satisfied with their jobs, which, in turn, leads to better performance.

The current study is one of the first empirical investigations of the role of contextual factors in models of EI relating to job outcomes (Cherniss, 2010; Côté, 2014). By developing and testing a multilevel moderated mediation model, our study indicated that organizational trust at the school level serves as an important boundary condition for the effects of teachers' trait EI ($\gamma = -0.64$). Specifically, in line with trait activation theory (Tett and Burnett, 2003), the findings supported our hypothesis that higher levels of organizational trust in schools render the trait EI of teachers less important in terms of predicting job outcomes. In contrast, when a lower level of organizational trust is present in a school, the importance of teachers' trait EI is highlighted. This result is consistent with the reasoning of Dirks and Ferrin (2001), which established organizational trust as a prominent framing condition for understanding work outcomes, and also with previous research demonstrating the moderating role of trust climate in team settings (e.g., Brahm and Kunze, 2012).

In our study, teachers in schools with high levels of organizational trust experienced higher job satisfaction than those in schools with low levels of organizational trust (see **Figure 2**). This result is also in agreement with studies

demonstrating the role of trust in school settings, especially in relation to job satisfaction (e.g., Van Maele and Van Houtte, 2012). Given that teachers in schools with higher levels of organizational trust already have higher job satisfaction than their peers in schools with lower levels, the difference in teachers' trait EI becomes less important. Therefore, the positive relationship between teachers' trait EI and job satisfaction is weaker in schools with higher levels of organizational trust than in those with lower levels. This echoes findings that trait EI is an asset as regards academic performance for vulnerable adolescents, but not so much for those who have strong cognitive skills (Petrides et al., 2004).

Last, the hypothesized relationship between principals' trait EI and the job performance of teachers was not supported in this study. This stands in contrast with previous work that reported leaders' trait EI positively influencing subordinates' job performance (e.g., Wong and Law, 2002; Miao et al., 2018). Possibly, this deviation from earlier results may be due to the structure, size, and culture of Chinese primary schools; here, principals do not hold direct administrative roles in relation to every frontline teacher. Thus, the direct effects of leaders' trait EI on subordinates' job performance found in many business organizations may be much less discernible. Another plausible explanation for the difference in our results regarding the hypothesized relationship may be the small number of principals included in the study.

Practical Implications

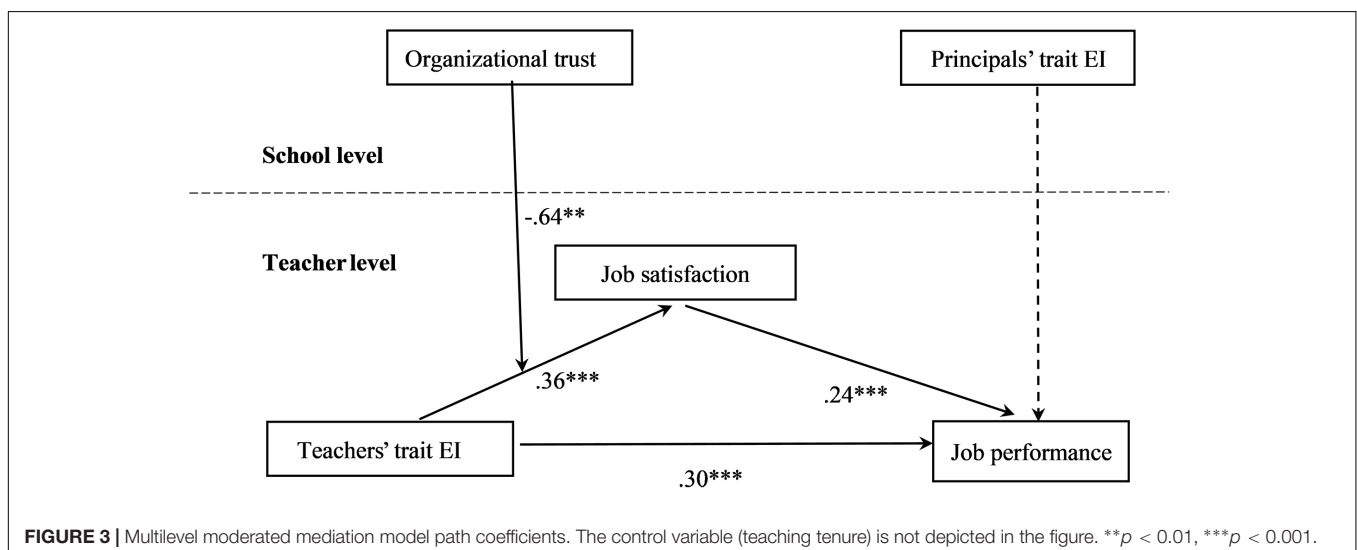
Our study has several practical implications regarding teachers' job performance. First, it revealed that teachers' trait EI can play an important role in promoting job performance in the workplace. Previous research has provided preliminary evidence that trait EI can be optimized through targeted training (e.g., Nelis et al., 2009, 2011). Thus, it is suggested that educational administrators and policymakers value its importance and incorporate it into training programs for primary school teachers. Although Chinese educators have increasingly recognized the

value of trait EI and its suitability for improving educational practices (Chan, 2004), most efforts have been placed on the development of students' trait EI, while training for school teachers remains insufficient (Yin et al., 2013). The need for EI training to achieve positive outcomes is especially important in mainland China, where teachers are faced with extensive educational reforms that put them under great performance pressure (Yin et al., 2014).

Since our findings suggest that higher levels of organizational trust in schools weaken the influence of teachers' trait EI on job satisfaction and, in turn, on job performance, building organizational trust in schools may act as a protective factor for low trait EI teachers. School leaders and teachers should be encouraged to pay attention to the quality of trust relationships within their schools in order to strengthen job satisfaction and performance. School leaders could play a central role in promoting a climate of trust within schools (Liu et al., 2016). This is especially true in mainland China, as it is highly influenced by the dominant Confucian value of collectivism and the extended practice of vertical leadership (Tsui and Farh, 1997; Hawkins, 2000). Hence, a deliberate expression of care and support from principals becomes particularly important for shaping positive social relationships in Chinese school settings (Liu et al., 2016). As regards teachers, it seems advisable to embrace the idea that a trusting environment is a pathway to optimal teaching in their schools (Van Maele and Van Houtte, 2012). Thus, they should seek to engage in positive interactions with their colleagues that can foster a shared perception of trustworthy relationships.

Limitations and Future Research

When interpreting our findings, several limitations should be borne in mind, which, at the same time, offer new avenues for research. First, the cross-sectional design of the study makes it difficult to determine the direction of causality between variables, which precludes the identification of any cause-effect relationships. As such, even though previous research supports



the hypothesized directions of relationships, we encourage researchers to test our model in a longitudinal way to establish the underlying causal inferences with greater certainty.

Second, the sample was sourced from a limited number of schools of uneven size. This could result in an unfavorable influence on the studied cross-level effects. For example, the cross-level relationship between principals' trait EI and teachers' job performance could have turned out to have a larger effect if an even size of schools had been addressed or more schools had been approached. Moreover, all of the 37 sampled schools were located in the Hubei Province, China, restraining the generalizability of the findings. In summary, expanding the school samples in terms of numbers as well as areas would be a worthwhile approach for future studies.

A third limitation concerns the measurement methodology for several focal variables. Job performance was operationalized only through teachers' self-reports, which may lead to social desirability bias. Although this method is consistent with prior research on the relationship between EI and job performance (Carmeli, 2003; Wu, 2011), we acknowledge that it may produce different results from other sources. Furthermore, several focal variables were measured from the same source at the same time, which could induce common method bias. However, it should be noted that the moderated mediation model is actually less likely to be detected when relationships are artificially inflated (Edwards and Lambert, 2007).

A fourth limitation is that our model was largely restricted to the positive influence of teachers' trait EI on job performance, mediated by job satisfaction and moderated by organizational trust at the school level. There are likely to be other constructs that influence these relationships. For example, the results indicated that job satisfaction only partially mediated the relationship between teachers' trait EI and job performance. In line with previous research, other attitudinal variables, such as organizational commitment (Anari, 2012), may also partly capture the complex processes underlying the link between teachers' trait EI and job performance. Moreover, additional powerful contextual influences may well reside at various levels of analysis, such as workplace social support (Ju et al., 2015) or power distance (Miao et al., 2016). In line with our multilevel model, it would be important to identify other contextual variables that could enhance or diminish the effect of teachers' trait EI on their job outcomes. In addition, leadership styles, which could account for the mechanisms by which principals' trait EI affects teachers' job performance, were not included in the current research design. Future studies could expand our findings by incorporating leadership styles into the proposed model.

CONCLUSION

Our study contributes significantly to the literature in that it relates teachers' trait EI to job performance and tests a multilevel model involving a moderated mediation relationship to reveal the underlying mechanisms. First, our findings confirmed that teachers' trait EI positively influences their job performance directly and indirectly via job satisfaction at the individual level, thus supporting Hypotheses 1 and 2. Second, we demonstrated that school-level organizational trust could moderate the indirect effect from teachers' trait EI to their job performance via job satisfaction, thus supporting Hypotheses 3 and 4. The multilevel model showed that the effect of teachers' trait EI on job performance through job satisfaction was stronger in schools with lower levels of organizational trust. Third, no significant relationship between principals' trait EI and teachers' job performance was detected. Thus, Hypothesis 5 was not supported in the current study. Collectively, the various predictors were found to account for 15% of the variance in job performance. Consistent with our findings as well as previous work, it appears that teachers' trait EI is indeed centrally important to the teaching performance, although its effects may vary across different settings. We look forward to future research that further examines the mechanisms underlying this important phenomenon.

AUTHOR CONTRIBUTIONS

ML and YM were involved in collecting the data. ML and PP-D developed the theoretical model, performed the data analyses, and drafted the manuscript with input from all authors. KP contributed in clarifying the theoretical model, revised the manuscript and provided feedback. KP and YM supervised the design and implementation of the project. All authors contributed to manuscript revision, read and approved the submitted version.

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Trait Emotional Intelligence as a Predictor of Adaptive Responses to Positive and Negative Affect During Adolescence

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Introduction and aim : The examination of trait emotional intelligence as an important component of adolescent psychological adjustment and coping has received a great deal of attention. Trait emotional intelligence is expected to reduce the vulnerability to emotional problems by reducing mood deterioration in adverse situations. Most research to date has addressed the regulation of negative affective states, with less attention paid to the responses to positive affect. Thus, the aim of this research was to examine the cross-sectional and prospective associations between trait emotional intelligence dimensions (i.e., trait emotional attention, trait emotional clarity, and trait emotional repair), response styles to negative affect (i.e., depressive rumination and distraction) and response to positive affect (i.e., emotion-focused and self-focused positive rumination and dampening) in adolescence.

Methods: A 1-year follow-up study was conducted with a sample of 880 adolescents (52.4% girls) aged 14–17 years old ($M = 14.74$, $SD = 0.68$) who were enrolled in 18 high schools in Andalusia (Spain). Participants completed self-report measures of trait emotional intelligence, response to negative affect and response styles to positive affect. To analyse the data, hierarchical regression analyses and path analysis were performed.

Results: Our results showed that high trait emotional attention was cross-sectionally and longitudinally associated with more dampening of positive affect and more depressive rumination. Furthermore, high trait emotional repair was cross-sectionally and longitudinally related to more distraction to negative affect and more self-focused positive rumination. Some gender differences were also found; girls reported higher trait emotional attention, higher dampening, and higher depressive rumination. Furthermore, boys reported higher trait emotional repair, higher self-focused positive rumination and higher distraction to negative affect.

Conclusions and discussion: Our findings provide longitudinal evidence of the relationships between trait emotional intelligence and responses to both positive and negative affect during adolescence. Consequently, interventions designed to promote resilience during adolescence could target the development of more adaptive responses to both negative and positive affect within the framework of school-based emotional education programmes.

Keywords: trait emotional intelligence, response styles, positive affect, adolescence, longitudinal

INTRODUCTION

Over time, adolescents become more realistic in their appraisals of their own strengths and weaknesses and present a greater self-consciousness regarding peer comparison (Harter, 2015). After pubertal growth, a heightened emotional sensitivity can reduce confidence in the ability to understand and manage affects and emotions (Steinberg, 2005). In turn, adolescents have to face new and complex experiences from a position of relative inexperience and fragile emotional stability. Consequently, adolescents deal with important life dilemmas before being fully prepared, since the development of self-regulation abilities is a lengthy process. Therefore, studying the factors that favor or hinder the development of emotional self-regulation in adolescence is important to effectively promote emotional well-being during the transition to adulthood.

The literature to date has concluded that emotional intelligence (EI) is an important component of adolescent psychological adjustment, and coping has recently drawn great interest. Within EI, two constructs have been separated: trait EI and ability EI (Petrides and Furnham, 2000a). Trait EI is a cluster of emotion-related self-perceptions and dispositions located at the lower levels of personality hierarchies and is assessed using self-report measures (Pérez-González and Sanchez-Ruiz, 2014; Petrides et al., 2016). Ability EI refers to actual emotion-related abilities and is measured by maximum-performance tests (Petrides and Furnham, 2003). Thus, the instruments used for evaluating EI, self-reports or maximum-performance measures, affect the operationalization of this variable (Petrides et al., 2007b). In Belgium, Mikolajczak et al. (2009b) showed that trait EI prevents vulnerability to emotional problems by reducing mood deterioration following stressful situations. Regarding the relationship between trait and ability EI in adolescent psychological adjustment, in the UK, Davis and Humphrey (2012a) indicated that ability EI allowed a more flexible selection of coping strategies whereas trait EI increased the effectiveness of coping by strengthening the beneficial effects of active coping and reducing the detrimental consequences of avoidance. In a later work, Davis and Humphrey (2014) concluded that the effect of ability EI on adolescent adaptive coping depended on perceived competency, or trait EI. They argued that despite high scores in ability EI, low self-confidence activates avoidant coping, which does not attenuate the impact of stress. Also in the UK, Mikolajczak et al. (2009a) concluded that trait EI was associated with more adaptive coping styles, which in turn were related to fewer self-harm behaviors in adolescence. In a sample of Italian adolescents, low trait EI was determined to mediate between high-perceived parental psychological control and more frequent internalizing and externalizing problems (Gugliandolo et al., 2015). Also in Italy, Mancini et al. (2017) concluded that high trait EI is also related to improved scholastic achievement. Thus, trait EI is expected to play a key role in adolescents' psychological adjustment (Davis and Humphrey, 2012b).

To assess trait EI, research to date has provided some instruments although only a few have robust empirical validation and a theoretical framework (Pérez-González et al., 2005). One of the scales with greater empirical support is the Trait

Meta-Mood Scale (TMMS; Salovey et al., 1995), which has been widely used for assessing individual differences in one's own perceptions of three emotional skills: trait emotional attention, trait emotional clarity, and trait emotional repair. Trait emotional attention refers to the attention level paid to one's own emotions, trait emotional clarity is defined as the degree of understanding of one's own emotional states, and trait emotional repair is the perceived skill to regulate one's own emotions and deal with negative emotional states. In this theoretical framework, developed by Salovey et al. (1995), a high trait EI would be composed of higher scores in trait emotional clarity and emotional repair as well as moderate punctuations in trait emotional attention. Some gender differences in trait EI have been observed in adolescence. Although boys present lower ability EI (Salguero et al., 2012), the boys believed that they had greater EI than girls (Petrides and Furnham, 2000b). Using the TMMS, Extremera et al. (2007) concluded that girls paid closer attention to their emotions whereas boys showed higher emotional clarity and emotional repair. Szymanowicz and Furnham (2013) concluded that women seem to underestimate their emotional abilities, whereas men tend to overstate them. A recent longitudinal study by Gómez-Baya et al. (2017a) concluded that lower trait emotional clarity and lower trait emotional repair in adolescent girls were associated with increased depressive symptoms.

There is some empirical evidence of the cross-sectional associations between moderate trait emotional attention and higher trait emotional clarity and repair with better psychological adjustment in adolescence (Salovey et al., 2002; Fernández-Berrocal et al., 2006). However, more longitudinal research on the mechanisms implicated in these associations is needed. The primary goal of this study was to examine the longitudinal associations between trait EI dimensions and response to both negative and positive affect in adolescents' transition to adulthood. Trait emotional attention, clarity, and repair have shown incremental predictive validity over personality traits and general intelligence to explain psychological adjustment (Fernández-Berrocal and Extremera, 2008). Thus, more research is needed to demonstrate the discriminant and predictive validity of a measure of EI in the context of other relevant variables (Izard, 2001; Bastian et al., 2005; Saklofske et al., 2007), such as coping responses. In the UK, Petrides et al. (2007a) showed that trait EI was related to measures of rumination, dysfunctional attitudes, coping, and psychological adjustment, even when personality traits were controlled. In a sample of Australian adolescents, Downey et al. (2010) determined that emotional recognition, understanding and expression were associated with engagement in problem-focused coping strategies to explain problem behaviors. In the USA, Stange et al. (2013) concluded that the interaction among low trait emotional clarity, a negative attributional style and experiencing a negative life event predicted the emergence of depressive symptoms in a 9-month longitudinal study in adolescence. In a study performed in Italy, trait EI was shown to predict emotional maladjustment in adolescence after controlling for personality traits, non-verbal cognitive ability, and gender (Andrei et al., 2014). In Spain, Fernández-Berrocal et al. (2006) observed that in adolescents, higher scores in

trait emotional clarity and repair were associated with fewer depressive and anxiety symptoms after controlling for self-esteem and thought suppression. In a similar vein, Ramos et al. (2007) pointed out that those undergraduates with high trait emotional clarity and repair experienced fewer intrusive thoughts and fewer negative emotional responses after a stressful event. Also in Spain, Salguero et al. (2013) showed that high trait emotional attention and low trait emotional repair were associated with more depressive rumination, which in turn was related to more depressive symptoms. In Belgium, Mikolajczak and Luminet (2008) concluded that undergraduates with high trait EI presented greater self-efficacy to cope with and appraise a situation as challenging. Furthermore, in another study of Belgian undergraduates, Mikolajczak et al. (2008) showed that trait EI fosters the selection of adaptive responses not only in the case of stress but also in situations of fear, shame, anger, sadness, and jealousy. Moreover, they observed that trait EI also promoted the selection of adaptive responses to maintain joy. Consequently, these few studies provided some evidence that better trait EI dimensions allow the use of adaptive response to repair negative emotions and to maintain positive ones. Thus, these emotion-related dispositions regarding perception, processing, regulation, and utilization of emotional information were determined to explain an increased propensity to experience positive emotions as well as a decreased propensity to experience negative ones.

Regarding coping responses, most research to date has been focused on responses to stress and negative affect and how stress and negative affect can create a vulnerability leading to the development of emotional disorders. In this area, Response Styles Theory states that the manner in which people respond to depressive symptoms influences the severity and duration of such symptoms (Nolen-Hoeksema et al., 2008). Following this theory, two types of responses to negative affect have been proposed: depressive rumination and distraction (Treyner et al., 2003). Depressive rumination is repetitive thinking about negative affect and its causes and consequences. This response style is expected to exacerbate negative emotions by developing pessimistic thoughts, which hinder adaptive coping (Nolen-Hoeksema, 1991). Instead, distraction is presented as a more adaptive response, which entails the shift of attention away from the negative affect toward neutral or pleasant thoughts and performing some actions to relieve the current affective state. Rood et al. (2009) argued in a meta-analysis of studies with samples of children and adolescents that girls begin to ruminate more frequently than boys during adolescence, increasing the risk for future and concurrent depression. A recent longitudinal study indicated that the increase in depressive symptoms in girls was related to an increase in rumination and a decrease in distraction after a 2-year follow-up during mid-adolescence (Gómez-Baya et al., 2017c).

However, studies have focused less attention on the regulation of positive emotional states (Carl et al., 2013; Gilbert et al., 2013; Davis and Suveg, 2014; Nelis et al., 2016). Diamond and Aspinwall (2003) argued that more integration is needed regarding the analysis of emotion regulation across the life span by examining the interplay between positive and negative

emotional states. According to Watson et al. (1995), affectivity presents an orthogonal structure, with negative and positive affect acting as two separate components. Thus, it is also necessary to examine the strategies that adolescents utilize in response to positive affect to better understand their psychological adjustment (Fredrickson, 2001; Bryant et al., 2011). Feldman et al. (2008) examined different responses to positive affect, i.e., dampening and two forms of positive rumination (self-focused and emotion-focused). Dampening is a response to positive affect that reduces the presence and intensity of positive affect by considering such positive emotions to be transient, by thinking about the appearance of future negative emotions or by considering that they did not deserve such positive feelings. Instead, positive rumination is expected to maintain and amplify the positive affect. Within positive rumination, emotion-focused positive rumination refers to savoring the positive emotions and their somatic sensations; self-focused positive rumination involves a self-attribution of positive affect to own positive qualities or the accomplishment of self-relevant aims. Feldman et al. (2008) showed that both higher and lower dampening and self-focused and emotion-focused positive rumination were associated with poorer adolescent adjustment, i.e., lower self-esteem and more depressive symptomatology. A recent study indicated that girls presented higher dampening and lower self-focused positive rumination than boys and that these gender differences longitudinally explained the increase in depressive symptoms in girls during middle adolescence (Gómez-Baya et al., 2017b). Other recent longitudinal work concluded that the use of adaptive responses to positive affect, specifically more self-focused positive rumination and less dampening, was interrelated with more self-esteem and life satisfaction after a one-year tracking in adolescence (Gómez-Baya et al., 2018).

Study Justification, Aim, and Hypotheses

Most research to date has presented cross-sectional results regarding the associations between trait EI and psychological adjustment, but more analysis is required regarding explanatory coping mechanisms implications and some possible gender differences. Thus, research should further examine the relationships between trait EI dimensions (i.e., emotional attention, emotional clarity, and emotional repair) and responses to different affective experiences, especially in adolescence, as a transition period of remarkable importance for social and emotional development. There is a gap in the literature regarding the longitudinal associations between trait EI and responses to affective experiences in adolescence. Furthermore, few studies to date, as far as we know, have addressed the relationships between trait EI dimensions and responses to negative affect and stress and have paid scant attention to responses to positive affect. Consequently, further longitudinal examination is recommended to examine the relationships between trait emotional attention, trait emotional clarity and trait emotional repair and responses to positive affect. Importantly, research is needed to integrate the validity of trait EI dimensions to predict responses to both negative and positive affect during adolescence.

Thus, the aims of the present work were (a) to examine trait EI dimensions (i.e., emotional attention, emotional clarity,

and emotional repair) and responses to positive and negative affect in adolescence by gender; (b) to study the cross-sectional associations between trait EI dimensions and responses to positive and negative affect in adolescence; and (c) to analyse the predictive validity of trait EI dimensions for responses to both types of affect in adolescence. Several hypotheses were developed with these goals in mind. First, girls were expected to present low trait EI (i.e., greater emotional attention and lower scores in emotional clarity and repair), consistent with Extremera et al. (2007), and fewer adaptive responses to negative affect, i.e., more depressive rumination. Girls were also expected to present less distraction and positive affect, i.e., more dampening and less positive rumination compared with boys, as reported by Rood et al. (2009) and Gomez-Baya et al. (2017b). Second, positive cross-sectional associations are expected of trait EI with distraction and positive rumination, consistent with Petrides et al. (2007a). Specifically, moderate attention and higher clarity and repair were hypothesized to be associated with more distraction and positive rumination. Negative associations were hypothesized regarding trait EI with depressive rumination and dampening, consistent with Mikolajczak et al. (2008) and Salguero et al. (2013), so that greater emotional attention and lower emotional clarity and repair would be related to more depressive rumination and dampening. Third, trait EI dimensions were expected to show predictive validity regarding responses to negative and positive affect in adolescence so that better trait EI (i.e., moderate emotional attention and higher emotional clarity and repair) would be prospectively related to more adaptive responses to both types of affects, as noted by Mikolajczak et al. (2008).

METHODS

Participants

A sample of 880 adolescents (52.4% girls), aged between 14 and 17 years old (38.2% of the sample was 14 years old, 51.4% was 15, 8.9% was 16, and 1.6%, 17 years old) participated in this study ($M = 14.74$, $SD = 0.68$). At the beginning of the study, they were enrolled in the academic years 8 (46%) and 9 (54%) in 18 secondary schools in Andalusia, an autonomous community in southern Spain. Students who had not repeated a year were 14 and 15 years old in grades 8 and 9, respectively. Given the compulsory nature of secondary education, secondary schools constitute an excellent environment for performing a follow-up study during adolescence. The schools were sampled using convenience sampling and included secondary schools with different types of ownership (4 schools were public and 14 were private), various neighborhoods with different levels of socio-economic status (33.3% low, 33.3% medium, and 33.3% medium-high social classes) and various habitats (55.6% urban, 22.2% semi-urban, and 22.2% rural). The participating classes were randomly selected within each secondary school.

Instrument and Variables

The self-report instrument was composed of three scales to measure trait emotional intelligence, responses to positive affect and responses to negative affect, as well as five demographic

questions to assess age ("In what year were you born?," "In what month were you born?," "On what day were you born?"), academic year ("What grade are you in?") and gender ("What is your gender?").

Trait Emotional Intelligence

The short and adolescent version by Gómez-Baya et al. (2017a) of the Spanish adaptation of the Trait Meta-Mood Scale (TMMS; Salovey et al., 1995; Fernandez-Berrocal et al., 2004) was administered. It consists of 12 items, which are presented by the following introduction: "Read each sentence carefully and answer how often you do or think each of the things indicated." Five Likert-type response options are presented, ranging from "never"(1) to "very often"(5). The 12 items are separated into three 4-item subscales concerning the three dimensions of trait EI: trait emotional attention or how often adolescents paid close attention to their emotional states (e.g., "I usually worry about what I feel" and "I normally spend time thinking about my emotions"); trait emotional clarity or how often adolescents perceived own emotions with clarity (e.g., "I usually know how I feel" and "I understand my feelings"); and trait emotional repair or how often adolescents succeed in repairing their negative emotional states (e.g., "Although sometimes I feel sad, I usually have an optimistic view" and "I try to have positive thoughts when I feel upset"). An overall score is calculated after adding the responses to the four items for each subscale. The scores ranged from 4 to 20 in each dimension of trait emotional intelligence; a higher score means higher trait emotional intelligence. In the validation study by Fernandez-Berrocal et al. (2004), the Spanish measure showed good reliability in each dimension (emotional attention, $\alpha = 0.90$; emotional clarity, $\alpha = 0.90$, and emotional repair, $\alpha = 0.86$). In the two assessments of the present study, each dimension presented notable internal consistency reliability, as calculated by Cronbach's α . Specifically, trait emotional attention presented an $\alpha = 0.91$ in Time 1 and $\alpha = 0.92$ in Time 2. Trait emotional clarity reached an $\alpha = 0.84$ in Time 1 and $\alpha = 0.87$ in Time 2. With regard to trait emotional repair, notable reliability ($\alpha = 0.89$ in Time 1 and $\alpha = 0.90$ in Time 2) was also observed. Concerning test-retest reliability in this work, high associations were observed in emotional attention between Time 1 and Time 2, $r_{(798)} = 0.46$, $p < 0.001$, between emotional clarity in Times 1 and 2, $r_{(798)} = 0.40$, $p < 0.001$, and between the two assessments of emotional repair, $r_{(798)} = 0.46$, $p < 0.001$.

Responses to Positive Affect

The reduced adaptation for Spanish adolescents by Gomez-Baya et al. (2017b) of the Responses to Positive Affect Questionnaire (Feldman et al., 2008) was administered. The scale presents 12 sentences about what "someone might do when he or she feels cheerful, happy or content." Like the original version for adult population, this adolescent adaptation is composed of three subscales: emotion-focused positive rumination (e.g., "I think about how happy I feel" and "I notice how I feel full of energy"), self-focused positive rumination (e.g., "I think, 'I am achieving everything'" and "I think, 'I am living up to my potential'" and dampening (e.g., "I think, 'My streak of luck is going to end soon'" and "I think about things that could go

wrong”). Four Likert-type responses were offered to assess how often the participants engaged in the actions described, ranging from “almost never” (1) to “almost always” (4). The scores were added for each dimension, and they ranged from 4 to 16; a higher score means higher frequency of the use of that response to positive affect. In the original version by Feldman et al. (2008), the dimension of emotion-focused positive rumination ($\alpha = 0.76$), self-focused positive rumination ($\alpha = 0.73$) and dampening ($\alpha = 0.72$) presented good internal consistency. In the present research, the internal consistency was notable for all subscales: for emotion-focused positive rumination, $\alpha = 0.87$ in both assessments; for self-focused positive rumination, $\alpha = 0.89$ in Time 1 and $\alpha = 0.88$ in Time 2; and for dampening, the internal consistency was $\alpha = 0.87$ in both times. With regard to test-retest reliability in this work, emotion-focused positive rumination assessments in Times 1 and 2 were positively related, $r_{(798)} = 0.44$, $p < 0.001$, as were both measures of self-focused positive rumination, $r_{(798)} = 0.46$, $p < 0.001$. In addition, dampening in Time 1 and dampening in Time 2 were significantly correlated, $r_{(798)} = 0.47$, $p < 0.001$.

Responses to Negative Affect

A reduced version of the Spanish adaptation of the Children's Response Styles Scale (CRSS; Ziegert and Kistner, 2002) was used. The CRSS was adapted to Spanish adolescents by Extremera and Fernández-Berrocal (2006), and the shortened version was validated by Gómez-Baya et al. (2017c), reporting good psychometric properties. This scale was composed of 12 sentences introduced by the following explanation: “Indicate how often you do each of the following things when you feel sad or depressed.” This questionnaire is composed of two subscales with six items each. The first subscale examined depressive rumination, e.g., “I go away by myself and think about why I feel this way” and “I think, ‘Why can't I stop feeling this way?’” The other subscale evaluates distraction responses, e.g., “I do something I really like to do” and “I think, ‘I'm going to do something to make myself feel better.’” A four-point Likert-response scale was presented for each statement, ranging from “almost never”(1) to “almost always”(4). Overall scores were calculated for both subscales by adding the responses to their respective items. The scores ranged from 6 to 24; a higher total punctuation means a more frequent use of this kind of response to negative affect. In the validation study by Extremera and Fernández-Berrocal (2006), rumination ($\alpha = 0.89$) and distraction ($\alpha = 0.80$) presented notable reliability. Moreover, in the present study, both the rumination scale and the distraction scale showed notable internal consistency reliability (Rumination: Time 1, $\alpha = 0.82$ and Time 2 $\alpha = 0.81$; Distraction: Times 1 and 2, $\alpha = 0.86$). Regarding test-retest reliability in this study, rumination measures in Times 1 and 2 were associated, $r_{(798)} = 0.44$, $p < 0.001$, as were the distraction assessments, $r_{(798)} = 0.42$, $p < 0.001$.

Overall Study Design and Data Collection

A prospective study was performed with two evaluations separated by 1 year to allow the establishment of relationships between antecedents and consequents. The first assessment was

performed in the months of April and May of 2012, and the second was conducted 1 year later. Regarding data collection in each wave, a paper-and-pencil questionnaire was anonymously and individually administered to the sample of students in each classroom of the respective high school. Further information is described elsewhere (Gómez-Baya, 2014). To allow tracking and to maintain anonymity, a code was created with the number of educational centers (1–18), birth date (day, month, and year), and gender (1-boy, 2-girl). No student refused to participate in the study. Neither the students nor the schools received any type of compensation. All principles in the Helsinki Declaration were respected, and written informed consent was signed by all adolescents and their parents. This research obtained formal approval from the University of [Anonymised]'s ethics committee.

Data Analysis Design

To examine the normality of the variables, the Kolmogorov-Smirnov test was conducted. Although this test showed that all variables were non-normally distributed ($p < 0.001$), a large sample size is robust to normality violations, according to Altman and Bland (1995). Consequently, parametric statistical tests were performed, using an α level of 0.05. Furthermore, missing values were below 5% in each separate question in the overall study. Little's test indicated that missing values were distributed completely randomly, $\chi^2_{(782, N = 880)} = 837.39$, $p = 0.083$. Then, an expectation-maximization imputation procedure was conducted following the indications by Gold and Bentler (2000).

First, descriptive statistics were examined, i.e., mean and standard deviation, and differences by gender and age in all variables were examined by conducting a multivariate variance analysis. Second, Pearson zero-order bivariate correlations were calculated among study variables in Times 1 and 2. Third, five stepwise regression analyses were conducted to examine the predictive validity of trait emotional intelligence dimensions in Time 1 for each response to positive (i.e., emotion-focused positive rumination, self-focused positive rumination, and dampening) and negative affect (i.e., depressive rumination and distraction) in Time 2. In the first step of these analyses, gender and age were introduced; in the second, each response to positive and negative affect in Time 1 was added. Thus, after controlling for demographics and initial values in each response, in the third step, the three dimensions of trait emotional intelligence in Time 1 were introduced (i.e., trait emotional attention, trait emotional clarity, and trait emotional repair) to explain scores for each response after a 1-year follow-up. These analyses were carried out with the statistical package SPSS 21.0 (IBM Corp, 2012).

Fourth, a path analysis model was performed to integrate the results from previous regression analysis within a confirmatory model. This model tested (a) the bidirectional relationships between dimensions of trait emotional intelligence and responses to positive and negative affect in Time 1 and (b) the relationships between trait emotional intelligence's dimensions and responses in Time 1 (as antecedents) and responses in Time 2 (as consequents). Thus, this model tested the incremental predictive validity of trait emotional intelligence for responses to positive and negative affect after controlling for the initial values in

these responses. This structural equation model was tested with program EQS 6.1 (Byrne, 2013). The effects described in this model only represent causal assumptions because there is no variable manipulation (Bollen and Pearl, 2013). Measurement equations were examined by analyzing standardized coefficients to estimate the effect of variables. To examine the overall model fit, the χ^2 test, the Bentler comparative fit index (CFI), the root mean square error of approximation (RMSEA), and a 90% confidence interval of RMSEA were calculated, following the instructions of Hu and Bentler (1999) and Jöreskog (1993). In addition, standardized residuals were analyzed.

RESULTS

Descriptive Statistics and Bivariate Correlations

Table 1 presents the mean and standard deviation of study variables in Times 1 and 2 as well as Pearson bivariate correlations. Moderate mean scores were observed in the dimensions of trait emotional intelligence in Times 1 and 2, with the lower punctuations in trait emotional attention. Regarding responses to positive affect, emotion-focused positive rumination presented the highest mean scores while dampening was lowest in Times 1 and 2. Concerning responses to negative affect, distraction responses were more frequently used on average than depressive rumination.

Furthermore, correlations analysis indicated significant associations among study variables. First, trait emotional attention presented small positive relationships with responses to positive affect while moderate positive relationships were observed with depressive rumination. Second, trait emotional clarity and trait emotional repair presented small to moderate positive associations with self-focused and emotion-focused positive rumination and distraction and small negative correlations with dampening. Third, scores on the variables in Time 1 showed moderate to high positive correlations in the scores 1 year later. Fourth, moderate positive associations were observed between trait emotional clarity and trait emotional repair whereas trait emotional attention showed small positive associations with those dimensions at each assessment time. Fifth, some associations may be consistently described between the responses in both waves: moderate positive associations were observed between emotion-focused and self-focused positive rumination dimensions; depressive rumination presented small positive associations with emotion-focused positive rumination and dampening; and distraction showed small positive associations with both types of positive rumination.

Table 1 also presents the descriptive statistics by gender of study variables in Times 1 and 2. Multivariate variance analysis showed some gender differences. Girls reported higher trait emotional attention in Time 1, $F_{(1, 878)} = 37.34$, $p < 0.001$, and Time 2, $F_{(1, 878)} = 23.35$, $p < 0.001$. Boys showed more trait emotional repair in Time 1, $F_{(1, 878)} = 6.09$, $p = 0.014$, and Time 2, $F_{(1, 878)} = 14.36$, $p < 0.001$, and more trait emotional clarity in Time 2, $F_{(1, 878)} = 11.30$, $p = 0.001$. Concerning responses to positive and negative affect, boys reported more self-focused

TABLE 1 | Descriptive statistics and Pearson zero-order bivariate correlations of study variables in Times 1 and 2.

	M	M _{boys} (SD)	M _{girls} (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.AT1	13.24(4.07)	12.37(4.21)	14.04(3.78)	1															
2.AT2	13.19(4.01)	12.50(4.08)	13.81(3.85)	0.46**	1														
3.CL1	13.79(3.54)	13.87(3.72)	13.71(3.36)	0.23**	0.14***	1													
4.CL2	13.70(3.52)	14.11(3.64)	13.33(3.36)	0.06	0.18**	0.40**	1												
5.RE1	13.59(4.22)	13.96(4.18)	13.24(4.22)	0.12*	0.03	0.45**	0.21**	1											
6.RE2	13.46(4.12)	14.00(4.09)	12.97(4.09)	0.05	0.08*	0.21**	0.35**	0.46**	1										
7.EF1	12.46(3.11)	12.59(2.95)	12.35(3.25)	0.26**	0.15**	0.35**	0.19**	0.40**	0.23**	1									
8.EF2	12.28(3.10)	12.26(3.05)	12.29(3.14)	0.19**	0.26**	0.19**	0.28**	0.19**	0.32**	0.44**	1								
9.SF1	10.55(3.48)	10.91(3.33)	10.22(3.57)	0.16**	0.06	0.36**	0.20**	0.37**	0.30**	0.55**	0.30**	1							
10.SF2	10.26(3.41)	10.58(3.21)	9.97(3.56)	0.12*	0.17**	0.20**	0.31**	0.24**	0.39**	0.37**	0.53**	0.46**	1						
11.DA1	7.85(3.44)	7.78(3.50)	7.91(3.39)	0.20**	0.09*	-0.11**	-0.07*	-0.17**	-0.16**	-0.01	-0.01	-0.10**	0.01	1					
12.DA2	7.68(3.30)	7.32(3.19)	8.00(3.36)	0.22**	0.22**	-0.04	-0.11**	-0.04	-0.19**	-0.03	-0.06	-0.12**	-0.06	0.47**	1				
13.RU1	15.76(4.47)	14.90(4.57)	16.55(4.24)	0.55**	0.32**	0.10*	0.03	-0.02	-0.07*	0.17**	0.12**	0.01	0.02	0.25**	0.19**	1			
14.RU2	15.96(4.35)	15.13(4.38)	16.71(4.18)	0.31**	0.51**	0.05	0.04	-0.01	-0.07*	0.12**	0.21**	-0.01	0.09**	0.15**	0.25**	0.44**	1		
15.DI1	16.19(4.76)	16.86(4.40)	15.58(4.98)	0.05	-0.04	0.31**	0.21**	0.59**	0.33**	0.30**	0.16**	0.31**	0.20**	-0.03	0.02	-0.03	-0.07*	1	
16.DI2	16.04(4.66)	16.66(4.43)	15.48(4.80)	0.01	-0.01	0.22**	0.23**	0.36**	0.51**	0.18**	0.27**	0.21**	0.33**	0.01	-0.02	-0.09*	-0.05	0.42**	1

AT, trait emotional attention; CL, trait emotional clarity; RE, trait emotional repair; EF, emotion-focused positive rumination; SF, self-focused positive rumination; DA, dampening; RU, depressive rumination; DI, distraction; 1, time 1; 2, time 2; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

positive rumination in Time 1, $F_{(1,878)} = 4.19$, $p = 0.006$, and Time 2, $F_{(1,878)} = 2.96$, $p = 0.032$, as well as more distraction in Time 1, $F_{(1,878)} = 7.15$, $p < 0.001$, and Time 2, $F_{(1,878)} = 5.02$, $p = 0.002$. Girls showed more depressive rumination in Time 1, $F_{(1,878)} = 10.72$, $p < 0.001$, and Time 2, $F_{(1,878)} = 11.56$, $p = 0.002$, and more dampening in Time 2, $F_{(1,878)} = 4.05$, $p = 0.007$. Furthermore, no substantial differences were observed by age. Only significant differences were presented in dampening in Time 1, $F_{(3,876)} = 3.69$, $p = 0.012$, and trait emotional attention in Time 2, $F_{(3,876)} = 4.17$, $p = 0.006$, with higher scores in older adolescents.

Stepwise Regression Analyses

Table 2 describes the results from stepwise regression analyses for responses to positive affect as criteria variables in Time 2. These analyses showed that the best predictors of each response to positive affect in Time 2 were the initial level of the same response 1 year before. After controlling for the initial levels of each response and demographics (i.e., gender and age), the results indicated that trait emotional repair in Time 1 was positively related to self-focused positive rumination in Time 2 while trait emotional attention in Time 1 showed a positive relationship with dampening after the follow-up. No relationship was observed between trait emotional intelligence in Time 1 and emotion-focused positive rumination in Time 2. Explained variance was above 20% for self-focused positive rumination and dampening. Although the majority of the explained variance accounted for the initial values in these responses, the increases in R^2 after adding trait emotional intelligence dimensions were significant in both self-focused positive rumination, $\Delta R^2 = 0.01$, $\Delta F_{(3,873)} = 3.29$, $p = 0.020$, and dampening, $\Delta R^2 = 0.01$, $\Delta F_{(3,873)} = 5.05$, $p = 0.002$.

Table 3 shows the results of stepwise regression analyses for responses to negative affect in Time 2 as criteria variables. The best predictors of depressive rumination and distraction in Time 2 were, respectively, depressive rumination and distraction in Time 1. After controlling for these initial values and demographics (i.e., gender and age), the results showed that trait emotional attention in Time 1 had a positive relationship with depressive rumination in Time 2. Moreover, trait emotional repair was positively related to distraction 1 year later. To explain depressive rumination and distraction in these analyses, explained variance was 21%. However, the majority of the explained variance accounted for initial values in those responses to negative affect. Concerning distraction, the increase in explained variance after including trait emotional intelligence dimensions in the equation was significant, $\Delta R^2 = 0.03$, $\Delta F_{(3,873)} = 7.56$, $p < 0.001$. No significant increase was observed for rumination's explained variance, $\Delta R^2 = 0.01$, $\Delta F_{(3,873)} = 1.84$, $p = 0.139$, despite the significant effect by emotional attention in Time 1.

Path Analysis

Based on previous results from correlations and stepwise regression analyses, a structural equation model was tested. Because stepwise regression analysis did not show a significant longitudinal relationship between trait emotional intelligence

and emotion-focused positive rumination, this response to positive affect was not included in this model. Moreover, since trait emotional clarity was not determined to be longitudinally related to responses to positive affect or to responses to negative affect, this dimension was not included in the model. Thus, the model proposed (a) the relationships between initial scores in responses to positive affect (i.e., dampening and self-focused positive rumination) and in responses to negative affect (i.e., depressive rumination and distraction) and the scores for these respective responses after the follow-up; (b) a bidirectional association between trait emotional attention and trait emotional repair in Time 1; (c) the relationships between trait emotional attention in Time 1 and dampening and depressive rumination in Time 2 and the relationships between trait emotional repair in Time 1 and self-focused positive rumination and distraction in Time 2; (d) the bidirectional associations between dampening and depressive rumination and between self-focused positive rumination and distraction in each assessment time; and (e) some bidirectional associations in Time 1 between trait emotional intelligence and responses, i.e., the association between trait emotional attention and dampening, self-focused positive rumination and depressive rumination, and between trait emotional repair and dampening, self-focused positive rumination and distraction. **Figure 1** presents the path analysis indicating standardized solutions. This model reached a good overall data fit, $\chi^2_{(26,N=880)} = 65.88$, $p < 0.001$, $\chi^2 / df = 2.53$, CFI = 0.971, RMSEA = 0.045, 90% CI RMSEA = 0.032–0.059.

All measurement equations were significant, and standardized residuals were quite low (between -0.1 and 0.1). The best predictors of responses in Time 2 were the same responses in Time 1, with all standardized solutions positive and above 0.30. The strongest relationship was observed for dampening ($\beta = 0.45$) while the lowest was observed for distraction ($\beta = 0.30$). Furthermore, the examined effects of trait emotional intelligence on responses after the follow-up were also positive and significant. Specifically, trait emotional attention in Time 1 presented similar positive effects on dampening ($\beta = 0.11$) and depressive rumination ($\beta = 0.10$). More differences were observed in the effects found between trait emotional repair in Time 1 and responses in Time 2. Thus, a greater positive effect was observed for distraction ($\beta = 0.18$) than for self-focused-positive rumination ($\beta = 0.08$). Finally, the associations in Time 1 between trait emotional attention and repair with responses also presented some interesting findings. Trait emotional attention was positively interrelated with dampening, self-focused positive rumination and depressive rumination. The strongest association was observed with regard to depressive rumination ($\beta = 0.53$) while the lowest was for self-focused positive rumination ($\beta = 0.14$). Moreover, trait emotional repair showed positive interrelations with self-focused positive rumination and distraction and a negative interrelation with dampening. The strongest association was presented for distraction ($\beta = 0.57$) and the lowest for dampening ($\beta = -0.15$). Finally, a small positive association was observed between trait emotional intelligence dimensions, and moderate positive associations at

TABLE 2 | Stepwise regression analyses for responses to positive affect as criteria variables.

Criteria 2	Emotion-focused positive rumination				Self-focused positive rumination				Dampening			
	R^2	F	t	β	R^2	F	t	β	R^2	F	t	β
1st Step	0.02	3.08*			0.01	3.90*			0.02	6.82**		
Gender			0.42	0.02			−2.60	−0.09*			3.23	0.11**
Age			1.37	0.09			0.86	0.03			1.98	0.07*
2nd Step	0.20	32.13***			0.22	82.33***			0.23	86.42***		
Gender			0.94	0.04			−1.32	−0.04			3.26	0.10**
Age			0.96	0.06			2.06	0.06			0.76	0.02
Criteria 1			10.83	0.43***			15.40	0.46***			15.55	0.46***
3rd Step	0.20	18.75***			0.23	43.13***			0.24	46.33***		
Gender			0.58	0.02			−1.55	−0.05			2.50	0.08*
Age			0.98	0.06			2.05	0.06			0.72	0.02
Criteria 1			9.30	0.42***			12.86	0.43***			14.35	0.44***
AT1			1.54	0.06			1.77	0.06			3.61	0.12***
CL1			−0.77	−0.03			−0.19	−0.01			−0.83	−0.03
RE1			0.01	0.01			2.34	0.08*			1.08	0.04

AT, trait emotional attention; CL, trait emotional clarity; RE, trait emotional repair; 1, Time 1; 2, Time 2. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 3 | Stepwise regression analyses for responses to negative affect as criteria variables.

Criteria 2	Depressive rumination				Distraction			
	R^2	F	t	β	R^2	F	t	β
1st Step	0.03	15.16***			0.02	7.36**		
Gender			5.50	0.18***			−3.72	−0.13***
Age			0.52	0.02			0.70	0.02
2nd Step	0.20	75.32***			0.18	65.81***		
Gender			3.42	0.11**			−2.24	−0.07*
Age			0.17	0.01			0.590	0.03
Criteria 1			13.75	0.42***			13.41	0.41***
3rd Step	0.21	38.68***			0.21	37.43***		
Gender			3.07	0.10**			−2.00	−0.06
Age			0.09	0.01			1.21	0.04
Criteria 1			10.38	0.38***			8.28	0.31***
AT1			2.31	0.09*			−0.92	−0.03
CL1			−0.26	−0.01			1.71	0.06
RE1			0.13	0.01			3.63	0.15***

AT, trait emotional attention; CL, trait emotional clarity; RE, trait emotional repair; 1, Time 1; 2, Time 2. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

each time were observed between dampening and depressive rumination and between self-focused positive rumination and distraction.

Concerning explained variance for responses to positive affect after the follow-up, the results indicated that dampening reached a $R^2 = 0.23$ while self-focused positive rumination showed a $R^2 = 0.21$. With regard to responses to negative affect, depressive rumination presented a $R^2 = 0.20$ while distraction presented a $R^2 = 0.19$.

DISCUSSION

This study sought to examine trait EI dimensions (i.e., emotional attention, emotional clarity, and emotional repair) and responses

to positive and negative affects in adolescence by gender and to analyse the cross-sectional and longitudinal relationships between trait EI dimensions and both types of responses. Some contributions may be described. Concerning the first goal, the results indicated that girls reported lower trait EI, i.e., increased emotional attention and lower emotional clarity and repair, consistent with results by Extremera et al. (2007) and Szymanowicz and Furnham (2013), who argued that girls seem to underestimate their emotional skills. In addition, girls indicated fewer adaptive responses to positive affect (i.e., more dampening and less self-focused positive rumination) and fewer adaptive responses to negative affect (i.e., more depressive rumination and less distraction) than boys, which is consistent with previous studies (Rood et al., 2009; Gomez-Baya et al., 2017b). These

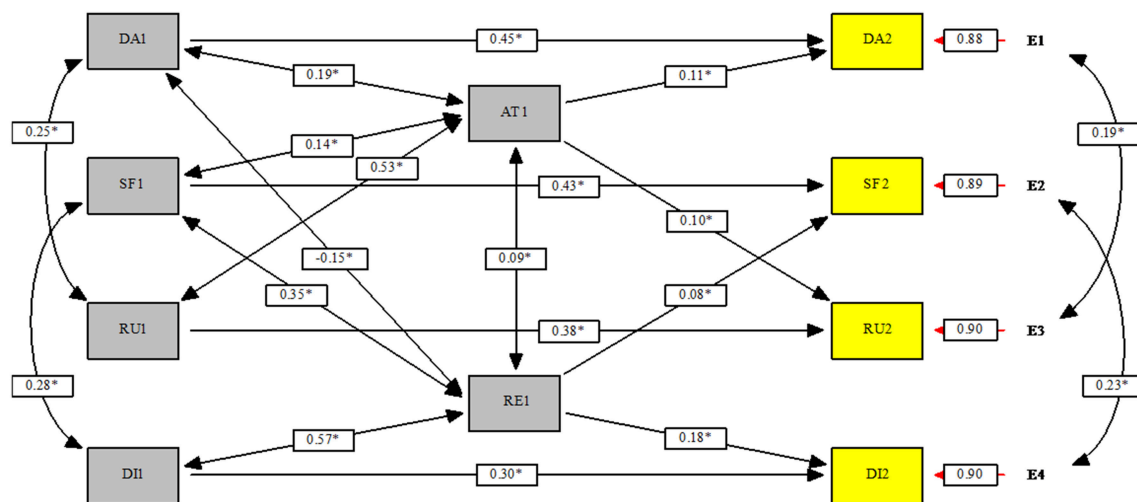


FIGURE 1 | Path analysis of responses of the relationships between responses to positive and negative affects in Times 1 and 2 and trait emotional intelligence dimensions in Time 1. AT, Trait Emotional Attention; RE, Trait Emotional Repair; SF, Self-focused Positive Rumination; DA, Dampening; RU, Depressive Rumination; DI, Distraction; 1, Time 1; 2, Time 2.

results are also consistent with our hypotheses for the first goal. Regarding the second goal, some cross-sectional associations were observed between trait EI dimensions and responses. Trait emotional attention showed positive associations with dampening, positive rumination, and depressive rumination. Furthermore, both trait emotional clarity and repair presented positive associations with distraction and positive rumination and a negative association with dampening. Thus, greater trait emotional attention appears to be associated with fewer adaptive responses while trait emotional clarity and repair are associated with more adaptive responses. No substantial differences were observed in these associations between boys and girls. The results concerning association with responses to negative affect are consistent with previous literature (Petrides et al., 2007a; Salguero et al., 2013) and with our hypotheses. The associations with responses to positive affect are an important contribution of the present work; the associations are consistent with previous research (Mikolajczak et al., 2008) and with our initial hypothesis. Finally, regarding the third aim, a confirmatory model has integrated the prospective relationships between trait EI dimensions and responses to positive and negative affect after a 1-year follow-up. After controlling for initial levels in these responses, this model showed that (a) greater trait emotional attention predicted fewer adaptive responses, i.e., high depressive rumination and high dampening, and (b) greater trait emotional repair predicted more adaptive responses, i.e., high distraction and high self-focused positive rumination. This model presenting the relationships between antecedents and consequents is the primary contribution of the present research to previous literature by integrating the predictive value of trait EI dimensions of responses to both negative and positive affect.

Some explanations may be proposed to explain the prospective association observed between trait emotional

attention and maladaptive responses to positive and negative affect. Studies have shown the detrimental effects of psychological adjustment of self-focused attention. A meta-analysis by Mor and Winquist (2002) showed the general association between self-focused attention on negative aspects and events and experiencing negative emotions. However, those authors distinguished between ruminative self-focus on negative aspects and events from self-focus on positive aspects, which was determined to be related to low negative affect. In this vein, Watkins E (2004) separated adaptive and maladaptive ruminative self-focus during emotional processing. Thus, to avoid the detrimental effects of high attention to one's own emotions, the focus may be moved toward developing the ability to observe, describe and accept the present moment, non-judgementally and non-reactively, to be able to participate with full awareness in the ongoing coping activity. The cultivation of this adaptive form of self-focused attention, as in mindfulness intervention, was related to less depressive rumination and reduced emotional avoidance, which in turn improves behavioral self-regulation (Baer, 2009). Furthermore, the perceived ability to repair emotional states, or trait emotional repair, is prospectively associated with the selection of adaptive responses to both negative and positive affective states, as previously noted by Mikolajczak et al. (2008). Thus, it seems that trait emotional repair would be especially associated with the choice of adaptive response to downregulate negative emotions using distraction but also to maintain positive responses by performing self-focused positive rumination. The upregulation of positive emotions is an important consequence of emotional repair as well, which would allow for maintaining and amplifying these experiences (Livingstone and Srivastava, 2012) and preventing emotional symptoms (Fussner et al., 2015; Gomez-Baya et al., 2017b; Nelis et al., 2018). In this sense, as a consequence of the

high self-efficacy in emotional repair, self-focused positive rumination would allow the attribution of the positive affect to good self-qualities, which is particularly relevant during adolescence, a life period during which self-concept becomes more complex and includes more abstract descriptions (Harter, 2015).

Thus, this work presents some important contributions to previous literature. This research has provided longitudinal evidence for the coping mechanisms associated with trait EI in adolescence. Moreover, the integrated analysis of the relationships between trait EI dimensions and responses to both positive and negative affect provided a novel result. Despite these contributions, some limitations should be acknowledged. The longitudinal study design allows for establishing associations between antecedents and consequents, but no causal inferences can be concluded because an experimental design would be required. Petrides and Furnham (2003) provided construct validity for trait EI after conducting experiments of emotion recognition and reactivity to mood induction. In this area, Matthews et al. (2015) showed that high trait EI was related to reduced stress response after an experimental task. Additional assessments or waves could be recommended in a longitudinal study to explore change trajectories during adolescence. Concerning the instrument, only self-reports were used, providing subjective information. A future line of research could come from collecting data from other relevant informants, such as parents, peers or teachers, consistent with conclusions by Boyatzis et al. (2015). Furthermore, low test-retest reliability coefficients were observed, what may be due to the 1-year interval between the two assessments and the possible changes in EI perceptions during this period in mid-adolescence, consistent with Keefer et al. (2013). These changes may be explained by the heightened emotional sensitivity (Forbes and Dahl, 2010) and the increased skill to produce more realistic self-appraisals (Harter, 2015). Finally, regarding sample composition, since a convenient procedure was used, the results cannot be generalized to Spanish adolescents. Although the sample size is remarkable, it comes from a single region in Spain, and the schools selected were not homogeneously distributed according to public or private ownership. An interesting area of future research could come from the examination of cultural differences in the associations between trait EI and coping by comparing samples from different countries. Some cultural differences in trait EI have been reported between Western individualist societies and Eastern collectivist societies (Gökçen et al., 2014) while the present work has provided some evidence from Southern Europe.

Some practical implications may be suggested from the study contributions. Schools may represent an excellent setting for implementing interventions during adolescence to promote EI and adaptive response because schools present appropriate conditions for programme implementation. The need to implement educational policies to promote emotional education has been strongly defended (Mayer and Cobb, 2000). A recent meta-analysis showed the effectiveness of universal intervention programmes with children and adolescents from

the framework of the Collaborative for Academic, Social and Emotional Learning (CASEL) in developing social and emotional skills and improving psychological adjustment and academic performance (Durlak et al., 2011). Another experience of school-based intervention in EI is RULER, which was designed to improve classroom social interactions and develop emotional literacy (Brackett et al., 2012). In Spain, the INTEMO programme has provided supportive evidence for developing skills regarding emotional perception, facilitation, understanding, and management, which were effective in promoting adolescent mental health (Ruiz-Aranda et al., 2012). Furthermore, resilience education has recently emerged to develop psychological strengths and coping resources to promote resilience within the school context (Gillham et al., 2013). Our conclusions regarding the associations between EI and responses to affect underline the need to integrate the interventions from emotional education and resilience education in adolescence. Moreover, our study suggests that resilience education should also promote adaptive responses to positive affect. Most interventions have targeted the development of coping resources to face negative affect, such as the Penn Resilience Program (Gillham et al., 2007). However, school-based interventions could be improved by including activities to increase positive emotions. In this vein, Quoidbach et al. (2015) concluded that exercising, socializing and being in nature were effective in enhancing positive affect. In addition, imagining future positive events seems to present more long-term benefits to prolong positive affective states. Consequently, the prospective associations between trait EI and responses to positive and negative affect in adolescents could invite the integration of school-based interventions. Moreover, given the gender differences observed, more gender-specific activities should be designed to improve interventions' overall effectiveness, as indicated by Zeidner et al. (2002). Thus, intervention programmes should be focused on improving emotional self-efficacy beliefs in girls and their coping resources to face the experiencing of both negative and positive affective states.

ETHICS STATEMENT

All procedures performed respected the ethical standards of the institutional research committee and Helsinki declaration. Written informed consent was obtained from all individual participants and their parents.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Does Emotional Intelligence Mediate the Relation Between Mindfulness and Anxiety and Depression in Adolescents?

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High anxiety and depression are often observed in the Australian adolescent population, and if left untreated, can have long-term negative consequences impacting educational attainment and a range of important life outcomes. The utilization of mindfulness techniques has been associated with decreased anxiety and depression, but the underlying mechanisms for this is only beginning to be understood. Previous research with adult samples has suggested that the development of emotional intelligence (EI) may be one mechanism by which mindfulness confers its benefits on wellbeing. This study is the first to examine the relation between mindfulness, EI, anxiety, and depression in an adolescent population. It was hypothesized that EI would mediate the relationships between mindfulness and anxiety, as well as mindfulness and depression. The sample consisted of 108 adolescents from a public secondary school, aged between 13 and 15 years ($M_{\text{age}} = 13.68$, $SD_{\text{age}} = 0.56$, 51 males and 57 females). Participants completed an online self-report questionnaire which measured dispositional mindfulness, EI, anxiety, and depression. The results indicated that one subscale of EI – Emotional Recognition and Expression (ERE) mediated the relation between mindfulness and anxiety, while two subscales of EI – ERE and Emotional Management and Control (EMC) mediated the relation between mindfulness and depression. Future research utilizing a mindfulness intervention should be conducted to examine whether the use of mindfulness increases EI and decreases anxiety and depression in adolescents.

Keywords: emotional intelligence, EI, mindfulness, anxiety, depression, adolescents

INTRODUCTION

Adolescence is the developmental period between childhood and adulthood and is a time of significant physical, social, and emotional development (Ernst et al., 2006; Garcia, 2010). It is also a time of increased risk-taking and emotional reactivity, combined with comparatively poor decision-making abilities, and impulse control (Steinberg, 2007; Casey et al., 2008). It has been hypothesized that the difference between emotional and cognitive abilities during adolescence explains why this can be a time of increased vulnerability for the onset of affective and anxiety disorders (Steinberg and Morris, 2001; Steinberg, 2005).

Approximately one in seven Australian children and adolescents met the criteria for a diagnosable mental disorder during 2013–2014, with anxiety disorders and major depressive disorder being the most prevalent (Lawrence et al., 2015). Many more adolescents experience sub-clinical symptoms of anxiety and depression (Balazs et al., 2013). These disorders have a significant negative impact on the individual and society, with anxiety and depression both demonstrated to be associated with a range of negative outcomes, including: poorer academic achievement (Mazzone et al., 2007; DeRoma et al., 2009); decreased productivity (Beck et al., 2011; Australian Bureau of Statistics, 2013); decreased subjective wellbeing (Keyes, 2005); increased substance use (Burns and Teesson, 2002); and an increased risk of suicide (Kendall et al., 2004).

Adolescent onset mental disorders can have long-term impacts which extend into adulthood (Goodman et al., 2011). Adolescence is a critical period for identity formation, and a clear and confident self-concept is thought to be an important aspect of psychological well-being (Erikson, 1968). It has been argued that the symptoms of anxiety and depression may interfere with identity formation, thus leading to long-term personality problems (Robins et al., 1996; Akse et al., 2004; van Aken and Semon Dubas, 2007).

Adolescence is also an important time for the completion of education, the acquisition of employment skills, and the development of relationships (American Psychiatric Association, 2002; McNeely and Blanchard, 2010). The disruption to these processes can potentially lead to long-term functional impairment (Costello et al., 1999; Balazs et al., 2013; Peters et al., 2016). Further, those individuals who experience depression or anxiety during adolescence are more likely to have recurrent episodes throughout life (Costello et al., 1999; Kessler et al., 2001; Kendall et al., 2004; Allen et al., 2014).

For these reasons, the identification of effective early interventions to prevent or treat subclinical and diagnosable anxiety and depression in adolescence is of primary importance. Mindfulness has been postulated to be one such intervention and has demonstrated promising results in studies with adults, where higher levels of mindfulness have been demonstrated to be associated with greater psychological wellbeing, and decreased anxiety and depression (Kabat-Zinn, 1994; Shapiro et al., 1998; Brown and Ryan, 2003; Khoury et al., 2013).

Such studies, however, are still rare for the adolescent population and therefore there is a need to evaluate whether a relationship exists between mindfulness and mental health variables. This is one of the aims of the current study where it is hypothesized that greater mindfulness will be associated with decreased depression and anxiety in adolescents, and further, that greater mindfulness will be positively associated with Emotional Intelligence (EI).

Mindfulness

The Western practice of mindfulness is derived from the practice of meditation which exists in all traditions of Buddhism (Kabat-Zinn, 2003). It can be defined as “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn, 1994, p. 4) and has become an increasingly

popular practice in the West as it has been demonstrated to be positively associated with psychological wellbeing and self-care, and negatively associated with anxiety and depression in adults (Kabat-Zinn, 1994; Shapiro et al., 1998; Brown and Ryan, 2003; Christopher and Gilbert, 2010; Richards et al., 2010; Khoury et al., 2013).

The practice of mindfulness involves two aspects: attention and attitude. The first aspect involves training the attention toward the present moment by knowing where one’s attention is, prioritizing where one’s attention needs to be, and training one’s attention to stay where it should be (Kabat-Zinn, 2003; Hassed, 2016). The second aspect of mindfulness involves bringing an attitude of openness, curiosity and acceptance to one’s thoughts and observations (Kabat-Zinn, 2003; Hassed, 2016).

Individuals have different levels of dispositional mindfulness (Brown and Ryan, 2003; Baer et al., 2006), but levels of mindfulness can also be increased through practice via mindfulness meditation, which involves gently bringing the attention back to the present moment, while observing but not becoming attached to thoughts (Carmody and Baer, 2008; Hassed, 2016). Participation in a mindfulness-based stress reduction course has been shown to significantly increase levels of mindfulness with effect sizes in the moderate to large range, with the extent of mindfulness practice correlating with the degree of change in mindfulness levels (Carmody and Baer, 2008).

The practice of mindfulness may result in neuroplastic changes to the brain, and these changes are thought to be the basis of the positive effects of mindfulness (Hölzel et al., 2011a,b; Tang et al., 2015). Cross-sectional research has demonstrated that increases in regional gray matter are associated with increased performance abilities (Mechelli et al., 2004), and experienced mindfulness practitioners exhibit greater gray matter concentrations in multiple brain areas compared to those individuals who do not practice mindfulness, including those brain areas involved in attention, learning, memory, and emotional regulation (Hölzel et al., 2011a,b; Tang et al., 2015). Thus, the increase in gray matter concentration in these areas is thought to be one mechanism by which mindfulness confers its benefits (Hölzel et al., 2011b; Paul et al., 2013).

While most of these studies are observational and therefore causation cannot be inferred, a recent randomized control trial found that a 3-day intensive mindfulness meditation training intervention reduced right amygdala resting state functional connectivity indicating that mindfulness meditation promotes neuroplastic changes responsible for a reduction in stress, anxiety and depression (Taren et al., 2015).

Research on mindfulness interventions over the past 20 years has focused on adult clinical populations. More recently there has been increased interest in evaluating effectiveness in mindfulness in children and adolescents (Semple et al., 2005; Hayes and Greco, 2008; Greco et al., 2011; Wootten, 2016).

There is evidence that mindfulness in adolescence differs from that in adults, due to the developing nature of the adolescent brain (Dahl, 2004; Greco et al., 2011). For example, mindfulness measures in adults include items that reflect a *describing* facet which involves the ability to put internal

experiences into words, but children and adolescents do not have such well-developed abilities in this area (Baer et al., 2004). Due to these differences, studies that specifically seek to understand mindfulness in adolescents are important, because the developmental period of adolescence strikes a compelling paradox; on the one hand, adolescence is a period of great physical strength and resilience, yet on the other hand, morbidity and mortality rates during adolescence double compared to childhood. The increase in morbidity and mortality rates in adolescence are thought to be due to difficulties in the control of behavior and emotion which lead to higher rates of accidents, suicide, substance use and other risk-taking behavior (Dahl, 2004).

It is therefore important to examine the emotional correlates of mindfulness in adolescence, because mindfulness in adults has been demonstrated to be highly correlated with self-control (Fetterman et al., 2010; Bowlin and Baer, 2012) and emotional regulation (Hill and Updegraff, 2012), two areas where adolescents are under-developed compared to adults, and which result in higher morbidity and mortality (Dahl, 2004).

Because of their age and stage, it is not expected that adolescents will have much formal experience in mindfulness meditation. However, research has demonstrated that individuals differ to the degree to which they are willing or able to attend to what is occurring in the present moment (Brown and Ryan, 2003; Baer et al., 2006) – a fundamental aspect of mindfulness. This is known as dispositional mindfulness. This study uses a self-report measure of dispositional mindfulness which was developed for children and adolescent populations and which assesses such mindfulness skills such as present-centered awareness and a non-judgmental stance toward internal experiences (Greco et al., 2011).

Self-report mindfulness levels in children and adolescents have been found to be associated with greater happiness and satisfaction with life (Brown et al., 2011; Greco et al., 2011), and trait mindfulness has been found to protect against decision-making processes that place adolescents at risk for smoking (Black et al., 2012). Further, higher levels of mindfulness in adolescents have been found to be associated with fewer internalizing and externalizing problems (Greco et al., 2011).

Of most relevance to this manuscript, the few studies on the effects of mindfulness in children and adolescents have found that higher levels of mindfulness are associated with lower depression (Hayes and Greco, 2008; Thompson and Gauntlett-Gilbert, 2008; Broderick and Blewitt, 2012) and anxiety (Semple et al., 2005; Bögels et al., 2008; Hayes and Greco, 2008; Thompson and Gauntlett-Gilbert, 2008).

In adults, there is evidence that mindfulness exerts its beneficial effects on psychological wellbeing by influencing EI. That is, EI has been shown to mediate the relationship between: mindfulness and perceived stress (Charoensukmongkol, 2014; Bao et al., 2015); mindfulness and general self-efficacy (Charoensukmongkol, 2014); mindfulness and life satisfaction and mental distress (Wang and Kong, 2013); and mindfulness and subjective well-being (Schutte and Malouff, 2011). This study will, for the first time,

examine the hypothesis that EI mediates the relationship between mindfulness and anxiety and mindfulness and depression in adolescents.

Emotional Intelligence

Emotional Intelligence (EI) has been defined as “the ability to perceive accurately, appraise and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth” (Mayer and Salovey, 1997b, p. 10) and despite early controversies as to its validity as a construct (Schulte et al., 2004; Landy, 2005; Locke, 2005) is growing in importance as research demonstrates its association with a number of wellbeing outcomes with medium effect sizes (Schutte et al., 2007). Higher levels of EI are associated with: better physical and mental health (Martins et al., 2010); greater psychological wellbeing (Roberts et al., 2012; Sánchez-Álvarez et al., 2015); academic success (Downey et al., 2008b); less severe depression and social anxiety in clinical samples (Downey et al., 2008a; Nolidin et al., 2013); greater happiness in adolescents (Abdollahi et al., 2015); lower test anxiety among adult students (Ahmadpanah et al., 2016); and lower anxiety and depression in adolescents (Resurrección et al., 2014).

There are two approaches to conceptualizing EI: ability and trait. Mayer et al. (2004) argued that EI is best conceptualized as an ability, in the same way that cognitive intelligence is conceptualized as an ability. In this conceptualization, EI abilities and skills are divided into four branches – the ability to perceive emotions, the ability to use emotions to facilitate thought, the ability to understand emotions and the ability to manage emotion (Mayer et al., 1999; Mayer et al., 2004, 2008b). According to this model, more basic abilities such as perceiving and expressing emotion develop before more complex abilities such as the regulation of emotion (Mayer and Salovey, 1997a). Ability models measure EI by using a set of problem-solving tasks, measured against a criterion of correctness (Mayer et al., 2008b). For example, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) assesses the perception of emotion branch by asking participants to identify the emotions in pictures of faces (Mayer et al., 1999).

Trait models view EI as a personality trait (Petrides and Furnham, 2001; Neubauer and Freudenthaler, 2005) and measure EI through self-report questionnaires, although some measures also use rater-versions. Luebbbers et al. (2007) developed a self-report and rater adolescent version of the Swinburne University Emotional Intelligence Test (Adolescent SUEIT) which is a self-report measure of EI based on the Mayer and Salovey (1997a) conceptualization of EI as a composite set of abilities. The Adolescent SUEIT broadly supports the four-factor model of EI as proposed by Mayer and Salovey (1997a): understanding and analysing emotions (UE); Emotional recognition and expression (ERE); emotional management and control (EMC); and emotions direct cognition (EDC) (Luebbbers et al., 2007).

EI therefore, is not a unitary construct and so it may be most useful and interesting to research how the subscales of EI relate to wellbeing. For example, EMC has been found to be significantly and negatively associated with severity of depression in an adult sample ($r = -0.56$) (Downey et al., 2008a), and in an adolescent sample the four different subscales of EI were differentially associated with anxiety and depression (ERE, $r = -0.21$), internalizing (ERE, $r = -0.19$, EMC, $r = -0.42$) and externalizing (ERE, $r = -0.17$, UE, $r = -0.18$, EMC, $r = -0.29$) behaviors, social problems (UE, $r = -0.17$, EMC, $r = -0.32$) and coping strategies (ERE, $r = 0.25$, EMC, $r = 0.32$) (Downey et al., 2010). EMC has also been found to be positively associated with greater scholastic success ($r = 0.25$) (Downey et al., 2013) and emotional regulation has been found to be negatively associated with Generalized Anxiety Disorder ($r = 0.32$) (Kerns et al., 2013). EMC has also been found to predict maths ($r^2 = 0.06$) and science ($r^2 = 0.04$) results in an adolescent sample, while the UE subscale predicts scores for art ($r^2 = 0.12$) and geography ($r^2 = 0.08$) (Downey et al., 2008b). This study uses the Adolescent SUEIT as it has been extensively validated with Australian adolescent populations.

Mindfulness and EI

Research has demonstrated a positive relationship between mindfulness and some of the subscales of EI, but not others (Brown and Ryan, 2003; Baer et al., 2006; Charoensukmongkol, 2014). There are several proposed explanations for this. Feldman et al. (2006) postulated that mindfulness encourages the present-centered attention to one's emotions and this coupled with the attitude of non-judgment, leads to a tendency for more mindful individuals to be more self-aware and have a higher clarity to their emotions.

Krasner et al. (2009) hypothesized that because greater mindfulness is associated with better overall attention (Brown et al., 2007), individuals with greater levels of mindfulness are more likely to be more aware of their own emotions. Greater levels of mindfulness are also associated with an enhanced ability to regulate and control emotions (Cahn and Polich, 2006; Broderick and Metz, 2009), increased self-awareness, attention and self-reflection (Jha et al., 2007; Lutz et al., 2008; Krasner et al., 2009) and greater levels of meta-cognitive ability (Zeidan et al., 2010) – the ability to monitor and control thoughts, thought to be the central ability whereby individuals effectively regulate their emotions and a key element of EI (Mayer and Salovey, 1997a). A recent study using the same measure of Adolescent EI as the current study reported significant relationships between adolescent EI scores (specifically Emotional Recognition and Expression (ERE) and Emotional Management and Control (EMC)), dispositional mindfulness and well-being in Australian males (Teal et al., 2018). This study also demonstrated that ERE and EMC partially mediated the relationship between dispositional mindfulness and psychological distress which although is different to the measures assessed in the present study provides an excellent platform to hypothesize similar

relationships between other measures of mental health such as anxiety and depression with mindfulness and EI.

Mindfulness, EI, Anxiety and Depression: A Mediation Relationship?

In adults, there is a growing body of evidence that mindfulness exerts its beneficial effects on psychological wellbeing by influencing EI. Specifically, EI has been shown to mediate the relationship between: mindfulness and perceived stress (Charoensukmongkol, 2014; Bao et al., 2015); mindfulness and general self-efficacy (Charoensukmongkol, 2014); mindfulness and life satisfaction and mental distress (Wang and Kong, 2013); and mindfulness and subjective well-being (Schutte and Malouff, 2011).

The proposed theoretical explanation of this is that mindfulness increases self-awareness which leads to increased emotional self-control (Vago and Silbersweig, 2012), which then leads to greater well-being and less anxiety and depression. Research suggests that successful emotional regulation prevents both avoidance or over-engagement with emotions which are two tendencies that are associated with poor mental health outcomes (Beevers et al., 1999; Gross, 2002; Hu et al., 2014). The biological mechanism postulated to explain this effect is that mindfulness is associated with increased gray matter in brain areas associated with attention, learning, memory, and emotional regulation (Hölzel et al., 2011a,b; Paul et al., 2013; Marchand, 2014; Tang et al., 2015).

The current study extends this line of research in two important ways. First, this is the first study to investigate whether EI mediates the relationships between mindfulness, depression and anxiety. Secondly, this is the first study to investigate the relationships between EI, mindfulness, depression and anxiety in an adolescent population. This is important because rates of anxiety and depression are high in the adolescent population, and both conditions are associated with a range of negative outcomes. The identification of protective interventions is therefore of vital importance. The practice of mindfulness is one such putative intervention.

Recent studies have provided a more meaningful interpretation of EI's influence on wellbeing variables by focusing on the subscale scores of EI, rather than the global EI scores. This study also focuses on subscale scores rather than global EI, to identify those aspects of EI which are most important in predicting depression and anxiety in adolescents.

MATERIALS AND METHODS

Participants

One hundred and thirty-five Year 8 students from a public school in South East Melbourne were recruited to complete an online questionnaire. Of this sample, 108 participants were included in the analysis after 4 outliers and 23 cases with incomplete data were removed ($M_{age} = 13.68$, $SD_{age} = 0.56$, 51 males and 57 females). Incomplete data was mainly observed near the completion of the survey and was due to time constraints in terms of completing the survey in class-time.

Measures

The online questionnaire consisted of five demographic questions and four scales measuring mindfulness, EI, anxiety and depression. These scales were selected as they have all been validated with an adolescent cohort and have previously been reported to show high validity and reliability.

Dispositional Mindfulness

Dispositional mindfulness was measured using the Child and Adolescent Mindfulness Measure (CAMM; Greco et al., 2011). The CAMM is a 10-item self-report measure designed to assess three of the four facets of mindfulness assessed in adult mindfulness measures: *Observing*, which is the degree to which individuals attend to internal phenomena such as thoughts, feelings and bodily sensations (e.g., “I keep myself busy so I don’t notice my thoughts or feelings”); *Acting with awareness* which is present-centered awareness and full engagement in one’s current activity (e.g., “At school, I walk from class to class without noticing what I’m doing”); and *Accepting without judgment* which is non-judgmental awareness and openness to experiencing a full range of internal events (e.g., “I get upset with myself for having certain thoughts”). The fourth facet in adult mindfulness measures - *Describing*, which is the ability to put internal experiences into words - is not measured by the CAMM due to the probable impact of participant’s developmental level on their responses. The CAMM has been found to be a reliable and valid measure of dispositional mindfulness in a non-clinical sample of adolescents, with excellent convergent and incremental validity and with adequate internal consistency with Cronbach’s $\alpha = 0.81$ (Greco et al., 2011). The CAMM correlates significantly and positively with outcomes such as quality of life and academic achievement, and negatively with internalizing symptoms and externalizing problem behavior (Greco et al., 2011).

Adolescent EI

Adolescent EI was measured using the Adolescent Swinburne University Emotional Intelligence Test (Adolescent SUEIT; Luebbbers et al., 2007). The Adolescent SUEIT is a 57-item test which measures four subscales of EI: Emotional Recognition and Expression (ERE; the ability to recognize one’s own emotions and express them to others – e.g., “I find it hard to talk about my feelings to other people”); Understanding Emotions (UE; the ability to identify and understand others’ emotions – e.g., “I can tell how others feel by the tone of their voice”); Emotions Direct Cognition (EDC; the use of emotions in decision-making and problem solving – e.g., “I use my feelings to help me find new ideas”); and Emotional Management and Control (EMC; the ability to manage and control emotions in oneself and in others – e.g., “I find it easy to control my anger and calm down”). Respondents indicated the extent to which each statement accorded with how they typically think, feel and act via a 5-point Likert scale ranging from 1 (very seldom) to 5 (very often). Negatively worded items were reverse scored and then scores were added together to give a total score for each scale. Subscale scores were added together to

give a total EI score. Higher subscale scores indicate greater proficiency in that EI skill. A higher total score indicates greater EI. The Adolescent SUEIT has been found to be a reliable scale for total EI as well as for each subscale, with coefficient alpha’s ranging from $\alpha = 0.75$ to $\alpha = 0.85$ (Luebbbers et al., 2007). The Adolescent SUEIT total EI score and subscales have found to be predictive of scholastic success (Downey et al., 2008b, 2013), bullying behavior and pro-victim attitudes (Schokman et al., 2014) and coping styles (Downey et al., 2010). In addition, the adult version of the A-SUEIT has been reported to show minimal social desirability (Downey et al., 2006).

Anxiety

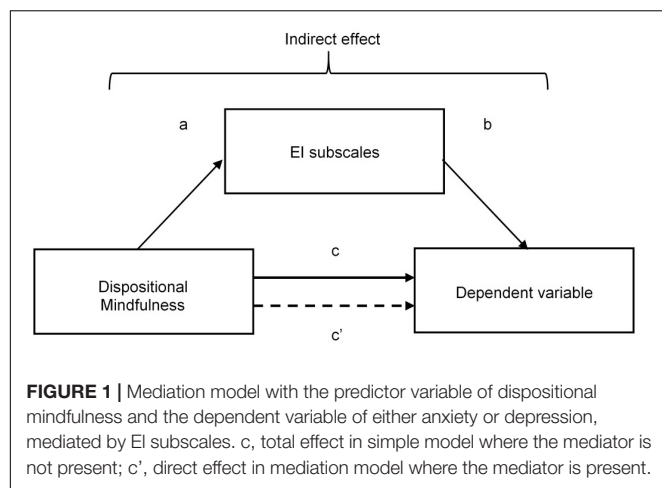
Anxiety was measured using the Beck Anxiety Inventory (BAI; Beck et al., 1988). The BAI is a 21-item self-report inventory used to assess anxiety levels in adults and adolescents. Respondents indicate to what extent they have been bothered by anxiety symptoms (e.g., “Numbness or tingling”) during the last month on a 4-point Likert scale ranging from 0 (Not at all) to 3 (Severely – it bothered me a lot). Scores on the 21-items are summed, and higher scores indicate higher anxiety. The BAI has been found to be a valid and reliable measure of anxiety, with an excellent internal consistency with Cronbach’s $\alpha = 0.92$ (Beck et al., 1988). Construct validity studies show excellent convergence of the BAI with other measures of anxiety, including the STAI ($r = 0.47$ – 0.58) (Fydrich et al., 1992) and the Hamilton Anxiety Rating Scale ($r = 0.56$) (Beck and Steer, 1991).

Depression

Depression was measured using the Beck Depression Inventory-II (BDI-II; Beck et al., 1996). The BDI-II is a 21-item self-report inventory used for detecting depression in adolescents and adults. The questionnaire consists of 21 depression symptoms (e.g., “self-dislike”), and respondents are required to pick one of four statements which best describes how they have been feeling in the past 2 weeks (e.g., 0 = “I feel the same about myself as ever” or 3 = “I dislike myself”). Two items were removed from the BDI for the purposes of the survey and analysis; a question relating to suicidal thoughts and wishes (question 9), and a question relating to loss of interest in sex (question 21). These questions were removed as the participant cohort was aged 13–15 years and the questions may have caused undue distress or discomfort. Scores were summed. High scores indicate more depression. Coefficient alpha estimates of reliability for the BDI-II with outpatients was 0.92 and was 0.93 for a non-clinical sample (Beck et al., 1996). Concurrent validity studies report that the BDI correlates with many other measures of depression including the SCL-90-D (Wang and Gorenstein, 2013) and the Revised Hamilton Rating Scale for Depression (Beck et al., 1996).

Data Collection

This study was approved by the Swinburne University Human Research Ethics Committee (SHR Project 2016/112) and the Victorian Department of Education and Training (2016_003128).



Statistical Analyses

We examined two multiple mediation models. The first the Sobel test is used in conjunction with the causal-steps method to test the significance of the mediation effect by computing the ratio of *ab* to its estimated standard error (Sobel, 1986). However the *p* value for this ratio is computed in reference to the standard normal distribution, and the sampling distribution of *ab* is only normal in large samples (Hayes, 2009). Preacher and Hayes (2008) advocate a mediation analysis technique which uses bootstrapping methods to compute confidence intervals for the indirect effect. The bootstrapping method is a non-parametric test which involves estimating a statistic by repeatedly randomly sampling observations with replacement from the data. As such, this method does not rely upon the assumption of normality and is therefore recommended for smaller sample sizes or skewed data. If zero does not fall between the resulting lower- and upper-bound confidence intervals of the bootstrapping method, the researcher can conclude that the indirect effect is not zero with CI% confidence. Perfect mediation is said to occur when *c'* is zero, which means that the relationship between the predictor and outcome is completely nulled by including the mediator in the model. Full mediation is unusual in social science research (Field, 2013), so we hypothesize that EI will partially mediate the relationships between mindfulness and anxiety and between mindfulness and depression. Two different indicators are used to measure the size of the indirect effect. The first uses the ratio of the indirect to the total effect (P_M) which is calculated by multiplying the 'a' and 'b' paths from **Figure 1** (i.e., the indirect effect) and dividing by the 'c' path (i.e., the total effect) (Preacher and Kelley, 2011). However caution should be taken when interpreting this measure as it can be unstable in samples smaller than 500, and the current study uses a sample of 108 (MacKinnon, 2008). For this reason, the *index of mediation* will also be reported to allow for comparison between mediators. The index of mediation standardizes the indirect effect with respect to the predictor, mediator and outcome variable (Field, 2013), and is useful in that it can be compared across different mediation models that use different measures of the predictor, mediator and outcome. Similar to the unstandardized indirect

effect, if the lower and upper bound confidence intervals do not contain zero, then it can be concluded that the true effect size is different from 'no effect' (Field, 2013). The model examined used anxiety as the dependent variable and the second model used depression as the dependent variable. Dispositional mindfulness was the predictor variable and EI subscales were included in both models as multiple mediator variables. **Figure 1** is a diagram of the mediation models being tested.

RESULTS

Descriptive Statistics

Descriptive statistics and Cronbach's alpha coefficients of the Adolescent SUEIT, Adolescent SUEIT subscales, the CAMM scale, the BDI and BAI scales are presented in **Table 1**.

The mean scores for the CAMM were slightly lower for the relative comparison group (grade 8 boys) in the standardization paper for this instrument (Greco et al., 2011). The mean scores for the Adolescent SUEIT global score appear to be slightly less than the mean reported by Luebbers et al. (2007), which may be due to the fact that the sample in that study consisted of nearly three times as many females to males compared to the current study, where 52.8% of the sample were female. Females typically have a greater overall EI than males (Mayer et al., 1999; Joseph and Newman, 2010; Smieja et al., 2014; Wojciechowski et al., 2014) possibly explaining the higher mean in Luebbers' research. The mean for the EMC score in the current research is substantially higher than the mean in Luebbers' research ($M = 42.99$), once again possibly explained by the higher number of males in the current sample compared to Luebbers' research. Males have scored slightly higher in EMC than females in previous research (Luebbers et al., 2007; Downey et al., 2010). The mean scores for the BDI were slightly greater in the current sample than for previous research (Osman et al., 2008) but fell within the same classification range (Low – mild mood disturbance), while the mean scores for the BAI were higher but still within the same classification band to previous research (low anxiety) (Fydrich et al., 1992; Osman et al., 1997; Osman et al., 2002). The slightly higher mean scores for the BDI and BAI in the current sample may be because anxiety and depression is increasing in the population,

TABLE 1 | Descriptive statistics and reliability statistics of variables.

Scale	<i>M</i>	<i>SD</i>	α
Adolescent SUEIT	176.20	14.56	0.75
Emotional recognition and expression	17.36	4.54	0.56
Understanding emotions	61.71	6.57	0.69
Emotions direct cognition	20.20	3.61	0.58
Emotional management and control	53.17	8.17	0.74
Child and adolescent mindfulness measure	20.96	6.82	0.80
Beck anxiety inventory	18.16	15.23	0.95
Beck depression inventory	13.31	11.76	0.96

N = 108.

TABLE 2 | Pearson correlations between variables.

		1	2	3	4	5	6	7	8
1	EI global	1							
2	ERE	0.70**	1						
3	UE	0.57**	0.08	1					
4	EDC	0.24*	0.02	0.03	1				
5	EMC	0.72**	0.48**	0.05	-0.22*	1			
6	Mindfulness	0.46**	0.47**	0.05	-0.08	0.51**	1		
7	Anxiety	-0.44**	-0.51**	-0.09	0.19*	-0.42**	-0.45**	1	
8	Depression	-0.59**	-0.59**	-0.06	-0.09	-0.58**	-0.58**	0.66**	1

N = 108. ERE, emotional recognition and expression; UE, understanding emotion; EDC, emotion directs cognition; EMC, emotional management and control. **p* < 0.05; ***p* < 0.01, two-tailed.

or because data collection mostly occurred during Term 4, a period typically filled with anxiety-provoking exams and assessments. The EI global, UE, EMC, CAMM, BAI and BDI scales demonstrated acceptable reliability, with Cronbach's alphas above 0.7, although the alpha's for both the BDI and BAI were very high, suggesting some redundancy in those scales. The internal consistency for the EDC and ERE subscales were unacceptably low, with Cronbach's alpha of 0.58 and 0.56, respectively. Four items were therefore removed from the ERE subscale until Cronbach's alpha reached an acceptable 0.76. Three items were removed from the EDC subscale until Cronbach's alpha reached 0.62 which is acceptable for a scale with seven items (Field, 2013).

Correlations

Pearson correlation coefficients were calculated between all variables. These are displayed in **Table 2**.

Pearson's correlations revealed a significant moderate negative correlation between dispositional mindfulness and anxiety ($r = -0.45$) with a medium to large effect size (Cohen, 1992). $R^2 = 0.20$, meaning that 20% of the variance of mindfulness is shared with anxiety.

Pearson's correlations revealed a significant negative correlation between dispositional mindfulness and depression ($r = -0.58$) which is a large effect (Cohen, 1992). $R^2 = 0.34$, meaning that 34% of the variance between mindfulness and depression is shared. Pearson's correlations revealed significant negative relations between ERE ($r = -0.51$), and EMC ($r = -0.42$) sharing 26% and 18% of the variance with anxiety, respectively, both with medium to large effects.

Pearson's correlations revealed that depression was significantly and negatively associated with ERE ($r = -0.59$) meaning ERE shares 35% of the variance with depression. This was a large effect (Cohen, 1992). EMC was also significantly and negatively associated with depression ($r = -0.58$, a large effect). Pearson's correlations revealed significant positive and large correlations between ERE ($r = 0.47$) and EMC ($r = 0.51$) and mindfulness, which share 22 and 26% of the variance with mindfulness, respectively. Both were large effects. Pearson's correlations revealed a significant positive and large relation between anxiety and depression ($r = 0.66$). $R^2 = 0.44$, meaning that anxiety and depression share 44% variance.

Regression Analyses

Regression analysis was used to test the hypothesis that higher mindfulness, ERE and EMC would predict lower anxiety in adolescents. It was found that altogether, mindfulness and the all four EI subscales (ERE, UE, EDC, and EMC) did significantly predict lower anxiety, $F(5,102) = 10.65$, $p < 0.001$. The model accounted for 34% of the variance in adolescent anxiety ($R^2 = 0.34$). Mindfulness ($b = -0.46$, $p = 0.04$) and ERE ($b = -1.14$, $p < 0.001$) were both significant predictors in the model, with mindfulness uniquely accounting for 3% of the variability of anxiety ($sr^2 = 0.03$), and ERE accounting for 8% of the variability of anxiety ($sr^2 = 0.08$). EMC was not a significant predictor in the model. We also predicted that higher mindfulness, ERE and EMC would predict lower depression in adolescents. It was found that altogether, mindfulness and the four EI subscales (ERE, UE, EDC and EMC) did significantly predict lower depression, $F(5,102) = 22.03$, $p < 0.001$. The model accounted for 52% of the variance in adolescent depression ($R^2 = 0.52$). Mindfulness ($b = -0.50$, $p < 0.001$), ERE ($b = -0.84$, $p < 0.001$), and EMC ($b = -0.40$, $p = 0.002$) were all significant predictors in the model uniquely accounting for 6%, 7% and 5% of the variance of depression, respectively. It should be noted that these analyses are based on cross-sectional data rather than multiple time points. Caution should be exercised in interpreting cross-sectional data such as these. Future studies should examine these relationships with longitudinal data.

Multiple Mediation Analysis

Figure 2 displays the first multiple mediation model in which anxiety was the dependent variable and the EI subscales the mediator variables. Shown are the associated 'a' and 'b' paths (unstandardized coefficients), their standard errors, and the direct and total effects. A bootstrap sample of 1000 was specified. **Figure 2** displays the results for the indirect effects and effect sizes for each pathway between mindfulness and anxiety, with EI subscales as the mediating variables.

Without any mediators in the model, the path between mindfulness and anxiety (path c in **Figure 3**) was significant. When all four EI subscales were included in the model, the path between mindfulness and anxiety (path c') was

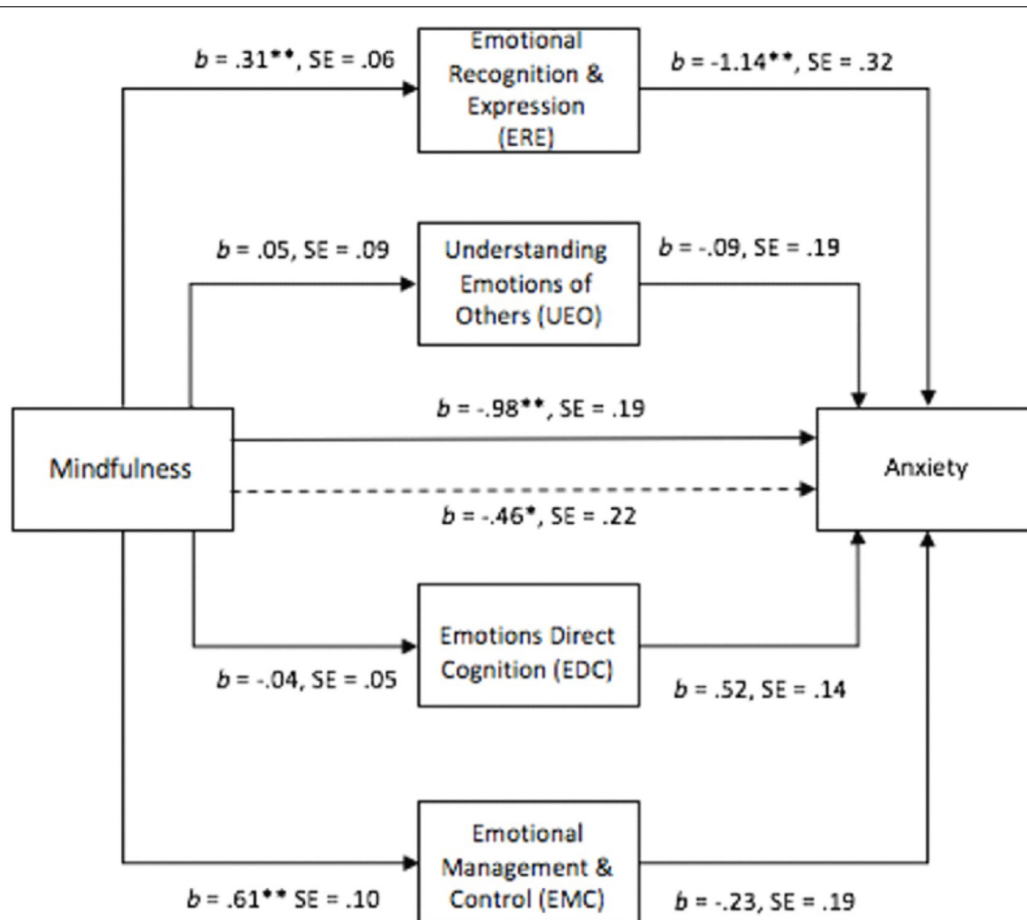


FIGURE 2 | Multiple mediator model examining relation between dispositional mindfulness, subscales of EI and anxiety. * $p < 0.05$; ** $p < 0.001$.

also significant. Dispositional mindfulness had significant and positive direct paths to ERE and EMC but did not have significant direct paths to EDC or UE. Only ERE had a significant, negative direct path to anxiety. Therefore, the relation between mindfulness and anxiety was partially mediated by ERE. The direction of the paths suggests that mindfulness increases ERE and ERE decreases anxiety.

Figure 3 displays the second multiple mediation model where depression is the dependent variable and the EI subscales are the mediator variables. Shown are the associated 'a' and 'b' paths (unstandardized coefficients), their standard errors, and the direct and total effects. A bootstrap sample of 1000 was specified. **Table 3** displays the results for the indirect effects effect sizes, and partial mediation for each pathway between mindfulness and depression, with EI subscales as the mediating variables.

In the depression model without mediators, the path between mindfulness and depression, (path c in **Figure 3**) was again significant. When all four mediators were included in the model, the path between mindfulness and anxiety (path c') was also significant. The first part of this model is identical to the first model; that is, mindfulness had significant and positive direct paths to ERE and EMC but

did not have significant direct paths to EDC or UE. ERE and EMC in this model had significant, negative direct paths to depression. This model suggests that mindfulness leads to increased ERE and EMC which leads to decreased depression (see **Table 4**).

DISCUSSION

Overview of Aims and Findings

Clinical and sub-clinical levels of anxiety and depression are prevalent in the adolescent population (Lawrence et al., 2015). Left untreated, these disorders can have serious negative long-term impacts on the individual and on society (Robins et al., 1996; Akse et al., 2004; van Aken and Semon Dubas, 2007; Goodman et al., 2011). For this reason, it is important to explore the correlates of good mental health, and whether there are interventions that can decrease anxiety and depression in adolescents.

Higher levels of dispositional mindfulness have been found to be associated with decreased depression (Hayes and Greco, 2008; Thompson and Gauntlett-Gilbert, 2008; Broderick and Blewitt, 2012) and decreased anxiety in adolescents (Semple et al.,

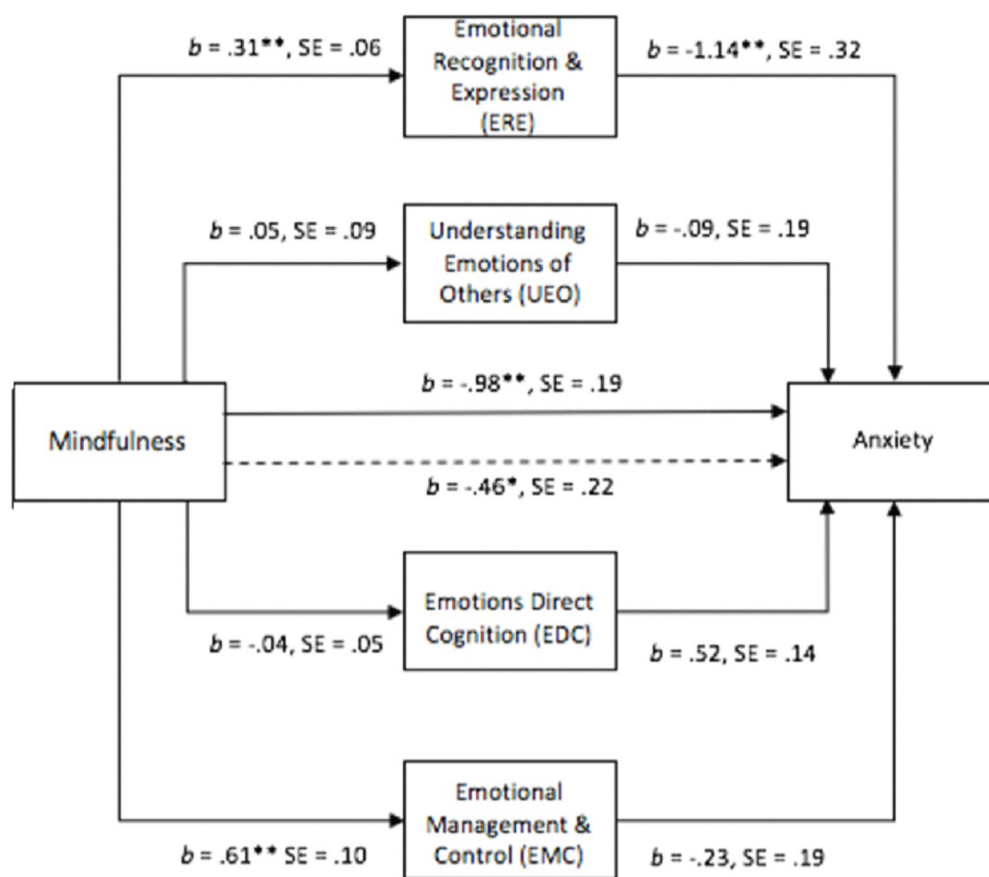


FIGURE 3 | Multiple mediator model examining relation between dispositional mindfulness, subscales of Ei and anxiety. * $p < 0.05$; ** $p < 0.001$.

TABLE 3 | Indirect effect and sizes for model pathways between mindfulness and anxiety with Ei subscales as the mediating variables.

Model pathway	Indirect effect	Index of mediation	PM
Mindfulness→ERE→Anxiety	-0.35, 95% CI [-0.65, -0.16]	-0.16, 95% CI [-0.30, -0.08]	0.36 95% CI [0.16, 0.73]
Mindfulness→UE→Anxiety	-0.004, 95% CI [-0.11, 0.02]	-0.002, 95% CI [-0.05, 0.01]	0.004, 95% CI [-0.03, 0.12]
Mindfulness→EDC→Anxiety	-0.02, 95% CI [-0.14, 0.05]	-0.01, 95% CI [-0.06, 0.02]	0.02, 95% CI [-0.05, 0.15]
Mindfulness→EMC→Anxiety	-0.14, 95% CI [-0.44, 0.06]	-0.06, 95% CI [-0.20, 0.03]	0.15, 95% CI [-0.07, 0.46]

TABLE 4 | Indirect effect and sizes for model pathways between mindfulness and depression with Ei subscales as the mediating variables.

Model pathway	Indirect effect	Index of mediation	PM
Mindfulness→ERE→Depression	-0.26, 95% CI [-0.49, -0.09]	-0.15, 95% CI [-0.28, -0.05]	0.26, 95% CI [0.08, 0.50]
Mindfulness→UE→Depression	-0.001, 95% CI [-0.03, 0.02]	-0.001, 95% CI [-0.02, 0.01]	0.001, 95% CI [-0.02, 0.04]
Mindfulness→EDC→Depression	0.001, 95% CI [-0.03, 0.05]	0.00, 95% CI [-0.02, 0.02]	-0.001, 95% CI [-0.05, 0.03]
Mindfulness→EMC→Depression	-0.24, 95% CI [-0.46, -0.10]	-0.14, 95% CI [-0.25, -0.05]	0.24, 95% CI [0.09, 0.42]

2005; Bögels et al., 2008; Hayes and Greco, 2008; Thompson and Gauntlett-Gilbert, 2008). Importantly, dispositional mindfulness can be increased through practice via mindfulness meditation and other techniques (Carmody and Baer, 2008; Chu, 2010; Hassed, 2016).

Previous research has demonstrated the mediating effect of EI on the relation between mindfulness and various

wellbeing variables: mindfulness and perceived stress (Charoensukmongkol, 2014; Bao et al., 2015); mindfulness and general self-efficacy (Charoensukmongkol, 2014); mindfulness and life satisfaction and mental distress (Wang and Kong, 2013); and mindfulness and subjective well-being (Schutte and Malouff, 2011). The current study extended this line of research to investigate whether specific EI subscales mediated

the relation between mindfulness and anxiety, and mindfulness and depression in adolescents. The theoretical underpinning of these hypotheses is that the awareness and attention aspects of mindfulness may facilitate the development of greater EI by increasing gray matter in areas of the brain responsible for attention, focus and emotional processing, and this in turn decreases anxiety and depression.

In the current study as hypothesized, there was a strong positive association between anxiety and depression, meaning that adolescents with high anxiety were much more likely to also have high depression. Also, as expected, higher dispositional mindfulness was associated with lower anxiety and lower depression in adolescents. The associations between EI, mindfulness, anxiety and depression tell a more complex story however. While ERE and EMC both had the predicted strong negative associations with anxiety and depression and a positive association with mindfulness, EDC had a significant but weak positive association with anxiety. As predicted, UE was not associated with anxiety, depression, nor mindfulness. As hypothesized, both ERE and EMC partially mediated the relation between mindfulness and depression, but only ERE was found to partially mediate the relation between mindfulness and anxiety. EDC and UE mediated neither the relation between mindfulness and anxiety, nor the relation between mindfulness and depression as predicted.

Implications and Future Research

The current study confirms several hypotheses – that mindfulness is associated with emotional intelligence, that depression and anxiety frequently co-occur in the adolescent population, and that the mechanism by which mindfulness impacts upon depression and anxiety is partially mediated by EI. These results are important because they demonstrate that increased mindfulness and increased EI are both associated with decreased anxiety and depression, but further experimental research must be conducted to confirm the causal hypothesis that mindfulness increases EI which then decreases anxiety and depression. Such research could involve a randomized control trial introducing a mindfulness intervention to a randomly selected group of adolescents versus a control group who undertake relaxation training. Baseline measurements of dispositional mindfulness, EI, anxiety and depression should be taken before introduction of the mindfulness intervention, during the intervention and a short period after the intervention has been completed.

Studies which investigate the duration and intensity of mindfulness training necessary to get positive results would also be useful, to ensure that mindfulness training is conducted in

the most efficient manner possible. Longitudinal designs would also be useful to investigate changes in mindfulness, EI, anxiety, depression over time.

Another important implication of this research is that mindfulness training may improve EI which is important for many other outcomes, as EI has also been associated with more effective leadership (Batool, 2013; Siegling et al., 2014), higher resilience (Schneider et al., 2013) and better social, family, and intimate relationships (Mayer et al., 2008a).

As the subscales of EI only partially mediated the relations between mindfulness and anxiety and mindfulness and depression, it would be useful and interesting to investigate other mediators in the mindfulness – anxiety/depression relation using more sophisticated statistical techniques such as structural equation modeling. Additional mediators could include stress, attention, and relationship quality – all demonstrated to be associated with mindfulness in previous research (Baer et al., 2012; Bao et al., 2015; Nezlek et al., 2016).

CONCLUSION

The current study investigated the relation between dispositional mindfulness, emotional intelligence, depression, and anxiety in an adolescent sample. The results of this study provide empirical support to previous research in adult samples suggesting that higher mindfulness is related to higher EI. Specifically, the two models in the current study suggest that greater mindfulness is related to a higher ability to recognize, express and manage emotions, and to lower levels of anxiety and depression. This is the first known study to examine the mediating effects of EI on the relations between mindfulness and anxiety and mindfulness and depression, and the first study to examine the relation between mindfulness, EI, anxiety and depression in an adolescent sample. Based on these results, future research should examine whether mindfulness could be manipulated to increase EI and reduce anxiety and depression in adolescents, thereby addressing a significant public health concern.

AUTHOR CONTRIBUTIONS

BF was involved in the conceptualization, data collection, data analysis, interpretation, and writing. JL was involved in the conceptualization, ethical approval, and data collection. LD was involved in the data analysis and writing. CS was involved in the conceptualization, ethical approval, data analysis, interpretation, and manuscript preparation.

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Resilience as a Mediator of Emotional Intelligence and Perceived Stress: A Cross-Country Study

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Existing literature provides evidence of the connection between emotional intelligence and resilience, both concepts being adversely related to perceived stress. Nevertheless, there is little evidence from cross-cultural and/or cross-country studies of the simultaneous relationship between these psychological variables. The objective of this study was to address this lack of research, examining the associations between emotional intelligence, resilience and perceived stress in a cross-country context. A total sample of 696 undergraduate students from two universities in the United States and the Basque Country (an autonomous community in northern Spain) participated in the study. Structural equation modeling was used to examine the effects of emotional intelligence and resilience that may affect students' perceived stress. The results revealed that emotional intelligence functions as a negative predictor of perceived stress through the mediating variable resilience for the American and Basque students. The findings suggest that university students with better emotional intelligence and resilience present lower perceived stress. Thus, improving emotional intelligence and resilience could prevent students from suffering perceived stress in higher education. Implications and directions for further research are discussed; in particular, it is highlighted that intervention programs that improve both EI and resilience could be helpful in reducing perceived stress.

Keywords: emotional intelligence, resilience, perceived stress, undergraduate students, cross-country study

INTRODUCTION

Since the first academic paper in 1990, research in emotional intelligence (EI) has grown considerably. However, very few cross-cultural/country studies have been carried out in the field. In general, these studies have found differences between European–American cultures and Eastern-Asian cultures, but not between European and American countries. Nozaki (2018) for example, found differences between European–American and Eastern Asian groups regarding the consequences of emotion regulation strategies. In particular, trait EI has been found to be negatively related to suppression (emotion regulation) in European–American groups, but not in the Japanese population. In the same vein, Gökçen et al. (2014) confirmed that there were cultural differences in trait EI. They compared two samples (Hong Kong and the United Kingdom) and they found that the British participants obtained higher EI compared to their Chinese counterparts. These

findings were justified by explaining that the European-American population is individualist, while the Eastern Asian population is collectivist. In collectivist cultures, emphasis is placed on in-group achievement and interdependence, while in individualist cultures emphasis is placed on personal success and independence (Gökçen et al., 2014).

Resilience and perceived stress have also been examined in cross-cultural studies. However, results are contradictory. In a study comprising three different samples (United States, China, and Taiwan) it was found that resilience levels were similar in the different cultures (Li and Yang, 2016). Likewise, in a study conducted with Spanish and French students it was demonstrated that the results in relation to resilience were similar in both countries (Alonso-Tapia and Villasana, 2014). Regarding stress, in a cross-cultural study comprising three samples (Japan, Lithuania, and United States) it was shown that perceived stress differed across those cultures (Kononovas and Dallas, 2009).

Although EI, resilience and perceived stress have been examined separately in cross-country/cultural studies, there is not a single study investigating the relationship between the three variables across countries or cultures. Given that the University of the Basque Country is located in Europe and the University of Nevada in the United States, the two samples included in the study come from western (European–American) cultures, that is, collectivist cultures.

Emotional Intelligence

Since the first scientific definition of EI in 1990, several theories have come up and currently there is no a single definition of the concept. The first scientific definition was provided by Salovey and Mayer (1990) who defined EI as “the ability to monitor one’s own and others’ feelings, to discriminate among them and to use this information to guide one’s thinking and action” (pp. 189). Later, in 1997, they modified this definition and presented a model with four branches (Mayer and Salovey, 1997; Mayer et al., 2004): Emotion perception, facilitation, understanding and regulation.

In the past 3 decades, several models have been developed, and EI is understood from different perspectives. On the one hand, EI can be considered an ability. On the other hand EI can be understood as a personality trait. Finally, EI can be taken as a mixed construct that comprise both abilities and personality traits. Regarding ability EI theories, ability EI is a cognitive ability related to the emotions that can be modified and improved thanks to intervention programs and trainings. As for trait EI theories, EI has been defined as a constellation of emotional perceptions located at the lower levels of personality hierarchies (Petrides and Furnham, 2001). Finally, according to mixed EI theories, EI is related to emotional abilities as well as personality traits.

This study is based on Mayer and Salovey’s (1997) four branch model: perception, facilitation, understanding and regulation of emotions. Perception of emotions refers to the ability to identify our own and other’s emotions, as well as the ability to identify emotions in other stimuli. Facilitation of emotions is related to the ability to use emotions to assist in certain cognitive enterprises, such as problem solving, interpersonal communication or reasoning. Understanding of

emotions involves the ability to analyze emotions. Regulation of emotions involves the ability to modify an emotional response.

Emotional intelligence (EI) is related to many important life factors. In fact, EI is a significant predictor of subjective well-being (Andrei et al., 2016), job performance (O’Boyle et al., 2011), interpersonal relationships with romantic partners (Malouff et al., 2014), social support (Goldenberg et al., 2006), IQ (Webb et al., 2013) and health (Martins et al., 2010; Mikolajczak et al., 2015); while it is negatively related to loneliness (Anguiano-Carrasco et al., 2015) and depression (Webb et al., 2013), among others. Likewise, EI can be improved thanks to trainings and intervention programs (Mikolajczak and Peña-Sarrionandia, 2015).

Resilience

After a stressful life event, some individuals have the capacity to recover more quickly than others and draw strength from the situation. Resilience has been described as a dynamic process where an individual adapts positively to an adversity (Luthar et al., 2000). That is, resilience is the capacity of a dynamic system to adapt successfully in the context of significant threats to system function, viability, or development (Masten, 2013).

Although there are different approaches to understanding resilience, in the present study resilience is considered as a trait. According to this approach resilience is a positive personality trait that promotes adaptation (Wagnild and Young, 1993; Connor and Davidson, 2003). In fact, resilience is considered as a series of individual attributes that can facilitate the ability to cope when confronted with stressful life events (Hoge et al., 2007). Based on a multidimensional nature of resilience, Connor and Davidson (2003) explained that there can be different reactions to a stressor. On the one hand, the stressor may represent a chance to grow and increase the person’s resilience, and thereby promote a come back to a higher level of balance. Conversely, the individual may have adjustment problems and deploy destructive means to cope with the stressor. This implies that resilient individuals could maintain their psychological health by buffering negative effects from difficult times.

Resilience has been associated with well-being (Harms et al., 2018), satisfaction with life, affect, self-concept and engagement (Sagone and De Caroli, 2014; Bajaj and Pande, 2016; Rodríguez-Fernández et al., 2016). Likewise, resilience has been found to be related to personal competence, high standards and tenacity; trust in one’s instincts, tolerance of negative affect, and strengthening effects of stress; positive acceptance of change, and secure relationships; control; and spiritual influences (Connor and Davidson, 2003).

Perceived Stress

Subjective perception of stress continues to be a relevant concept of considerable interest in health studies. It is associated with a person’s overall health status and different diseases, including adjustment disorders (Vallejo et al., 2018). Understood as a maladaptive indicator, Lazarus and Folkman (1984, p. 19) defined stress as a “relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being. Stressful

events, and thus perceived stress, appear throughout the life cycle, and they also affect college students. Indeed, there is increasing empirical evidence for the presence of psychological problems in young adults, especially during their years at university (Milojevich and Lukowski, 2016). Undergraduate students are moving into and through a major developmental period of transition, and stress is becoming more prevalent among this population (Beiter et al., 2015). Consequently, they face different stressful situations due to the challenging developmental tasks of the young adulthood stage which can limit their psychological comfort. According to the previous research, university life can be considered as a potentially stressful situation and college students display high levels of psychological distress, such as depression, anxiety, and specially stress (Saleh et al., 2017b). Some studies have found that the tendency to experience unpleasant emotions and suffer from low self-esteem, little optimism and a low sense of self-efficacy could be stress predictors in college students (Saleh et al., 2017a). Notwithstanding the above, many studies also highlight the existing link between certain positive traits like individual differences and stress regulation processes (Nelis et al., 2009; Thomas et al., 2018).

Relationship Between Emotional Intelligence, Resilience and Perceived Stress

In the following paragraphs, the results of studies evaluating the relationships between EI, resilience and perceived stress are presented. The first paragraph refers to the studies investigating the relationship between EI and resilience, the second paragraph focuses on EI and stress and the last paragraph presents the results of the studies that evaluating the relationship between resilience and perceived stress.

In relation to the association between EI and resilience, the vast majority of research in the area shows that people with better EI have better resilience. In particular, Schneider et al. (2013) demonstrated that EI facilitates stress resilience. In fact, the four EI abilities appeared to facilitate resilient stress responses including challenge appraisals, more positive and less negative affect, and challenge physiology. Likewise, Magnano et al. (2016) showed that EI plays a significant role on resilience. In the same vein, Armstrong et al. (2011) revealed that EI was related to psychological resilience. According to these authors, having higher EI is adaptive in stressful circumstances. Salovey et al. (1999, p. 161), for their part, confirm that people with better EI fare better with the emotional requests of stressful situations as they are able to “accurately perceive and appraise their emotions, know how and when to express their feelings, and can effectively regulate their mood states.” Finally, Cejudo et al. (2016) confirm that people with a high level of EI show a greater degree of resilience, being the correlation between emotion repair and resilience the most significant (among the different EI dimensions).

In terms of the relationship between EI and stress, the literature confirms that emotionally intelligent people show less perceived stress. According to Zysberg et al. (2017), stress levels

mediate the association between EI and burnout. Likewise, Jung et al. (2016) found an inverse correlation between EI and self-reported stress. Similarly, Urquijo et al. (2016) suggested that EI enhances well-being, diminishing the experience of stress.

Finally, with respect to the link between resilience and perceived stress it is necessary to highlight that in the previous research resilience is clearly conceptualized as the ability to cope after a stressor (Masten, 2001; Connor and Davidson, 2003). Even common life stressors may require coping. Consequently, this study is based on the idea that resilience should reflect with the successful management of stressors in general (Seery and Quinton, 2016). As resilience implies the ability to recover from undesirable circumstances, it can protect one's positive psychological functioning against stressors. In addition, previous studies suggest that psychopathological symptoms are closely linked with resilience (Southwick et al., 2005; Yu et al., 2016), so high resilience scores are generally associated with fewer indicators of maladjustment. To the contrary, lower levels of resilience forecast injured psychological functioning. Besides which, in the family context resilience has been negatively associated with adolescent/young adults' perceived stress (Chen et al., 2018); however, it would be beneficial to examine this relationship thoroughly. Thus, there are limited data about the protective role of resilience on perceived stress in undergraduate students.

In short, it should be noted that although there are indeed some studies assessing the relationship between two of the three variables evaluated in the study (EI-resilience, EI-perceived stress, resilience-perceived stress), there is a huge deficiency regarding the relationship between the three variables (EI-resilience-perceived stress). In fact, there is not a single study assessing this relationship; and this gap should be closed.

Aims of the Present Study

Based on prior research in the field of EI, resilience and perceived stress, the present study had two main aims. Firstly, this study was aimed at exploring the relationships between EI, resilience and perceived stress in two different countries: America and Basque Country. The use of such samples would help to identify the cross-country replicability of the relationships between the variables of the study, but would also provide a first insight into specific associations within each group. Secondly, the study aimed to shed light on the way EI affects perceived stress by analyzing the potential mediating influence of resilience to bridge the gap in relation to previous research. Moreover, a better understanding of these associations would have a crucial practical impact concerning stress prevention. The model with EI as predictor, resilience as mediating variable and perceived stress is shown in **Figure 1**.

The following hypotheses were therefore formulated:

Hypothesis 1: EI positively predicts resilience.

Hypothesis 2: Resilience negatively predicts perceived stress.

Hypothesis 3: EI negatively predicts perceived stress.

Hypothesis 4: The effect of EI on perceived stress is mediated by resilience. In particular, EI should lead to

higher resilience, which should in turn lead to lower perceived stress (high EI → high resilience → low perceived stress).

Hypothesis 5: The relationships between EI-resilience-perceived stress will be similar in both countries.

MATERIALS AND METHODS

Design

We performed a cross-country comparative analysis of data from undergraduate student population in the United States and the Basque Country (Northern Spain). These two natural groups belonging to different cultures were compared at a given point in time. This is an explanatory design with latent variables in which structural equation models make it possible to test the effects of partial mediation as well to compare the adjustment of alternative full mediation models.

Participants and Procedure

Participants were comprised of 698 undergraduate students (232 male, 466 female; $M_{\text{age}} = 20.69$ years, $SD = 2.33$; age range 18–45) enrolled in Psychology and Education faculties. Among these 698 students, 300 were recruited from the University of Nevada (United States) and 398 from the University of the Basque Country (Northern Spain), using the convenience sampling method. Response rate was 92% in the United States and 95% in the Basque Country.

The University of the Basque Country is the public university of the Basque Country. It has three campuses over three provinces receiving more than 40,000 students. The university offers 68 degrees, 111 official masters, and 65 Ph.D. programs. According to the Shanghai Ranking (ARWU), the University of the Basque Country is among the best 400 universities of the world (2018). The University of Nevada is a public research university located in Reno, Nevada. It has more than 18,000 students and offers more than 100 degrees, certificates and licensures in more than

145 academic majors. The university was ranked joint 197th among national universities by United States News and World Reports (2017).

A link to the online survey was given to American students, and data from the Basque sample was obtained using paper and pencil questionnaires. The demographic characteristics of the respondents can be found in **Table 1** for both samples. Participation was strictly anonymous and voluntary. The students agreed to participate in the research via informed consent or mouse click in line with the questionnaire method. Participants did not receive financial compensation.

Measures

Perceived Emotional Intelligence

This construct was evaluated using the Self-Rated Emotional Intelligence Scale (SREIS; Brackett et al., 2006). It is a self-rating measure with 19 items and a 5-point Likert-type scale (ranging from 0 = *very inaccurate* to 4 = *very accurate*) that allows the participants to describe, in their view, how accurate or inaccurate each statement is. The SREIS assesses in both oneself and others the perception of emotions (e.g., By looking at people's facial expressions, I recognize the emotions they are experiencing), use of emotions (e.g., When making decisions, I listen to my feelings to see if the decision feels right), understanding emotions (e.g., I have a rich vocabulary to describe my emotions) and management of emotions (e.g., I can handle stressful situations without getting too nervous). The total SREIS score ranges from 1 (low emotional intelligence) to 95 (high EI). Brackett et al. (2006) conducted several studies in which the reported Cronbach's alphas for the SREIS were as follows: 0.84 (study 1), 0.77 (study 2), and 0.66 (study 3). In this study, the full scale was reliable: 0.75 and 0.81 for the United States sample and Basque sample, respectively. As for the four dimensions that assess the SREIS, the reported Cronbach's alphas are the following: Perception of emotions 0.70, Facilitation of emotions 0.67, Understanding of emotions 0.84, and Regulation of emotions 0.75.

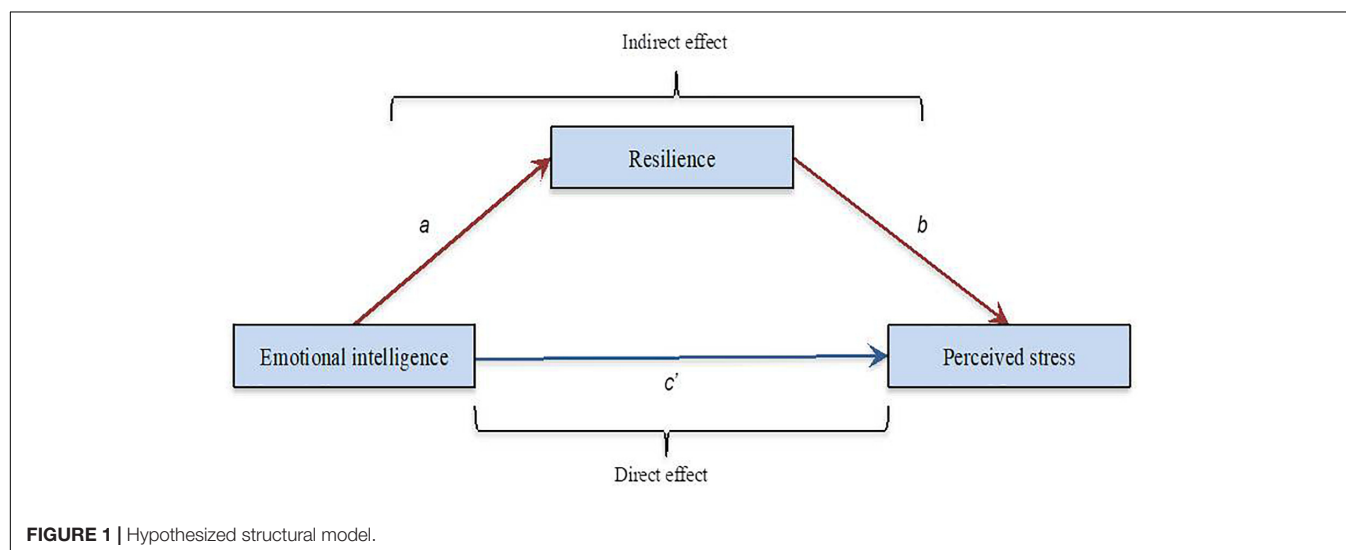


TABLE 1 | Demographic characteristics of the study samples.

Country	Questionnaire method	Sample size	Males/females	Age
United States	Online	300	90/210	$M = 21.56$ ($SD = 2.82$)
Basque Country	Paper-pencil	398	140/256	$M = 20.13$ ($SD = 1.72$)
Total		698	230/466	$M = 20.69$ ($SD = 2.33$)

Resilience

Participant resilience was measured with the 10-item Connor-Davidson Resilience Scale (10-item CD-RISC; Campbell-Sills and Stein, 2007). This self-report scale is an abbreviated version of the Connor-Davidson Scale (Connor and Davidson, 2003) that consists of 10 items (e.g., Can deal with whatever comes, Able to adapt to change) preceded by the following opening phrase: “In the last month, how often have you felt. . .”. Respondents rate themselves on a 5-point Likert Scale (ranging from 0 = *never* to 4 = *almost always*). The answers to the items are added up to create a resilience score (range 0–40), with higher scores indicating greater resilience. Psychometric evaluation of the 10-item CD-RISC conducted on undergraduate samples demonstrated that the scale had good reliability (Cronbach $\alpha = 0.85$) (Campbell-Sills and Stein, 2007). In the present sample, the internal reliability indices of the 10-item CD-RISC were 0.83 for the United States sample and 0.73 for the Basque sample.

Perceived Stress

The Perceived Stress Scale 4 (PSS-4) was applied to evaluate the degree to which life situations are perceived as stressful (Cohen et al., 1983; Cohen and Williamson, 1988). This questionnaire asks participants about how unpredictable, uncontrollable, and overloading respondents find their lives, and how they think they felt during the last month. The 5-point Likert scale (ranging from 0 = *never* to 4 = *very often*) allows the respondent to agree or disagree with a series of statements. In particular, the four items are “*In the last month, how often have you felt that you were unable to control the important things in your life?*”, “*In the last month, how often have you felt confident about your ability to handle your personal problems?*”, “*In the last month, how often have you felt that things were going your way?*”, and “*In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?*”. Total psychological stress score is ranged between 0–16, with higher scores suggesting higher psychological perceived stress. The four-item version of the PSS-4 presents good reliability and validity (Cohen et al., 1983). In the original study Cronbach's alpha of this abbreviated scale was 0.72. In the present sample, the internal reliability indices of the PSS-4 were 0.70 for the United States sample and 0.70 for the Basque sample.

Ethical Considerations

The study adheres to the ethical values set up for psychological research and assessment, and respected the basic principles arranged in the American Psychology Association's ethics code and in current regulations (informed consent and the right

to information, protection of personal data and confidentiality guarantees, non-discrimination, non-remuneration and the right to withdraw from the study at any time). The protocol was approved by the Ethical Committee for Investigations related to Human Beings (University of the Basque Country).

Data Analyses

Descriptive statistics were performed using SPSS Statistics 24.0 and the confirmatory analysis was computed using SPSS Amos 24. There is not a high percentage of extreme values, which could distort further testing, and a decision was made not to disregard them. In fact, these extreme values are representative of the sample object of interest. The rate of missing data was low and therefore, no imputation procedures were implemented.

The bootstrap method was applied, as offered by the AMOS 24 program (with 2000 repetitions and establishing a confidence interval of 95%). This method calculates the empirical distribution for the statistics using random sampling with replacement. Therefore, the estimates are robust insofar as they are not affected by a lack of normality in the residual distribution.

Before being able to test the hypothesized model, the measurement portion of the model needs to be specified, so the two-step procedure (Anderson and Gerbing, 1988; Byrne, 2013) was followed in this study. According to this method, the task involved in developing and testing the structural model is twofold: The first step involves a confirmatory factor analysis (CFA) of the measurement model, which includes the relationships between the observed variables and the latent variables. The second step includes a CFA of the causal relationships between the constructs of the model as specified by the theory.

In order to verify the hypothesized model regarding the potential mediating role of resilience between EI and perceived stress, structured equation procedure was applied. The maximum likelihood estimation (ML) method was used. To examine the overall fit of the model to the data, several indexes proposed by Hu and Bentler (1999) and Kline (2015) were computed in the present study: chi-square statistic (χ^2) and its level of associated probability, CFI (Comparative Fit Index), TLI (Tucker–Lewis Index), RMSEA (Root Mean Square Error of Approximation) with its confidence interval (CI), and SRMR (Standardized Root Mean Square Residual). The chi-squared test was also included to compare the estimated models. For the CFI, values over 0.90 suggest acceptable fit, while values over 0.95 suggest a good fit. Values on the SRMR and the RMSEA near 0.05 suggest an excellent fit, whereas values between 0.05 and 0.08 suggest an acceptable fit (Hu and Bentler, 1999; Kline, 2015).

RESULTS

Descriptive Statistics and Relationships Between the Study Variables in the Two Samples

To examine the measurements (SREIS, CD-RISC 10, and PSS-4), mean, standard deviation and reliability analyses (Cronbach's

alpha) were computed. Furthermore, Pearson correlations between the three study variables were conducted in order to analyze the relationships between EI, resilience and perceived stress. The descriptive statistics, correlation coefficients, and Cronbach's alphas for each of the two samples are presented in **Table 2**.

Table 2 displays the means of the SREIS in the Basque sample and the PSS-4 in both samples ranged around the scale midpoints (i.e., 47.5 for the SREIS; 8 for the PSS-4). Means of the SREIS in the American sample and the CD-RISC 10 in both samples were significantly above the scale midpoint (i.e., 20 for the CD-RISC 10 and 47.5 for the SREIS). Standard deviation showed the tendency to be higher in both samples. Internal consistencies were acceptable as showed by Cronbach's alpha coefficients.

To analyze the relationships between EI, resilience, and perceived stress, correlations between the SREIS, CD-RISC10, and PSS-4 were estimated. While EI had positive and significant association with resilience, EI and resilience were negatively related with perceived stress. In the American sample resilience was more strongly related to EI and perceived stress than in the Basque sample. Besides which, a statistically significantly higher correlation coefficient was found in the Basque sample regarding the relationship between EI and perceived stress.

Mediational Analyses Measurement Model

The measurement model consisted of three interrelated latent variables (EI, resilience, and perceived stress), whose indicators, in the case of resilience and perceived stress, were those items of the questionnaires in the corresponding test. With regards to EI, parcels of items were used as manifest variable in structural equation modeling procedure. In accordance with the internal-consistency method, parcels were created by using the facets as the grouping criteria. Each parcel reflects each facet and is the average of all the items. The results of this analysis revealed a good level of model adjustment in the American and Basque samples: $\chi^2_{(69)} = 96.20$, $p < 0.05$; CFI = 0.98; TLI = 0.97; SRMR = 0.040; RMSEA = 0.036 (90% CI = 0.016–0.053) and $\chi^2_{(67)} = 130.06$,

$p < 0.05$; CFI = 0.94; TLI = 0.91; SRMR = 0.046; RMSEA = 0.049 (90% CI = 0.036–0.061), respectively.

Structural Model: Partial Versus Full Mediation

Structural equation models (SEM) using maximum likelihood estimations were conducted to examine the mediating effect of resilience on the influence of EI on perceived stress. To verify the relationships among all the variables analyzed in this study, the values of goodness-of-fit indices obtained from the hypothesized model of partial mediation and the model of full mediation for the American and Basque samples were compared (see **Table 3**). On the one hand, the partial mediating model tested the possible direct effect of EI on perceived stress, and, on the other, the full mediating model constrained this potential direct path to zero.

Based on the same criteria used for evaluating the relationships between the different constructs involved in the research, the results of the proposed structural model for the American and Basque samples were very close together. With regards to the American sample, the hypothesized model (partial mediating model) fit the data adequately: $\chi^2_{(69)} = 96.20$, $p < 0.05$; CFI = 0.98; TLI = 0.97; SRMR = 0.040; RMSEA = 0.036 (90% CI = 0.016–0.053). Nevertheless, after a detailed examination of the estimated parameters it was noted that the path from resilience to perceived stress ($\beta = -0.147$, $p = 0.700$) did not provide the expected significant explanatory level. These results suggested that resilience is not directly associated with perceived stress when a direct path from EI to perceived stress is included in the model. In addition to testing the indirect effect of EI on perceived stress through resilience, the alternative model (full mediating model) also suggested an adequate global fit: $\chi^2_{(70)} = 107.79$, $p < 0.05$; CFI = 0.97; TLI = 0.96; SRMR = 0.044; RMSEA = 0.042 (90% CI = 0.026–0.058). In view of the regression coefficients, all of the suggested pathways achieved statistically significant levels. Considering the contrast between two models, as well as the degrees of freedom, the chi-squared test [$\Delta\chi^2_{(1,300)} = 11.59$, $p < 0.001$] corroborated the significant difference between the tested models. The cross-validation index (ECVI) also supported the fact that both models were significantly different; besides, it confirmed that the alternative model showed more replicability due to its lower value as compared to the index obtained in the hypothesized model. As a consequence, the full mediating model concerning the relationship between EI and perceived stress was supported. Standardized path coefficients for the final mediational model in the American sample are depicted in **Figure 2**.

As regards to the Basque sample, the resulting parameters obtained in the hypothesized model (partial mediating model) were within accepted limits, and thus suggested an acceptable global fit: $\chi^2_{(69)} = 120.01$, $p < 0.05$; CFI = 0.94; TLI = 0.93; SRMR = 0.059; RMSEA = 0.043 (90% CI = 0.030–0.056). Excepting the path from EI to perceived stress ($\beta = -0.277$, $p = 0.083$), all the proposed directions obtained significance level ($p < 0.001$). Accordingly, there seems to be no direct link between these variables in the proposed model. Besides that, the alternative model (full mediating model) also showed a good global fit: $\chi^2_{(67)} = 130.06$, $p < 0.05$; CFI = 0.93;

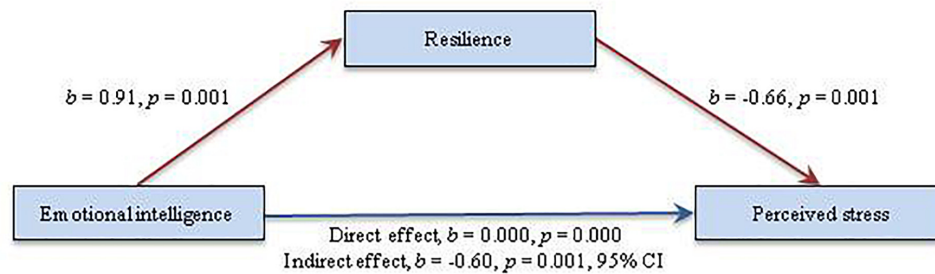
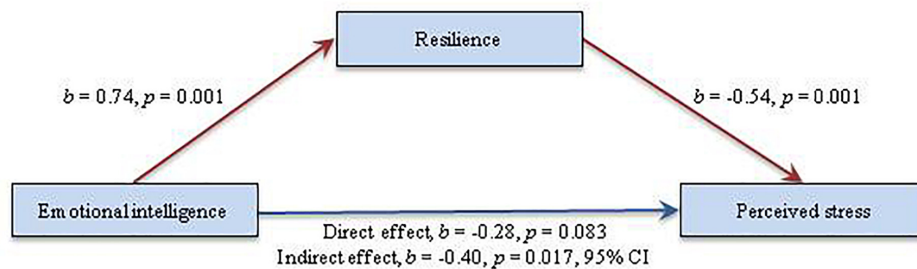
TABLE 2 | Correlation coefficients, descriptive statistics and alphas for the United States and Basque Country samples.

Measures	United States (N = 300)			Basque Country (N = 396)		
	1	2	3	1	2	3
(1) SREIS	1	0.52**	−0.29**	1	0.39**	−0.48**
(2) CD-RISC		1	−0.48**		1	−0.11**
(3) PSS-4			1			1
M (0–4 scale)	3.36	3.13	2.11	2.92	2.65	2.16
Sd	0.44	0.51	0.60	0.44	0.43	0.42
Cronbach α	0.75	0.83	0.70	0.81	0.73	0.65

** $p < 0.01$. $N_{\text{American sample}} = 300$ (90 men, 210 women); $M_{\text{Basque sample}} = 396$ (140 men; 256 women); SREIS: Self-Rated Emotional Intelligence Scale; CD-RISC: Connor-Davidson Resilience Scale (10 item version); SPSS-24: Perceived Stress Scale (4 item version).

TABLE 3 | Model fit summary for the final structural model for the American and Basque samples.

Fit index	Suggested value Hair et al. (2010)	American sample		Basque sample	
		Hypothesized model	Alternative model	Hypothesized model	Alternative model
χ^2	$p < 0.05$	96.20	107.79	120.01	130.06
df	n/a	69	70	69	67
χ^2/df	< 5 preferably < 3	1.39	1.54	1.74	1.94
CFI	> 0.90	0.98	0.97	0.94	0.93
TLI	> 0.90	0.97	0.96	0.93	0.91
SRMR	< 0.10	0.040	0.044	0.059	0.046
RMSEA _(IC)	< 0.08	0.036 _(0.016–0.053)	0.042 _(0.026–0.058)	0.043 _(0.030–0.056)	0.049 _(0.036–0.061)
ECVI _(IC)		0.59 _(0.51–0.70)	0.56 _(0.49–0.66)	0.51 _(0.45–0.61)	0.52 _(0.45–0.62)

**FIGURE 2 |** Standardized Solution of the Final Model in the American Sample.**FIGURE 3 |** Standardized Solution of the Final Model in the Basque Sample.

TLI = 0.91; SRMR = 0.046; RMSEA = 0.049 (90% CI = 0.036–0.061). After analyzing the estimated parameters, all the suggested paths were found to reach statistically significant levels ($p < 0.001$). The comparison between the models using the chi-square difference test indicated that the two models were significantly different [$\Delta\chi^2_{(1,398)} = 10.05$, $p < 0.001$]. This was also verified by the ECVI, according to which the hypothesized model (Figure 3) presents a better degree of replicability compared to the alternative mediating model.

Path Coefficients and Assessment of Mediation

The significance of the mediating effect of resilience in both final models was assessed using the non-parametric Bootstrap procedure in AMOS 24. Specifically, 2000 bootstrap iterations were generated through random sampling with replacement

from the data set in each sample ($N_{\text{Americansample}} = 300$; $N_{\text{Basquesample}} = 398$).

Standardized direct and indirect effects of EI and resilience on perceived stress are presented in Table 4. If the model's regression coefficients are analyzed individually, it is clear that the majority of the supposed direct effects obtained significant levels ($p < 0.001$; $p < 0.05$), with the exception of the EI-perceived stress pathway in the Basque sample ($\beta_{\text{Basquesample}} = -0.28$, $p > 0.05$). EI revealed a significant positive path to resilience ($\beta_{\text{Americansample}} = 0.91$, $p < 0.001$; $\beta_{\text{Basquesample}} = 0.74$, $p < 0.001$), showing a statistically significantly higher regression coefficient in the American sample compared to the Basque sample.

On the other hand, a significant path from resilience to perceived stress could be observed, showing a higher negative coefficient in the American sample ($\beta_{\text{Americansample}} = -0.66$, $p < 0.001$; $\beta_{\text{Basquesample}} = -0.54$, $p < 0.001$).

TABLE 4 | Model pathways, bootstrapped point estimates of direct and indirect effects, *p*-values and study results.

Hypothesis	Model pathways	Point estimate	<i>p</i> -value	Study results
American sample				
Hypothesis 1	EI → RE direct	0.912***	0.001	Supported
Hypothesis 2	RE → PS direct	−0.663***	0.001	Supported
Hypothesis 3	EI → PS direct	0.000	0.000	Not supported
Hypothesis 4	EI → PS indirect	−0.605***	0.001	Supported
Basque sample				
Hypothesis 1	EI → RE direct	0.741***	0.001	Supported
Hypothesis 2	RE → PS direct	−0.544***	0.001	Supported
Hypothesis 3	EI → PS direct	−0.277	0.083	Not supported
Hypothesis 4	EI → PS indirect	−0.403*	0.017	Supported

p* < 0.05, **p* < 0.001. EI, emotional intelligence. RE, resilience. PS, perceived stress.

According to the results, the effect of EI on perceived stress was completely mediated by resilience in both samples ($\beta_{\text{Americansample}} = -0.60$, $p < 0.001$; $\beta_{\text{Basquesample}} = -0.40$, $p < 0.05$), explaining the 44 and 60% of the variance in perceived stress in the American and Basque sample, respectively. To see the path coefficients of the ultimate model in standardized form, see Figures 2, 3.

DISCUSSION

The main goal of this cross-country study was to simultaneously evaluate the association between EI, resilience and perceived stress in two samples of undergraduate students. Congruent with our primary hypothesis, we found that the previously reported positive effect of EI on resilience (Armstrong et al., 2011; Cejudo et al., 2016; Magnano et al., 2016) was significant in the two countries -the Basque Country and the United States-. These findings revealed that the ability of undergraduate students to identify and manage their own emotions, as well as other's emotions seems to have a predictive impact on their ability to cope with developmental tasks despite the risks.

Consistent with our second hypothesis, resilience was expected to have a significantly negative impact on perceived stress. Findings did confirm this hypothesis in Basque and American students. This is in accordance with previous studies that suggest that individuals with high resilience may recover effectively from daily stress (Ong et al., 2006). Likewise, studies report resilience as a crucial source of students' healthy adaptation despite difficult or unpleasant situations (Wright et al., 2013; Rodríguez-Fernández et al., 2016). Some recent research looks at the buffering impact of resilience on daily stressors leading to lower psychological discomfort (McKay et al., 2018); however, few studies look at the processes underlying such findings.

Furthermore, contrary to our third hypothesis, we found that the models of the current study did not support the negative direct impact from EI to perceived stress. Based on the results obtained

in studies that have evaluated the relationship between EI and perceived stress (Jung et al., 2016; Urquijo et al., 2016; Zysberg et al., 2017), we hypothesized that EI would be negatively associated with perceived stress. However, results have shown that there is not a direct link between these two variables, but an indirect one (EI and perceived stress are connected through resilience). Our results are in line with those of Zeidner and Olnick-Shemesh (2010), which posit that emotionally intelligent individuals may have superior skills in coping with threatening events, either through direct management of stressors, or through finding opportunities for personal growth and learning in adverse situations. Thus, it is suggested that there could be some different possible pathways for psychological impacts on adaptative responses. Our results demonstrated evidence of an indirect role for EI when individuals possess resilience characteristics that protect them from stress. Indeed, EI may lead individuals to become more resilient, indicating that resilience is not only the complement of psychological readjustment, but more (Ong et al., 2006).

In line with our expectations in relation to our fourth hypothesis, the specific indirect effect of EI on perceived stress via resilience was significant in both samples. That is, undergraduate students with higher levels of EI were inclined to be more resilient, which may contribute to a decrease in perceived stress. If we compare the input of the different variables included in the theoretical model, it becomes clear that perceived stress is indirectly determined by EI. Moreover, and in accordance with Hodzic et al. (2016) we identify that EI, as a protective factor promoting stress-resiliency, plays a paramount role in the activation of strategies that could help in protecting psychological adjustment.

Regarding the fifth hypothesis, bearing in mind that the association between EI-resilience-perceived stress has been the same in both countries, hypothesis five has been confirmed. These results are in line with those cross-cultural/country studies that show that there are differences between European-American and Eastern Asian cultures, but not between European and American cultures (Gökçen et al., 2014; Li and Yang, 2016; Nozaki, 2018). Given that our study includes one European sample and one American, we confirm the results of those studies that have not found differences between these cultures.

This research offers remarkable strengths, such as the cross-country nature of the study, and the assessment of the way EI affects perceived stress by analyzing the potential mediating influence of resilience. Regarding the cross-country nature of this research, it must be highlighted that although EI, resilience and stress have already been examined in other studies, there is little evidence from cross-country studies of the simultaneous relationship between these psychological variables. As for the further knowledge obtained regarding the association between EI, resilience and perceived stress, the study has shed light on the way EI affects perceived stress by analyzing the potential mediating influence of resilience, thus bridging the gap in relation to previous research. In this regard, the most important contribution of this study is that resilience is a mediator of the relationship between EI and perceived stress in young students. These results allow us to strongly suggest that resilience plays a crucial role in determining psychological health during university years.

As future lines of research, it is suggested to replicate this investigation using other potential mediators that might act between EI and perceived stress, as well as explaining the relationship between these variables. It has been demonstrated that EI is related to subjective well-being, mental health, social support, etc.; that resilience is associated to well-being outcomes like satisfaction with life, affect, self-concept and engagement; and that stress is related to low self-esteem, little optimism and a low sense of self-efficacy, among others. Thus, subjective well-being, self-esteem, satisfaction with life or self-concept could be potential mediators acting between EI and perceived stress.

The results obtained in the study have important applied implications. In fact, it would be beneficial for practitioners to recognize that EI and resilience may be used to prevent or reduce perceived stress. Thus, intervention programs that improve both EI and resilience could be helpful in reducing perceived stress. Such interventions could be applied in universities to develop EI and resilience, and avoid perceived stress. In fact, undergraduate students suffer from high perceived stress levels, and it would be helpful for them to develop their EI and resilience, thus reducing their perceived stress and improving their mental health.

A few limitations of this study warrant mention. First, it should be noted that in both samples women outnumber men. This gender imbalance represents the existing reality in certain university degrees (such as Psychology and Education) in which objectively there is a higher percentage of female students. Nevertheless, in future studies an attempt could be made to achieve a balanced participation of both genders, by collecting data in university degrees in which there is a higher proportion of male students or in which both subgroups are more balanced. Second, it should be made clear that due to the design used this study proves relations and predictive capacity between variables; but never shows cause-effect associations. Therefore, further research to test the model with longitudinal data to establish the casual relationships. Third, it should be mentioned that the sample of the study is imbalanced regarding the degree courses. In fact, the participants of the present study come from Psychology and Education, two similar degrees that are not representative of the variety of university courses. Thus, conclusions should be interpreted with caution. Fourth, the length of the PSS-4 should be highlighted. Although it has good psychometric properties (good reliability and validity), perceived stress has been evaluated using only four items. It would be interesting for future studies to replicate the study using longer versions of the PSS in order to verify the results. Fifth, the small size of the sample should be highlighted. As the sample of the study is comprised with 300 undergraduates from the University of Nevada (United States) and 398 from the University of the Basque Country, we cannot generalize the results to the general population of the United States and Basque Country as 300 and 398 are not representative of the whole population. Sixth, and connected with the aforementioned limitation, we should clarify that although we have tried to fill the gap in cross-country studies regarding EI, resilience and perceived stress, more research is needed in order to fill the gap. In fact, the present study is a first step that should be followed by more research to deepen in

the field. Seventh, the low internal consistency of the Facilitation of emotions subscale should also be mentioned. In fact, this score may not be enough (Nunnally, 1978) due to the fact that a significant part of the variance would be explained by other factors, putting the internal reliability of the results obtained in this subscale at risk. The low internal consistency could be explained by the fact that Facilitation of emotions subscale consists in only three items. Nevertheless, as the total SREIS presents good internal consistency, the results presented in the study are reliable. Finally, future research may shed more light on the mediational variables between EI and perceived stress by integrating other psychological and contextual variables.

CONCLUSION

The results of this cross-national study demonstrate a predictive effect of EI and resilience on stress. Resilience can be considered a skill. Likewise, it has been proved that EI can be trained and thus improved (Mikolajczak and Peña-Sarrionandia, 2015). In this way, this study may easily conclude that EI and resilience would buffer the negative influence of stress. Therefore, it is essential to design socio-emotional intervention programs whose objective is to enhance these psychological variables (EI and resilience). Only through the implementation of such interventions under an experimental design and a longitudinal study will it be possible to verify whether the improvement of EI influences the levels of resilience and whether these, in turn, have an impact on stress reduction in undergraduate students.

AUTHOR CONTRIBUTIONS

ER-D collected data in the United States. ER-D, AS, and OF-L collected data in the Basque Country. ER-D ran the statistical analysis and wrote the methodological part. OF-L helped in the methodological part. AS and ER-D wrote the introduction. AS, ER-D, and OF-L wrote the discussion and revised the paper regarding the contents. AS revised the paper regarding the format.

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Emotional Intelligence Buffers the Effects of Negative Emotions on Job Burnout in Nursing

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The study was designed to examine whether trait emotional intelligence would moderate the impact of negative emotions at work on job burnout. A total of 188 female nurses participated in this study and completed measures of trait affectivity, emotional intelligence, anger and sadness at work, and burnout. The results revealed significant and positive relationships between both types of negative emotions and burnout above and beyond demographics and the nurses' trait affectivity. Importantly, the study demonstrated that trait emotional intelligence buffers the effects of negative emotions on burnout. Specifically, anger- and sadness-related emotions predicted greater burnout among nurses with low trait emotional intelligence but not among nurses with high trait emotional intelligence. These results suggest that emotional intelligence training could be implemented to prevent the adverse effect of negative emotions felt at work on job burnout.

Keywords: emotional competence, anger, sadness, occupational stress, nurses

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INTRODUCTION

Job burnout is a specific disorder resulting from prolonged exposure to high job demands in the absence of enough resources to compensate for their effects (Demerouti et al., 2000; Maslach et al., 2001; Bakker et al., 2004, 2014; Hu et al., 2017). There is ample evidence showing that burnout is costly for both individuals and organizations (for a review, see Cordes and Dougherty, 1993; Swider and Zimmerman, 2010): it affects workers' well-being, decreases job performance, and increases absenteeism and the intention to leave the job. The majority of research on burnout has been conducted in the human services (Schaufeli and Enzmann, 1998) and nursing professions have been described as particularly susceptible to burnout (Demerouti et al., 2000; Maslach et al., 2001; Consiglio, 2014; Munnangi et al., 2018). In the United States, up to 45% of nurses working in hospitals reach high burnout scores (Aiken et al., 2001).

Burnout has been shown to have a deleterious impact on nurses, as it affects their health (e.g., Shimizu et al., 2005; Jaworek et al., 2010; Duan-Porter et al., 2018). It also affects healthcare organizations, by increasing absenteeism (Iverson et al., 1998), job dissatisfaction (Wolpin et al., 1991) and intention to leave the profession (Leiter and Maslach, 2009; Heinen et al., 2013). Last but not least, burnout affects patient safety: higher rates of burnout among healthcare professionals are associated with lower quality of care (Poghosyan et al., 2010), increased frequency of neglectful behaviors toward patients (Reader and Gillespie, 2013) and increased frequency of adverse patient events, such as nosocomial infections (Cimiotti et al., 2012) and medication errors (Tsiga et al., 2017).

Nurses are exposed to a variety of occupational stressors, ranging from organizational factors such as heavy workloads and time pressure (Demerouti et al., 2000), to interpersonal conflicts at work (Dåderman and Basinska, 2016) and patient-related factors such as the suffering of or verbal aggression from patients and their relatives (Edward et al., 2014; Viotti et al., 2015). These conditions make nurses particularly vulnerable not only to stress but also to the experience of negative emotions (NE) (e.g., Acquadro Maran et al., 2018). Despite the significant role that emotions play in nursing practice (Bulmer-Smith et al., 2009), surprisingly little attention has been paid to the NE–burnout relationship and even less to the moderators of this relationship. These are the issues that inspired the current study.

The few studies that have measured both NE and burnout provide evidence suggesting that NE felt at work are related to burnout among nurses. Hillhouse and Adler (1997) were the first to demonstrate a statistical association between NE and burnout in nurses. In a cross-sectional study on 260 hospital nurses, they showed that nurses with the highest levels of anger and depression experience at work also reported the highest burnout scores. Erickson and Grove (2007) corroborated this relationship in another cross-sectional study on 829 nurses: younger nurses (i.e., under 30 years of age) with higher levels of anger and frustration at work reported higher rates of burnout. Similar results were obtained by Ersoy-Kart (2009), who conducted a study in a sample of 100 nurses (of which 47 worked in the private sector and 53 in the public sector) and observed that expression of anger at workplace correlated positively with emotional exhaustion scores. Zellars et al. (2004) demonstrated in a study on 296 hospital nurses that negative moods (states) at work correlated positively with emotional exhaustion, depersonalization, and reduced personal accomplishment. Importantly, in the study of Zellars et al. (2004), emotional exhaustion and depersonalization were predicted by negative moods over and above affectively saturated personality dimensions, such as neuroticism and extraversion. Finally, in the most recent study, Barr (2018) showed positive correlation between state negative affect and burnout in 142 nurses. It should be noted that the NE–burnout relationship was also observed among employees working in other than the health service sector. For example, Basińska et al. (2014) demonstrated positive correlations between burnout and NE (e.g., anger, boredom) in police officers. Similarly, Bedyńska and Żołnierczyk-Zreda (2015) observed positive association between NE and burnout in a study among managers, administrative staff, and shop assistants.

The foregoing studies constitute important evidence that NE could indeed contribute to nurses' burnout. In all above-mentioned studies, however, emotions were measured only once, which raises the possibility that the relationship between NE and burnout was driven by the momentary affective state. Moreover, respondents' emotions were assessed using the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) (see the study of Barr's, 2018), the Job Affect Scale (JAS; Brief et al., 1988) (see Zellars et al., 2004), and the Profile of Mood States (POMS; McNair et al., 1981) (see Hillhouse and Adler, 1997), thus providing a global NE score, but not referring to specific (discrete) emotions at work. Moreover, nurses' affective

dispositions were not controlled for [with the exception of the Zellars's et al. (2004) study], which limits the interpretation of the findings (i.e., the correlation between NE and reported burnout could simply be the product of a third variable, such as trait negative affectivity).

Given the importance of this issue, the current study aims to extend previous findings in four ways: first, by re-examining the association between NE and burnout using daily reports on emotions, collected over five consecutive days; second, by examining whether specific (discrete) NE, such as sadness-related and anger-related emotions uniquely contribute to nurses' burnout; third, by investigating whether sadness- and anger-related emotions contribute to burnout beyond the respondents' trait positive and negative affectivity; and, fourth, because we believe that attention should be paid to the factors that may alleviate the adverse effect of NE on job burnout, we aimed to examine whether the strength of the association between NE and burnout varies according to each nurse's emotional intelligence (EI).

The Role of Trait Emotional Intelligence in the Negative Emotions–Burnout Relationship

Do negative emotions always lead to burnout? The answer to this question requires the examination of emotion-related individual differences. The construct widely used to account for these differences is EI (Petrides and Furnham, 2000, 2001; Petrides, 2011). Although the past decade has witnessed an abundance of theoretical and empirical work dealing with EI in the nursing profession (e.g., Gerits et al., 2005; Kooker et al., 2007; Landa et al., 2008; Quoidbach and Hansenne, 2009; Kozłowski et al., 2017; Snowden et al., 2018), knowledge about the role of EI in nursing is still limited (Bulmer-Smith et al., 2009; Petrides and Sevdalis, 2010; McCloughen and Foster, 2018).

The notion of EI aims to capture individual differences in the way people process emotions and, in particular, in the way in which they identify, express, understand, regulate and use their emotions and those of others. Individuals high in EI are able to identify their own emotions and emotions of others, they are able to express emotions in a socially acceptable manner, understand causes and consequences of emotions, use them to enhance their thoughts, actions, and social relations, and regulate them when they are not appropriate to either their goals or the situational context (Mayer et al., 2016; Petrides et al., 2016).

There are two main conceptualizations of EI: ability models (e.g., Mayer and Salovey, 1997) and trait models (e.g., Petrides and Furnham, 2003; Petrides, 2011), which have led to different lines of research and to some debates on the status of EI as a set of traits (best assessed via personality-like tests) or abilities (best assessed via intelligence-like tests). These debates between trait and ability conceptions of EI have resulted in an integrative model encompassing three levels: knowledge, abilities, and traits (Mikolajczak, 2009). The knowledge level refers to what people know about emotions and emotionally intelligent behaviors (e.g., *do I know* which emotional expressions are constructive in a given social situation?). The ability level refers to the ability to apply

this knowledge in a real-world situation (e.g., *am I able* to express anger constructively in a given social situation?). The focus here is not on what people know but on what they can do: even though many people know that they should not shout when angry, many are simply unable to contain themselves. The trait level refers to emotion-related dispositions and captures people's disposition to behave in a certain way in emotional situations (e.g., when I am angry, do I *typically* express my anger constructively?). As the foregoing illustrations should have made obvious, these three levels of emotion-related individual differences are loosely connected (Lumley et al., 2005; Cardoso-Seixas, 2016). In the current paper, we refer to the trait level because we are interested in what a person actually does, and how people typically behave in emotional situations.

Previous research has shown that trait EI was negatively associated with burnout in nursing and medical staff, in both cross-sectional (e.g., Weng et al., 2011) and longitudinal (e.g., Mikolajczak et al., 2007a) studies. Experimental studies confirmed that trait EI is causally involved in this relationship: when trait EI is increased through training, burnout symptoms decrease (Karahana and Yalçin, 2009). Gerits et al. (2005) observed, in a 2-year longitudinal study, that female nurses relatively high in EI declared less burnout symptoms than their low-trait-EI counterparts. There is also evidence that high trait EI not only mitigates the symptoms of burnout, but also mediates the relationship between burnout and organizational outcomes, such as turnover intention and job performance (Magnano et al., 2017).

The processes, however, which underline this protective effect of EI on burnout in nurses have not received much attention. Görgens-Ekermans and Brand (2012) provided evidence that trait EI could moderate the relationship between stress and burnout. This is not surprising as trait EI promotes better management of negative or stressful situations. Research shows that individuals high in trait EI are both more likely to appraise stressful situations as a challenge rather than a threat, and they are more confident that they can cope with such situations (Mikolajczak and Luminet, 2008). This results in significantly lower reactivity to stressful events at both psychological (i.e., mood deterioration) and physiological (i.e., salivary cortisol) levels (Mikolajczak et al., 2007a,b). Moreover, trait EI is associated with the use of more efficient emotion-regulation strategies (for a meta-analysis, see Peña-Sarrionandia et al., 2015), which should help nurses with high EI to decrease efficiently the intensity and duration of NE, thereby protecting them against burnout. Trait EI, however, does not only promote better management of stressful situations. It also promotes better management of anger and sadness (Mikolajczak et al., 2008). The current study builds on these findings and suggests that EI could also moderate the relationship between NE and burnout.

The Current Study

In this study, we examined the impact of two state NE on burnout: anger-related emotions (ARE) and sadness-related emotions (SRE). We focused on these two state NE based on the results of our pilot study (see section "Materials and Methods"), which sought to identify the emotions most

frequently experienced by nurses at work. We hypothesized that both ARE and SRE would be related to burnout. Examining this, requires to control for trait negative affectivity (NA), as high trait NA is associated with higher levels of burnout (e.g., Wright and Cropanzano, 1998) and increases emotional reactivity to negative-mood induction (e.g., Larsen and Ketelaar, 1991). This raises the possibility that NE are only spuriously associated with burnout, the actual "driver" of this relationship being trait NA (cf. Wright and Cropanzano, 1998). We, therefore, controlled for this possibility. If state NE are indeed associated with burnout (beyond trait NA), we predicted that this relationship would be moderated by EI: nurses high in trait EI should be better able to regulate NE and, therefore, experience lower burnout levels than their low-trait-EI counterparts. In summary, we propose the following hypotheses:

Hypothesis 1: State anger-related emotions experienced by nurses at work are positively related to burnout, beyond trait negative affectivity.

Hypothesis 2: State sadness-related emotions experienced by nurses at work are positively related to burnout, beyond trait negative affectivity.

Hypothesis 3: Trait emotional intelligence moderates the relationships between anger-related emotions and burnout in such a way that this relationship is weaker among those with higher emotional intelligence than among those with lower emotional intelligence.

Hypothesis 4: Trait emotional intelligence moderates the relationships between sadness-related emotions and burnout in such a way that this relationship is weaker among those with higher emotional intelligence than among those with lower emotional intelligence.

MATERIALS AND METHODS

Participants

A total of 188 female nurses from three hospitals located in northern Poland participated in this study. The inclusion criteria for this study were as follows: voluntary participation, working with adults and working in shifts. The exclusion criteria: unwillingness to participate in this study and returning incomplete questionnaires. A total of 275 individuals initially expressed interest in this project, of which 188 actually participated (68%). Eighty-seven participants were excluded from the final sample, as they did not complete the questionnaires fully. The study involved nurses representing various care units: cardiology, surgery, orthopedics, internal medicine as well as anaesthesiology and intensive care. The participants were, on average, 42 years old ($SD = 9.43$), and ranged from 23 to 61 years old. The average number of hours at work/per week was 45 ($SD = 8.11$).

Measures Emotions

The emotions experienced by nurses at work were assessed using the Nurses Job Emotions Scale (NJES), which was created on the

basis of a pilot study. We decided to create the NJES for two reasons. First, we were interested in measuring specific (discrete) NE and not just NE. Second, to the best of our knowledge, there is no established and published instrument for assessing self-reported discrete emotions experienced by nurses in the workplace. Therefore, prior to the study, we conducted interviews with 47 nurses, who were asked to name the emotions they most frequently experienced during an average working day. All of the nurses reported experiencing stress and a number of discrete emotions. After the exclusion of repeated and synonymous terms, we devised a list of ten emotions that are most frequently experienced by nurses at work. In descending order of occurrence frequency, nurses reported experiencing positive emotions of enthusiasm, joy, pride, and contentment. The negative they experienced were (again, in descending order of frequency) anger, irritation, sadness, disappointment, embitterment, and depression. Therefore, the NJES that was used in this study consists of these ten adjectives describing emotions. Participants rated the extent to which they felt each emotion at work. They were asked to fill the questionnaire in relation to the current workday, i.e., “How do you feel today?” The NJES was completed five times, i.e., once a day, over five consecutive workdays. The response options ranged from one (not at all) to five (very much). As recommended by Fisher (2000), we calculated the mean level of intensity of each of the ten emotions over 5 days, by averaging participants’ ratings on each emotion; for similar approach see also Conway and Briner (2002) and Grandey et al. (2002). Next, in order to examine the factor structure of the ten emotion items used in the NJES, a principal component analysis with oblimin rotation has been conducted. Three factors were extracted based on the eigenvalues-greater-than-one rule, explaining 79.61% of common variance and with a clear differentiation between three factors. The first factor accounted for 39.53% of the total variance and consisted of SRE (“depression,” “disappointment,” and “sadness”). The second factor accounted for 21.53% of the total variance and consisted of the four positive emotions (“enthusiasm,” “happiness,” “contentment,” and “pride”). The third factor accounted for a further 18.55% of the total variance and consisted of ARE (“irritation,” “embitterment,” and “anger”). All factor loadings exceeded 0.78. Finally, scores for anger-related and sadness-related emotions were created by averaging their respective items. Consequently, anger-related and sadness-related scores reflected the average intensity level of each type of emotions (i.e., ARE and SRE) felt by nurses within five working days.

Burnout

Burnout was measured with the Oldenburg Burnout Inventory (OLBI; Demerouti et al., 2010; Polish version by Baka and Basińska, 2016). The OLBI consists of 16 items, eight of which measure the exhaustion dimension of burnout, while the remaining eight measure the disengagement dimension of burnout. Items were scored on a four-point rating scale, ranging from one (strongly agree) to four (strongly disagree). Examples of items are: “There are days when I feel tired before I arrive at work” (reversed) and “it happens more and more often that I talk about my work in a negative way” (reversed), for exhaustion

and disengagement, respectively. Scale scores were calculated by averaging the responses to the items associated with each burnout dimension, after appropriate items were reversed.

Trait Emotional Intelligence

Trait EI was assessed with the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF, Petrides and Furnham, 2006; Polish version by Szczygiel et al., 2015). This instrument is derived from the full form of the TEIQue (for an extensive description of the factors and subscales, see Petrides, 2011). The TEIQue-SF consists of 30 items with answers on a seven-point Likert scale ranging from one (completely disagree) to seven (completely agree). Examples of items are: “Expressing my emotions with words is not a problem for me” and “I often find it difficult to see things from another person’s viewpoint” (reversed). Scores for the TEIQue-SF were calculated by averaging the responses to the items, after appropriate items were reversed.

Dispositional Affectivity

Trait negative affectivity was measured using the Positive Affectivity Negative Affectivity Schedule (PANAS, Watson et al., 1988; Polish adaptation by Brzozowski, 2010). PANAS is a 20-item scale, which consists of 10 positive (e.g., excited, enthusiastic) and 10 negative (e.g., nervous, scared) adjectives describing emotional states. Participants were asked, “To what extent do you generally feel this way, on average, across all situations?” Items were scored on a five-point rating scale, ranging from one (very slightly or not at all) to five (extremely). Scores for negative and positive affectivity scale were formed by summing the responses to the appropriate items.

Procedure

Participants were recruited by psychology students who volunteered to take part in this project. First, the purpose of the study and its voluntary nature of participation were explained to the supervisors of the nursing wards. The study protocol was reviewed and approved by the supervisors. Next, participants were asked face-to-face to participate in the study and were assured that their data would be kept confidential. Nurses who gave their informed consent to participate started by completing questionnaires on demographics and job characteristics, trait EI, trait affectivity and emotions at work (i.e., the NJES was completed for the first time); they were also asked to create their own “pseudo-code” (to ensure the anonymity of the study). They also received four envelopes with the numbers “first,” “second,” “third,” and “fourth.” The envelopes contained questionnaires for four consecutive days of the study. From the following day onward, they completed the questionnaire about emotions once a day, over four consecutive working days. On the last day, along with a questionnaire about emotions, the nurses filled out the burnout inventory. Questionnaires were filled in during coffee or lunch breaks. When we were designing this study, we planned to contact participants on each day of the study (via mobile phone short message service) to remind them to complete the questionnaires, but two hospitals did not allow us to do so (to prevent nurses’ distractions during service). We were allowed

to contact participants only at the beginning and at end of the study (and not every day). Therefore, the sealed envelopes were collected from participants on the fifth, sixth, or seventh day counting from the first day of the study (by the same student of psychology who initiated the study). This procedure has been applied to all participants.

Participants did not receive any compensation for participation in the study. Data were collected in January and February 2018.

RESULTS

Preliminary Results

Table 1 contains the means, standard deviations, internal consistency coefficients (Cronbach's α) and intercorrelations of all the variables measured. The pattern of correlations between the variables was in line with our expectations. Both ARE and SRE were significantly and positively associated with burnout. Trait EI was significantly and negatively correlated with burnout, and with both ARE and SRE. Age was negatively correlated, whereas intensity of patient contact was positively correlated with burnout.

Main Results

In order to examine the main and interactive effects of NE (both ARE and SRE) and trait EI on burnout, a moderated hierarchical regression analysis was performed. The variables were entered into the regression model as follows: socio-demographic characteristics (nurses' age and the amount of time they spent with their patients during an average working day) and both NA and PA were entered in the first step as control variables. NE (both ARE and SRE) were entered in the second step, and trait EI in the third step, in order to examine their unique contribution to the prediction of burnout. In the last step, in order to investigate whether the main effects of ARE and SRE were moderated by trait EI, two interaction terms were introduced, which were products of NE and trait EI. These terms were: ARE

X trait EI; and, SRE X trait EI. Prior to creating interaction terms, NE and trait EI were centered, rendering the beta-weight of the interaction terms more interpretable (Cohen et al., 2003). When the interaction terms reached significant value, the simple slope procedure was employed to examine further the shape of the interaction (Aiken and West, 1991). The data were also analyzed for multicollinearity between independent variables using tolerance and the variance inflation factor (VIF). The results showed that there was no concern for multicollinearity in any of the regression models: all VIFs were below 2.5 (e.g., O'Brien, 2007). All statistical analyses were executed using the SPSS version 24 statistical package. The results of the regression analysis are depicted in **Table 2**.

As depicted in **Table 2**, the full model explains 26% of the variance in burnout. Among the variables entered in the first step, only trait NA emerged as a significant predictor of burnout: higher trait NA was associated with higher burnout. In the second step, when ARE and SRE were introduced into the regression equation, the amount of variance explained increased significantly ($\Delta R^2 = 0.08$, $p < 0.001$). Trait NA remained significant, and both ARE and SRE were positively related to burnout beyond the control variables, which supports our 1a and 1b hypotheses. When trait EI was entered in the third step, the amount of variance explained increased significantly ($\Delta R^2 = 0.02$, $p < 0.05$). Trait EI emerged as a significant predictor of burnout: higher trait EI was associated with lower burnout. Both NA and SRE remained significant, but the correlation between ARE and burnout failed to reach the conventional level of significance ($p = 0.06$). Finally, when interaction terms were entered in the last step, two expected interactions between NE and trait EI were significant and the amount of variance explained increased significantly ($\Delta R^2 = 0.05$, $p < 0.01$).

Simple slopes analyses clarified the nature of these interactions. The relationship between ARE and burnout was plotted in order to compare nurses who scored more than one standard deviation above the average level of EI. As depicted in **Figure 1**, ARE predicted greater burnout among low-trait-EI

TABLE 1 | Internal-consistency reliability (Cronbach's α), means, standard deviations, and intercorrelations among all study variables.

Variable	M	SD	1	2	3	4	5	6	7	8	Patient contact/day (%)	Age
1. Burnout	2.40	0.68	(0.92)								0.15*	-0.16*
2. Exhaustion	2.48	0.74	0.94***	(0.88)							0.08	-0.12
3. Disengagement	2.26	0.71	0.93***	0.74***	(0.86)						0.20**	-0.17*
4. Anger-related emotions	2.30	0.88	0.33***	0.30***	0.32***	(0.88)					0.08	-0.03
5. Sadness-related emotions	2.13	0.95	0.32***	0.25***	0.36***	0.28***	(0.95)				0.15*	-0.09
6. Emotional intelligence	4.65	0.89	-0.36***	-0.30***	-0.36***	-0.36***	-0.33***	(0.91)			-0.06	0.12
7. Trait negative affectivity	20.34	7.01	0.32**	0.30***	0.31***	0.43***	0.21**	-0.33***	(0.90)		0.05	-0.06
8. Trait positive affectivity	32.49	6.90	-0.15*	-0.09	-0.18*	-0.13	-0.11	0.29***	-0.27***	(0.84)	-0.04	0.06

Diagonal values are the internal consistency estimates for each scale. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (all two-tailed significance tests).

TABLE 2 | Results of moderated hierarchical regression analyses of negative emotions experienced by nurses at work and trait emotional intelligence on burnout.

Variables	Step 1 β	Step 2 β	Step 3 β	Step 4 β
Age	-0.11	-0.10	-0.09	-0.09
Patient contact (%/day)	0.10	0.06	0.07	0.06
Trait negative affectivity	0.30***	0.18*	0.16*	0.14
Trait positive affectivity	-0.06	-0.04	-0.01	-0.01
Anger-related emotions (ARE)		0.18*	0.14	0.09
Sadness-related emotions (SRE)		0.21**	0.17*	0.10
Emotional intelligence (EI)			-0.18*	-0.14
ARE X EI				-0.16*
SRE X EI				-0.16*
R^2 (adjusted)	0.12	0.19	0.21	0.26
ΔR^2	0.12	0.08	0.02	0.05

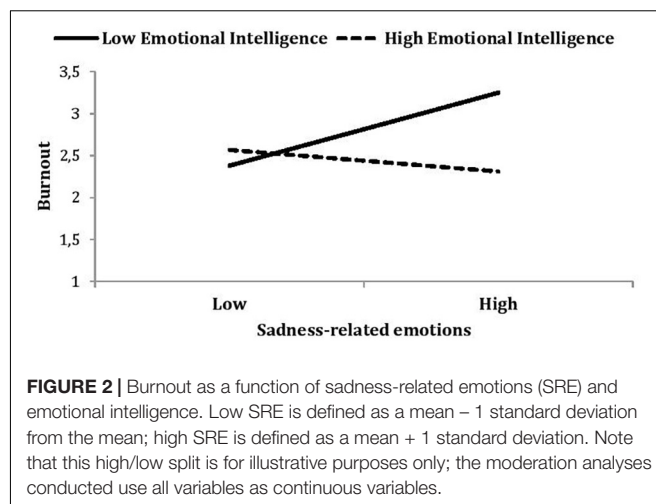
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

nurses ($\beta = 0.56$, $p < 0.01$) but not among high-trait-EI nurses ($\beta = 0.15$, $p = 0.37$).

The relationship between SRE and burnout was plotted in a similar way. As shown in **Figure 2**, SRE predicted greater burnout among nurses low in trait EI ($\beta = 0.66$, $p < 0.001$) but not among nurses high in trait EI ($\beta = -0.08$, $p = 0.65$). In other words, NE experienced at work only increase burnout for nurses low in trait EI. Both H2a and H2b were supported. We repeated the above analysis for both exhaustion and disengagement as the dependent variable and we found a similar pattern of results (i.e., the shape of interactions) for each burnout dimension.

DISCUSSION

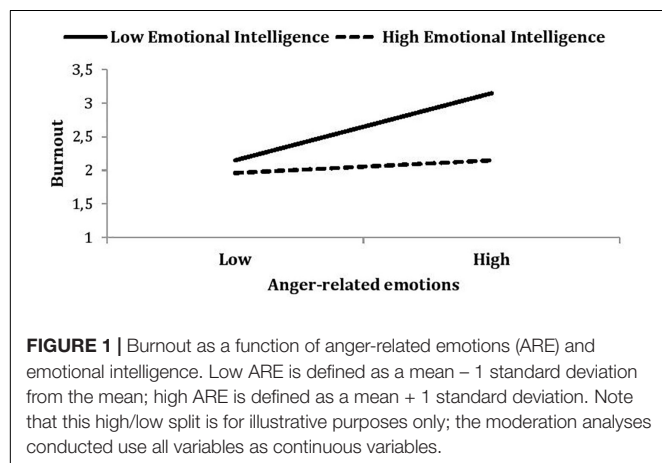
The present study sheds light on an important, yet under-researched, consequence of NE experienced by nurses at work: burnout. The results demonstrated a significant and positive relationship between nurses' NE (both ARE and SRE) and burnout. These results substantiate previous research (Hillhouse



and Adler, 1997; Erickson and Grove, 2007; Ersoy-Kart, 2009; Barr, 2018) and extend it by demonstrating that NE predict burnout above and beyond demographics and the nurses' trait affectivity. This indicates the unique contribution of nurses' NE in predicting burnout, which confirms our hypotheses and complements the aforementioned cited research of Zellars et al. (2004), who observed that NE predicted emotional exhaustion and depersonalization over neuroticism and extraversion.

There are at least two explanations as to why NE contribute to burnout: one is general in nature, while the second is specific for occupations involving intense interpersonal contact (Mikolajczak et al., 2007a). First, experiencing NE enhances one's level of physiological and psychological arousal, which, if long-drawn, can have a deleterious effect on affective and cognitive functioning (e.g., Schröder, 1995; Szczygiel et al., 2012) and both mental and health (Lazarus and Cohen-Charash, 2001; Gross et al., 2011). Second, experiencing NE creates a specific burden upon nurses who, despite their true feelings, must maintain professional and supportive demeanors. Nurses are expected to express positive emotions (e.g., empathy and compassion), and hide NE (e.g., anger and resentment) (Diefendorff et al., 2011). Thus, in many job situations nurses must conceal their true emotional reactions and express emotions that they do not feel (Diefendorff et al., 2011), which leads to emotional dissonance and feelings of inauthenticity, both of which are considered significant occupational stressors leading to burnout (Hülshager and Schewe, 2011).

Importantly, our findings show that NE do not *always* lead to burnout, but that they particularly do for nurses who lack EI. Coupled with the previous findings showing that EI reduces burnout symptoms (as previously shown by Gerits et al., 2005; Görgens-Ekermans and Brand, 2012; see also Mikolajczak et al., 2007a), with causality demonstrated experimentally by Karahan and Yalçin (2009), and by additionally showing that EI mitigates the effect of NE on burnout, the results of the present study bear several practical implications. Situations causing sadness and anger are an unavoidable part of nursing, and nurses should not, of course, be encouraged to become emotionally detached



robots, therefore, healthcare organizations may want to consider providing EI training for their employees to help them strengthen their emotional skills. Such training would primarily aim to reduce the intensity, frequency, and duration of NE experienced at work and thus could likely prevent the adverse manifestations of NE, such as job burnout studied here.

Trait EI is a relatively stable disposition, but there is evidence showing that EI can be increased via programs targeting the core emotional competencies (identification, understanding, expression, regulation, and use of emotions), and that relatively short training initiatives (usually between 15 and 18 h) are already sufficient to produce a significant decrease in psychological distress with a corollary significant increase in well-being and health (Nelis et al., 2009; Kotsou et al., 2011). The effects of these EI trainings are not only statistically significant but also practically meaningful. For instance, in an elegant controlled trial, Karahan and Yalçın (2009) demonstrated that their 18-h EI training course (comprising 12 one-and-a-half hour sessions) reduced burnout by approximately 50%. For a review of the most robust studies on this issue, see Kotsou et al., (2018).

Furthermore, nurses may need practical training improving their ability in using adaptive emotion regulation strategies that help them to cope with emotion-laden situations and reduce stress responses (Roger and Hudson, 1995; Meichenbaum, 2007). During such training particular emphasis should be placed on providing nurses with knowledge of the effectiveness of various emotion regulation strategies. Research shows that people differ substantially with respect to emotion-related knowledge (Wranik et al., 2007; Mikołajczak, 2009) and some nurses may simply not know how to cope with emotionally demanding situations and how to reduce distress associated with NE.

It is likely, however, that the effect of such training would be lower among nurses who face many risk factors (not only emotionally demanding situations and daily work hassles but also exclusion from decision-making process and inadequate management). Therefore, the EI training should be supplemented with activities improving the organization of work and people management. Last but not least, according to a proverb, “prevention is better than cure,” programs providing EI training should be included in advance in nursing education. Such training would be beneficial for future nurses not only because it would help them to reduce the likelihood of job burnout, but also because EI skills increase the likelihood of successful completion of nursing education (Snowden et al., 2018).

There are several limitations to the current study that should be acknowledged. First, our data relied exclusively on self-report instruments, which could lead to concerns about common method variance (Podsakoff et al., 2003). We, however, assessed predictors (NE and trait EI) and outcome variables (burnout) at different points in time, which reduced the likelihood that our findings are solely due to common method variance. Moreover, emotions were measured in five sessions, which also ruled out the possibility that momentary affect drove the significant

relationship between NE and burnout. Finally, we controlled for trait affectivity, which constituted a more conservative test of the emotions–burnout relationship. Nevertheless, future studies might use additional sources of data, such as peer reports, to strengthen the findings. Second, although we had five emotion measurements, the design was not cross-lagged; hence, statements about causal relationships should be put forward with caution until these results are replicated in a cross-lagged research design. Third, the use of data from female nurses only prevents generalization to males and to other organizational settings. There is, however, some evidence coming from research conducted among service sector employees, that trait EI plays a protective role in the relationship between NE at work and burnout. Szczygieł and Bazińska (2013) demonstrated that shop assistants and banking customer service representatives who declared greater intensity of NE (e.g., irritation and anger) while interacting with clients reported more symptoms of emotional exhaustion; this effect, however, was observed only among low-trait-EI employees. It would be desirable for further research to be conducted in more diverse groups, both in terms of gender and types of organizations. Fourth, the study sample size was small, thus further larger research is needed to confirm the results described here. Fifth, future researchers may consider taking seniority as a nurse as a control variable to refine the results.

Despite the limitations noted above, we believe that our study deserves attention, as it demonstrates that NE experienced at work increase nurses' vulnerability to job burnout, but also that EI mitigates this effect. Moreover, there is evidence suggesting that even if NE cannot be avoided in daily nursing work, EI training can help reduce their adverse manifestations (Nelis et al., 2009; Kotsou et al., 2011). The past decade has witnessed an abundance of theoretical and empirical work dealing with EI in the nursing profession (e.g., Gerits et al., 2005; Kooker et al., 2007; Landa et al., 2008; Quidbach and Hansenne, 2009) but knowledge about the role of EI in nursing is still limited (Bulmer-Smith et al., 2009; Petrides and Sevdalis, 2010; McCloughen and Foster, 2018). We believe that our research contributes to this under-researched field and provides inspiration for future research.

ETHICS STATEMENT

All study procedures were approved by the Ethics Committee of the SWPS University of Social Sciences and Humanities (Poland), WKE-S-16-V-8. All subjects gave written informed consent in accordance with the Declaration of Helsinki.

AUTHOR CONTRIBUTIONS

DS developed the study design, performed the data collection, and analyzed the data. DS and MM contributed to data interpretation and writing the manuscript and approved the final version of the manuscript for submission.

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The Assessment of Trait Emotional Intelligence: Psychometric Characteristics of the TEIQue-Full Form in a Large Italian Adult Sample

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Trait Emotional Intelligence (or trait emotional self-efficacy) is a constellation of emotional perceptions assessed through questionnaires and rating scales (Petrides et al., 2007b). This paper examined the psychometric features of the Trait Emotional Questionnaire Full Form (TEIQue-FF; Petrides, 2009b) in the Italian context. Incremental validity in the prediction of depression and anxiety was also tested with respect to the Big Five. Participants were 1343 individuals balanced for gender (690 females and 653 males) whose mean age was 29.65 years ($SD = 13.64$, range 17–74 years). They completed a questionnaire battery containing the TEIQue and measures of the Big Five, depression, and anxiety (both trait and state). Results indicated that the performance of the TEIQue-FF in the Italian context was comparable to the original United Kingdom version as regards its reliability and factor structure. Moreover, the instrument showed incremental validity in the prediction of depression and state-trait anxiety after controlling for the Big Five.

Keywords: Trait Emotional Intelligence, dimensionality, reliability, incremental validity, Big Five, depression, anxiety, TEIQue

INTRODUCTION

In the last decades, a relevant body of research has focused on the concept of emotional intelligence which was applied in several domains such as educational, organizational, and clinical psychology (Petrides et al., 2016). In the literature, there is a clean-cut conceptual distinction between *ability* emotional intelligence and *trait* emotional intelligence. In the first case, emotional intelligence was conceived as a cognitive-emotional ability assessed via performance-based tests, whereas in the second case emotional intelligence was conceived as a personality trait often referred to as emotional self-efficacy and assessed via self-report instruments (Petrides and Furnham, 2000).

Trait Emotional Intelligence (EI) is defined as a constellation of emotional perceptions assessed through questionnaires and rating scales (Petrides et al., 2007b). Based on a content analysis of early models of EI and cognate constructs, such as alexithymia, affective communication, emotional expression, and empathy, Petrides (2001) identified 15 distinct aspects that would frame the dimensional domain of the trait EI construct as assessed by the Trait Emotional Intelligence

Questionnaire (TEIQue). More specifically, the TEIQue taps 13 different facets grouped into four second-order factors named *well-being*, *self-control*, *emotionality*, and *sociability*. Two additional facets (*adaptability* and *self-motivation*) contribute directly to the global trait EI score. In **Table 1**, a brief definition and a sample item for each of the facets were provided (for a detailed TEIQue description see Petrides, 2009a).

As regards the location of trait EI in the factorial space of personality and its discriminant validity, factor analyses have demonstrated that trait EI facets define a distinct oblique factor in Giant Three and Big Five factor space (Petrides et al., 2007b). This pattern of results has been replicated in different samples and cultural contexts (e.g., Petrides et al., 2010; Van der Linden et al., 2012; Pérez-González and Sanchez-Ruiz, 2014) and extended also to the HEXACO model of personality (Veselka et al., 2009a). In addition, another investigation pointed out that correlations between trait EI and the Big Five are sizable, stable, and partly influenced genetically (Vernon et al., 2008). More recent studies reported consistent overlap between the so-called “General Factor of Personality” (GFP) and trait EI (e.g., Veselka et al., 2009a,b; Pérez-González and Sanchez-Ruiz, 2014). In general, findings showed that the highest loadings in the GFP came from trait EI and that the correlation between trait EI and the GFP is very strong and genetically influenced, remaining high even after controlling

for social desirability (Van der Linden et al., 2012, 2017, 2018).

There is also a growing body of evidence, including from meta-analyses (Andrei et al., 2016a), showing the criterion and incremental validity of TEIQue in predicting a wide range of criteria over and above the Big Five and the Giant Three, such as life satisfaction, emotional reactivity, coping styles, depression, loneliness, rumination, and personality disorders (e.g., Austin et al., 2005; Mikolajczak et al., 2007a; Petrides et al., 2007a; Szczygieł and Mikolajczak, 2017). When compared to other instruments measuring EI, the TEIQue has been found to be the best predictor of multiple psychological criteria, at the same time showing incremental validity beyond age, gender, the Big Five, and the other two EI measures (Gardner and Qualter, 2010). A meta-analysis revealed that trait EI is more strongly associated than ability EI with health (Martins et al., 2010) and that the TEIQue is the best predictor of health outcomes than all other variables.

The Present Study

The TEIQue has been translated in many languages and proved to be reliable and valid in different cultural and linguistic contexts (e.g., Mikolajczak et al., 2007a; Freudenthaler et al., 2008; Martskvishvili et al., 2013; Gökçen et al., 2014; Stamatopoulou et al., 2018). The present study aimed to test the psychometric properties of the TEIQue Full Form, investigating its reliability, factor structure, and construct validity using an Italian-speaking sample. Previous assessments of the TEIQue in Italy have principally focused on the short form of the instrument and have, mainly or exclusively, relied on adolescents or students, so that its generalizability remains limited (e.g., Andrei et al., 2014; Andrei et al., 2016b; Di Fabio et al., 2016). Accordingly, our research sought to scrutinize the psychometric features of the full form of the instrument employing a large sample of adults.

More specifically, we firstly aimed to assess the underlying TEIQue factor structure. The TEIQue-FF was not designed to be factor analyzed at the item level. As Petrides (2009b, p. 89) pointed out: “The TEIQue is based on a combination of the construct-oriented and inductive approaches to scale construction (Hough and Paullin, 1994). The instrument was designed to be factor analyzed at the facet level in order to avoid the problems associated with item-level factor analysis (Bernstein and Teng, 1989). Its higher-order structure is explicitly hypothesized as oblique, in line with conceptions of multifaceted constructs. Consequently, factor overlap as well as cross-loadings are to be expected and provide the justification for aggregating factor scores into global trait EI.” Therefore, in the present study, the factor analyses were carried out at the facet level as in other papers in the literature.

Specifically, the TEIQue factor structure was examined applying an Explorative Structural Equation Modeling approach (ESEM; Asparouhov and Muthén, 2009). ESEM represents a data analytic strategy suitable for investigating the latent structure underlying multi-dimensional personality tests and has been fruitfully applied also to assess the factor structure of the TEIQue Short Form (Perera, 2015). In contrast to the common

TABLE 1 | The sampling domain of trait emotional intelligence in adults.

Facets	Definition
Adaptability	Being flexible and willing to adapt to new conditions
Assertiveness	Being frank, straightforward, and prepared to stand up for one's own rights
Emotion perception (self and others)	Being clear about their own and other people's feelings
Emotion expression	Being capable of communicating their feelings to others
Emotion management (others)	Being capable of affecting other people's feelings
Emotion regulation	Being capable of controlling one's own emotions
Impulse control	Being reflective and less likely to surrender to one's own drives
Relationships	Being capable of having satisfying personal relationships
Self-esteem	Being successful and self-confident
Self-motivation	Being driven and unlikely to surrender in front of difficulty
Social awareness	Being talented in networking with good social skills
Stress management	Being capable of cope with pressure and regulate stress
Trait empathy	Being capable of taking someone else's perspective
Trait happiness	Being cheerful and satisfied with one's own life
Trait optimism	Being confident and positive

confirmatory approach, in the ESEM frame work both primary and non-target loadings are freely estimated and factors can be rotated (Asparouhov and Muthén, 2009; Morin et al., 2013; Marsh et al., 2014). In this regard, ESEM provides a less restrictive test for examining the latent factor structure that can satisfactorily account for the complexity of multidimensional instruments. ESEM is an integration of Explorative Factor Analysis (EFA) within the general structural equation modeling framework (Asparouhov and Muthén, 2009). Compared to EFA, ESEM technique has the compelling advantage of the statistical features of SEM, like, for example, the possibility of estimating model fit indexes (Morin et al., 2013; Marsh et al., 2014).

The reliability of the 20 TEIQue variables (15 facets, 4 factors, and the global score) and gender differences in trait scores were also assessed. Subsequently, we investigated the incremental validity over the Big Five of the Italian adaptation of the TEIQue in relation to the prediction of depression and anxiety. It was expected that trait EI would remain a reliable negative predictor of depression and anxiety in the presence of the Big Five traits.

MATERIALS AND METHODS

Participants

Participants were 1343 Italian adults balanced for gender (690 females and 653 males). Average age was 29.65 years ($SD = 13.64$, range = 17–74 years). As regards educational level, about 7% of participants completed junior high-school, 85% completed high-school, and 8% had a university degree. Concerning occupation, 7.1% of participants were blue-collar workers, 16.4% white-collar workers, 7.1% self-employed individuals, 4.7% housewives, and 53.5% university students (about 11.3% reported other occupations).

Data were collected by first-year psychology students in introductory statistics courses at the D'Annunzio University of Chieti–Pescara. Each student was requested to collect questionnaires from two to four people, equally balanced for age

and gender¹. Students were blind regarding research hypotheses and were instructed on how to administer the questionnaires. After data collection, students were briefed on the general aim of the research. Participants received written instructions about how to fill the questionnaire on the first page of the booklet. Instructions guaranteed for anonymity of responses and pointed out that there were no “correct” or “wrong” answer for questionnaire items. For a similar procedure, see Caprara et al. (2006).

The study was approved by the Psychological Science Departmental ethics committee at the D'Annunzio University of Chieti–Pescara.

Measures

Trait EI was operationalized through the Italian adaptation of the TEIQue-FF (Petrides, 2009a,b). The TEIQue-FF comprises 153 brief statements rated by participants on a 7-point scale, ranging from completely disagree (1) to completely agree (7). The TEIQue-FF consists of 13 facets (Table 1) clustered under four-factors: well-being, self-control, emotionality, and sociability. Two additional facets (namely adaptability and self-motivation) contribute directly to the global trait EI score but are not part of the factors (for a detailed description of the TEIQue, see Petrides, 2009a).

Personality traits were assessed via the Big Five Questionnaire (BFQ-2; Caprara et al., 1993, 2007) which comprises 134 items rated on a 5-point Likert scale (1 = very false for me, 5 = very true for me). The BFQ was been shown to be a valid and reliable measure of the Big Five traits in large samples of Italian respondents as well as in cross-cultural comparisons (e.g., Caprara et al., 2000). In the present study, the internal consistencies of the five traits were 0.84 for Extraversion, 0.88 for Agreeableness, 0.86 for Conscientiousness, 0.87 for Openness, and 0.92 for Emotional Stability.

The Italian version of Beck Depression Inventory-II (BDI-II; Beck et al., 2006) was used to assess depression. The BDI is a 21-item self-report inventory designed to assess the presence and severity of depressive symptoms. Each item is rated on a 4-point Likert-type scale, ranging from 0 to 3, based on the severity of depressive symptoms experienced over the last 2 weeks. Each item presents a list of four statements arranged in increasing severity about a particular symptom of depression. The total score ranges from 0 to 63, with higher scores indicating more severe depressive symptoms. The psychometric features of the scale are

¹For similar applications of the snowball data collection procedure in personality research, see Caprara et al. (2006), Hilbig et al. (2013), and Romero et al. (2015).

TABLE 2 | Factor loadings for the retained ESEM four correlated traits model.

	Well-Being	Self-Control	Emotionality	Sociability
Trait happiness	0.81	−0.07	0.09	−0.00
Trait optimism	0.77	0.09	−0.03	0.08
Self-esteem	0.37	0.07	−0.00	0.39
Emotion regulation	0.00	0.69	−0.04	0.06
Impulse control	−0.02	0.34	0.23	0.04
Stress management	0.19	0.62	0.07	−0.03
Trait empathy	−0.12	0.03	0.54	−0.01
Emotion perception	0.03	0.01	0.54	0.09
Emotion expression	0.25	−0.20	0.54	0.16
Relationships	0.23	0.02	0.34	−0.06
Emotion management	−0.12	−0.01	0.14	0.58
Assertiveness	0.02	−0.02	−0.05	0.66
Social awareness	0.06	0.02	0.17	0.57

Coefficients that should theoretically define each factor are in boldface.

TABLE 3 | TEIQue-FF factor intercorrelations.

Factor	Well-Being	Self-Control	Emotionality	Sociability
Well-being	–			
Self-control	0.32**	–		
Emotionality	0.41*	0.22*	–	
Sociability	0.43**	0.20**	0.47**	–

* $p < 0.01$, ** $p < 0.001$.

supported in clinical and non-clinical samples by an extensive literature (e.g., Arbisi, 2001). In this study, the Cronbach's alpha of the BDI-II was 0.87.

The Italian version of the State-Trait Anxiety Inventory (STAI-Y) was employed to measure trait and state anxiety (Spielberger, 1989). This measure is commonly used in clinical settings to diagnose anxiety as distinct from depression. The Y form consists of 20 items targeting Trait anxiety and 20 targeting State anxiety. State anxiety items include: "I am tense; I am worried" and "I feel calm; I feel secure." Trait anxiety items include: "I worry too much over something that really doesn't matter" and "I am content; I am a steady person." All items are rated on a 4-point Likert scale (e.g., from "Almost Never" to "Almost Always"). The total score ranges from 20 to 80, with higher scores indicating greater anxiety. In the present study, the STAI-State ($\alpha = 0.94$) and the STAI-Trait ($\alpha = 0.90$) demonstrated excellent internal consistency.

All 1343 participants completed the TEIQue-FF. For the validity investigations, a subsample of 409 participants also completed the measures of the Big Five, depression, and trait and state anxiety. The mean age for the subsample was 28.06 years ($SD = 13.07$, range = 17–66 years), while the gender distribution was 221 females and 188 males.

Data Analysis

The TEIQue factor structure was examined via ESEM (Asparouhov and Muthén, 2009). Besides the chi-square, the fit of the factorial model was evaluated via the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual

(SRMR), and the root mean square error of approximation (RMSEA). The following guidelines, derived from existing literature (Browne and Cudeck, 1993; Hu and Bentler, 1999; Marsh et al., 2004), were used to assess the adequacy of model fit: $CFI > 0.90$, $RMSEA < 0.08$, and $SRMR < 0.10$ were considered acceptable fit, while $CFI > 0.95$, $RMSEA < 0.05$, and $SRMR < 0.08$ were deemed to reflect an excellent fit.

Internal consistencies for all TEIQue variables were estimated using Cronbach's alpha. Descriptive statistics and general distributional properties of the scales were also assessed. A one-way ANOVA was carried out to investigate gender differences in trait EI scores. Finally, the incremental validity of trait EI in the prediction of depression and anxiety beyond the Big Five personality traits was tested through hierarchical regression analyses conducted at the factor level of the TEIQue.

Statistical data analyses were conducted with MPlus8 and SPSS 24.

RESULTS

Factor Structure of the TEIQue-FF

The aforementioned ESEM analysis was applied to the 13 TEIQue-FF Facets². Standardized factor loading estimates from the retained ESEM four correlated traits model, with oblique

²As in previous research (Aluja et al., 2016), the facets of adaptability and self-motivation were not entered into the factor analysis since they have been modeled to load directly on global trait EI (Petrides, 2009a,b).

TABLE 4 | Descriptives for the TEIQue-FF facet, factor, and global scores (total sample $N = 1343$).

	Items	α	$R_{it}(\text{mean})$	Skewness	Kurtoses	Mean	SD
Facets							
Self-esteem	11	0.80	0.47	−0.36	−0.06	4.98	0.86
Emotion expression	10	0.85	0.56	−0.14	−0.42	4.39	1.17
Self-motivation	10	0.69	0.36	−0.11	−0.34	4.95	0.79
Emotion regulation	12	0.76	0.40	0.09	0.05	4.10	0.85
Trait happiness	8	0.84	0.59	−0.59	−0.27	5.59	0.98
Trait empathy	9	0.68	0.37	−0.05	−0.01	4.83	0.81
Social awareness	11	0.77	0.43	−0.11	−0.33	4.78	0.86
Impulse control	9	0.70	0.38	−0.14	−0.36	4.66	0.95
Emotion perception	10	0.68	0.34	−0.07	−0.21	4.90	0.80
Stress management	10	0.74	0.41	−0.17	0.04	4.34	0.92
Emotion management	9	0.68	0.36	−0.07	−0.14	4.62	0.87
Trait optimism	8	0.78	0.49	−0.11	−0.56	4.97	0.99
Relationships	9	0.55	0.26	−0.27	−0.28	5.41	0.73
Adaptability	9	0.63	0.32	−0.10	0.31	4.17	0.79
Assertiveness	9	0.65	0.33	−0.07	−0.20	4.71	0.86
Factors							
Emotionality	38	0.70	0.50	0.10	−0.35	4.88	0.65
Self-control	31	0.69	0.51	0.11	−0.08	4.37	0.71
Sociability	29	0.78	0.62	0.06	−0.24	4.70	0.72
Well-being	27	0.82	0.68	−0.32	−0.48	5.18	0.81
Global trait EI		0.86	0.51	0.15	−0.33	4.76	0.52

$R_{it}(\text{mean})$, mean inter-item correlation.

TABLE 5 | Descriptives and gender difference tests for the TEIQue-FF.

	Females (N = 690)						Males (N = 653)						
	Mean	SD	α	$R_{it}(mean)$	Skewness	Kurtoses	Mean	SD	α	$R_{it}(mean)$	Skewness	Kurtoses	F
Self-esteem	4.84	0.91	0.82	0.50	-0.29	-0.20	5.13	0.77	0.75	0.42	-0.29	-0.13	39.59***
Emotion expression	4.43	1.22	0.87	0.59	-0.25	-0.49	4.34	1.11	0.83	0.53	-0.01	-0.31	2.38
Self-motivation	4.92	0.80	0.69	0.36	-0.17	-0.16	4.98	0.79	0.69	0.37	-0.04	-0.57	2.11
Emotion regulation	3.87	0.79	0.72	0.36	0.02	-0.15	4.35	0.84	0.76	0.40	0.07	0.18	113.33***
Trait happiness	5.56	1.01	0.86	0.62	-0.53	-0.49	5.61	0.95	0.82	0.56	-0.66	0.01	0.74
Trait empathy	5.00	0.77	0.66	0.35	0.01	-0.34	4.65	0.82	0.68	0.36	-0.03	0.23	64.74***
Social awareness	4.72	0.86	0.77	0.42	-0.03	-0.28	4.84	0.87	0.78	0.44	-0.20	-0.33	7.11**
Impulse control	4.63	0.92	0.68	0.35	-0.06	-0.42	4.69	0.98	0.73	0.40	-0.23	-0.30	1.11
Emotion perception	4.96	0.80	0.68	0.34	0.02	-0.36	4.83	0.80	0.69	0.35	-0.17	-0.11	8.90**
Stress management	4.12	0.90	0.72	0.39	-0.20	0.01	4.58	0.89	0.74	0.40	-0.14	0.04	86.97***
Emotion management	4.60	0.87	0.68	0.36	-0.05	-0.29	4.64	0.87	0.68	0.36	-0.09	0.04	0.90
Trait optimism	4.85	1.01	0.79	0.49	0.00	-0.57	5.11	0.95	0.77	0.47	-0.21	-0.49	23.00***
Relationships	5.46	0.71	0.52	0.25	-0.38	-0.22	5.35	0.74	0.57	0.28	-0.16	-0.30	8.22**
Adaptability	4.10	0.76	0.61	0.30	-0.11	0.35	4.24	0.81	0.65	0.34	-0.11	0.27	9.66**
Assertiveness	4.63	0.87	0.66	0.33	-0.12	-0.36	4.80	0.85	0.64	0.32	0.01	-0.07	12.26***
Factors													
Emotionality	4.97	0.64	0.67	0.47	0.15	-0.45	4.79	0.65	0.73	0.53	0.08	-0.30	24.20***
Self-control	4.21	0.67	0.65	0.47	0.09	0.00	4.54	0.72	0.71	0.53	0.06	-0.17	75.04***
Sociability	4.65	0.72	0.78	0.61	0.13	-0.37	4.76	0.72	0.78	0.62	-0.01	-0.05	8.08**
Well-being	5.08	0.84	0.82	0.68	-0.23	-0.55	5.28	0.77	0.83	0.69	-0.38	-0.40	20.23***
Global trait EI	4.71	0.51	0.85	0.49	0.16	-0.32	4.80	0.53	0.88	0.53	0.12	0.35	11.20**

** $p < 0.01$, *** $p < 0.001$; $R_{it}(\text{mean})$, mean inter-item correlation.

rotation, are shown in **Table 2**. Despite one cross-loading between Self-esteem and Sociability, the four factors were substantively identical to the original United Kingdom structure (Petrides, 2009a) and were thus labeled accordingly: Well-Being, Self-Control, Emotionality, and Sociability. The fit of the retained model was excellent, $\chi^2(32) = 331.42$, $p < 0.001$, $CFI = 0.95$, $RMSEA = 0.08$, $SRMR = 0.03$, and in line with those reported by other authors who have conducted similar analyses (Perera, 2015). In the final solution, the four factors were positively and significantly correlated (**Table 3**). Factor inter-correlations were generally above 0.40, with the exception of Self-Control that had somewhat lower correlations with Sociability (0.20) and Emotionality (0.22).

Descriptive Statistics, Reliability, and Gender Differences

Descriptive statistics, number of items, and internal consistencies for the TEIQue-FF facets, factors and global score, are given in **Table 4** for the total sample and for men and women separately in **Table 5**.

All TEIQue variables (facets, factors, and global score) had reasonably normal distributions. None of the variables had a skew or kurtosis greater than 1 (in absolute value). Eight of the 15 facets had high alphas (between 0.70 and 0.85; **Table 4**), six showed moderate levels (between 0.63 and 0.68), and one (Relationships) showed a low level (0.55). Reliabilities were satisfactory for all four TEIQue factors: Well-being (0.82), Self-control (0.69), Sociability (0.78), and Emotionality (0.70). Corrected item-total correlations ranged from 0.26 (Relationships) to 0.59 (Trait happiness) and from 0.50 (Emotionality) to 0.68 (Well-being). The reliability of the global trait EI score was high ($\alpha = 0.86$).

With respect to gender differences, significant differences were observed at the facet, factor, and global levels of the instrument (see **Table 5**). Means and standard deviations as well as gender-specific alphas, for the 15 facets, 4 factors, and global trait EI can be seen in **Table 4**. Males scored significantly higher on the facets of Self-Esteem, Emotion Regulation, Social Awareness, Stress Management, Trait optimism, Adaptability, and Assertiveness, as well as on the factors of Self-Control, Sociability, Well-being, and

global trait. Conversely, females scored significantly higher on the facets of Trait empathy, Emotion perception, and Relationships, as well as on the factor of Emotionality.

Incremental Validity

In order to test the validity of the TEIQue, a subsample of 409 participants also completed measures of the Big Five, depression and anxiety as reported in the method section. Correlations among these variables are presented in **Table 6**.

As expected, the four TEIQue factors were all significantly and negatively correlated with depression and both types of anxiety, confirming that TEIQue scores are strongly related to mental health variables (Martins et al., 2010; Rudenstine and Espinosa, 2018).

To examine the incremental validity of the TEIQue-FF factors beyond the Big Five, we conducted three separate hierarchical regression analyses³. For each criterion, the Big Five traits were entered as a first block of predictors, followed by the four TEIQue factors as a second block. This data analytic strategy aimed at examining the contributions of the Big Five traits in predicting the criteria (depression and anxiety) at step 1, and the incremental variance accounted by the TEIQue-FF traits at step 2 (R^2 change). If the TEIQue-FF traits have incremental validity over the Big Five ones, then they would be expected to explain a significant amount of additional variance at step 2 (that is, the R^2 change would be statistically significant).

Concerning depression, the Big Five traits collectively explained 30% of the variance, $R^2 = 0.30$, $p < 0.001$. When the TEIQue traits were included in the second step of the hierarchical regression, an additional 16% of variance was accounted for, $R^2 = 0.46$, $R^2_{\text{change}} = 0.16$, $p < 0.001$. Regression coefficients for the second step are reported in **Table 7**.

Concerning state anxiety, the Big Five traits collectively explained 32% of the variance, $R^2 = 0.32$, $p < 0.001$. The TEIQue traits subsequently explained a further 9% of criterion variance,

³These analyses were conducted at the factor level of trait EI in order to help address the inherently biased comparisons in incremental validity studies that pitch a single degree of freedom for trait EI against multiple degrees of freedom for personality (Petrides et al., 2007a).

TABLE 6 | Intercorrelations for key variables in the study.

	1	2	3	4	5	6	7	8	9	10	11
1. Trait EI wellbeing	–										
2. Trait EI self-control	0.42**	–									
3. Trait EI emotionality	0.43**	0.27**	–								
4. Trait EI sociability	0.52**	0.26**	0.46**	–							
5. Energy	0.43**	0.09*	0.20**	0.58**	–						
6. Openness	0.18**	0.17**	0.32**	0.28**	0.33**	–					
7. Agreeableness	0.21**	0.15**	0.52**	0.21**	0.15**	0.45**	–				
8. Conscientiousness	0.26**	0.26**	0.25**	0.24**	0.38**	0.34**	0.38**	–			
9. Emotional stability	0.42**	0.68**	0.14**	0.19**	0.08	0.11**	0.04	0.05	–		
10. Depression	–0.59**	–0.43**	–0.23**	–0.27**	–0.24**	–0.12**	–0.06	–0.15**	–0.50**	–	
11. State anxiety	–0.55**	–0.48**	–0.26**	–0.34**	–0.23**	–0.13**	–0.13**	–0.16**	–0.55**	0.64**	–
12. Trait anxiety	–0.71**	–0.48**	–0.28**	–0.40**	–0.36**	–0.16**	–0.07	–0.13**	–0.60**	0.68**	0.75**

* $p < 0.05$, ** $p < 0.01$.

TABLE 7 | Step 2 results for hierarchical regression of depression on the four TEIQue factors and the Big Five.

	Depression				
	<i>b</i>	<i>SE</i>	<i>Beta</i>	<i>t</i>	<i>p</i>
Trait EI well-being	-4.307	0.450	-0.480	-9.578	0.000
Trait EI self-control	-0.234	0.606	-0.022	-0.387	0.699
Trait EI emotionality	-0.646	0.597	-0.055	-1.082	0.280
Trait sociability	0.364	0.586	0.035	0.620	0.535
Extraversion	1.708	0.856	0.107	1.996	0.047
Agreeableness	2.350	0.781	0.143	3.007	0.003
Conscientiousness	-0.981	0.717	-0.062	-1.369	0.172
Emotional stability	-3.726	0.674	-0.301	-5.527	0.000
Open mindedness	-1.115	0.614	-0.079	-1.816	0.070

$R^2 = 0.41$, $R^2_{\text{change}} = 0.09$, $p < 0.01$. Regression coefficients for the second step are reported in **Table 8**.

Concerning trait anxiety, the Big Five traits collectively explained 45% of the variance, $R^2 = 0.45$, $p < 0.001$. The TEIQue traits subsequently explained an additional 21% of criterion variance, $R^2 = 0.66$, $R^2_{\text{change}} = 0.21$, $p < 0.001$. Regression coefficients for the second step are reported in **Table 9**.

As can be noted, the TEIQue-FF showed clear predictive capability in the presence of the Big Five, incrementally explaining significant proportions of variance across all three criteria.

DISCUSSION

The present study scrutinized the psychometric characteristics of the Italian TEIQue-FF by investigating the instrument's distributional properties, reliability, factor structure, and gender differences. Moreover, criterion and incremental validity were established by demonstrating the ability of the four TEIQue factors to predict mental health (i.e., absence of depression and anxiety) over and above the Big Five. The distributional properties of the Italian version of the TEIQue-FF were satisfactory, with all of its variables showing near-normal distributions with means and standard deviations comparable to those obtained for the original scale (Petrides, 2009a).

In general, the reliability of TEIQue scales reached satisfactory levels although, for the Italian version, they appear to be a little lower than for other translations (e.g., Mikolajczak et al., 2007a; Freudenthaler et al., 2008; Petrides, 2009a). However, the only facet with a low internal consistency was Relationships, which has displayed lower alpha values in many countries, such as the United Kingdom (Petrides, 2009a), France (Mikolajczak et al., 2007a), Georgia (Martskvishvili et al., 2013), Germany (Freudenthaler et al., 2008), and Serbia (Jolijæ-Marjanović and Altaras-Dimitrijević, 2014) as well as in the autonomous community of Catalonia (Aluja et al., 2016). More important, the four-factor structure of the TEIQue emerged clearly from the Italian data, replicating robust, and consistent results from many different countries around the world. In regards to the validity of the instrument, the TEIQue factors were significantly

and negatively associated with depression and the two types of anxiety (state and trait). In line with previous research, these results persisted even after controlling for the Big Five personality dimensions, thus confirming the excellent incremental validity of the TEIQue (e.g., Siegling et al., 2015; Andrei et al., 2016a).

Despite the robust psychometric properties of the Italian version of the TEIQue highlighted by this study, some limitations should be listed. Due to its length, the full form of the TEIQue may be not suitable for rapid clinical screenings or for research designs where there is limited availability of time and space for data collection and wherein trait EI is not a central variable. In those cases, the short form could be more appropriate. Conversely, however, the full form of the TEIQue would be more useful for in-depth analyses at the factor and facet levels of the construct. The richness of information derived from the administration of the full form is most valuable, for instance, in clinical examinations, coaching assessments, or career and vocational counseling contexts. In the present study all the variables were operationalized through self-report questionnaires, which may have created common method variance that could potentially inflate construct relationships. Future research could profitably employ a multi-method approach in order to demonstrate the incremental validity of the TEIQue in relation to external criteria measured

TABLE 8 | Step 2 results for hierarchical regression of state anxiety on the four TEIQue factors and the Big Five.

	State anxiety				
	<i>b</i>	<i>SE</i>	<i>Beta</i>	<i>t</i>	<i>p</i>
Well-being	-4.206	0.691	-0.316	-6.086	0.000
Self-control	-1.355	0.931	-0.086	-1.455	0.146
Emotionality	-0.424	0.917	-0.024	-0.462	0.644
Sociability	-1.130	0.900	-0.073	-1.255	0.210
Extraversion	1.413	1.314	0.060	1.075	0.283
Agreeableness	-0.085	1.201	-0.003	-0.071	0.944
Conscientiousness	-1.048	1.101	-0.045	-0.952	0.342
Emotional stability	-6.054	1.035	-0.330	-5.848	0.000
Open mindedness	-0.025	0.943	-0.001	-0.026	0.979

TABLE 9 | Step 2 results for hierarchical regression of trait anxiety on the four TEIQue factors and the Big Five.

	Trait anxiety				
	<i>b</i>	<i>SE</i>	<i>Beta</i>	<i>t</i>	<i>p</i>
Trait EI well-being	-6.171	0.466	-0.524	-13.242	0.000
Trait EI self-control	-1.086	0.628	-0.078	-1.728	0.085
Trait EI emotionality	-1.195	0.619	-0.078	-1.931	0.054
Trait EI sociability	0.420	0.608	0.031	0.690	0.490
Extraversion	-1.598	0.887	-0.076	-1.802	0.072
Agreeableness	2.240	0.810	0.104	2.766	0.006
Conscientiousness	-0.520	0.743	-0.025	-0.700	0.484
Emotional stability	-5.331	0.699	-0.328	-7.628	0.000
Open mindedness	-0.186	0.637	-0.010	-0.292	0.770

using, for example, observational methods. Moreover, the present findings are based on correlational and cross-sectional data. Thus, they cannot be used to infer causal relationships between trait EI and the criteria examined.

The TEIQue and its underlying theory of trait emotional intelligence, have a wide range of important applications in educational, clinical, and organizational contexts (see Petrides et al., 2016 for a summary of recent developments). Regarding educational implications, the TEIQue can be used to measure trait EI within school and university contexts in order to identify students who are in need of intervention programs to eradicate disruptive behavior and enhance well-being (Rutledge and Petrides, 2012). High trait EI also appears to best advantages in relation to academic performance particularly for vulnerable groups of children, such as those with learning difficulties (Petrides et al., 2004; Mavroveli and Sánchez-Ruiz, 2011; Perera and DiGiacomo, 2013). Nevertheless, teachers and educators should also take into consideration possible maladaptive effects of trait EI. For example, students who are confident in managing and understanding others' emotions, could attempt to exploit or manipulate their peers as happens in bullying dynamics (Sutton and Keogh, 2000).

In vocational contexts, trait EI, in general, and the TEIQue, in particular, have been linked, phenotypically as well as genetically, to vocational interests (Schermer et al., 2015). In addition, there are significant differences in the trait EI profiles of students studying different subjects in university (Sánchez-Ruiz et al., 2010). The construct has also been strongly linked to career adaptability (Merino-Tejedor et al., 2018) and career-related decision-making (Di Fabio and Saklofske, 2014; Farnia et al., 2018). It, therefore, seems clear that trait EI should be taken into consideration by career-counselors as well by people entering the workforce or those considering a career change.

Trait EI is also a solid predictor of important outcomes in business and organizational contexts (e.g., Mikolajczak et al., 2007b; O'Boyle et al., 2011; Miao et al., 2016; Petrides et al., 2016), which is why the TEIQue is used globally by HR practitioners and business coaches for recruitment, training, and development purposes. The adaptation and standardization of the instrument in the Italian language opens up diverse opportunities for similar applications in the Italian context.

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Last, trait EI and the TEIQue, specifically, is a very strong negative predictor of psychopathology (Martins et al., 2010), a relationship that has been replicated in children (Russo et al., 2012), adolescents (e.g., Mavroveli et al., 2007), and adults (e.g., Petrides et al., 2017) alike. Therefore, the instrument, supported and interpreted through the underlying theory, can be usefully incorporated in clinical and counseling screening and intervention programs across most age groups.

In conclusion, the present study tested and demonstrated, in a large adult sample, that the TEIQue-FF shows robust psychometric properties in the Italian context, just as it has shown in many other countries around the world. It also provides further evidence of the stability of the TEIQue factors across different countries and cultures, thus offering support for the construct's universality. This validation of the TEIQue builds on previous work in the Italian context that had been conducted on adolescents (Di Fabio, 2013), young adult samples (Di Fabio et al., 2016), or smaller samples comprising predominantly undergraduate students (Andrei et al., 2016b). Thus, the present research delivers a more solid basis for generalizability to the adult Italian population.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of "APA ethical standards" with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Psychological Science Departmental ethical committee at the D'Annunzio University of Chieti–Pescara.

AUTHOR CONTRIBUTIONS

AC designed the study, wrote the introduction, part of results and discussion, run the analyses and revised the manuscript. LP designed the study, collected the data, run the analyses and wrote most of the result section. MM wrote part of the discussion. KP supervised the entire project, wrote several part of the manuscript, and deeply revised all the manuscript.

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An Investigation of the Psychometric Properties of the Chinese Trait Emotional Intelligence Questionnaire Short Form (Chinese TEIQue-SF)

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The present study examined the psychometric properties of the Chinese version of the Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF). Analyses were performed using a sample of undergraduates ($N = 585$) recruited from four universities across China. Confirmatory factor analysis of the Chinese TEIQue-SF supported the one-factor structure of trait emotional intelligence. Measurement invariance analyses were conducted across the Chinese sample and a sample of Canadian undergraduate students ($N = 638$). Although the two samples demonstrated configural and partial metric invariance, scalar invariance was not found. Cross-cultural implications and explanations of the present findings, as well as suggestions for future research are discussed.

Keywords: trait emotional intelligence, TEIQue-SF, cross-cultural, confirmatory factor analysis, measurement invariance

INTRODUCTION

Emotional intelligence (EI) has garnered considerable research interest since its introduction to the research literature by Salovey and Mayer (1990). EI can be broadly conceived of as an individual differences variable describing emotion related distinctions (Petrides et al., 2007a; Petrides et al., 2018). One commonly-cited description of EI, referred to as trait EI (also called trait emotional self-efficacy), defines it as a cluster of behavioral dispositions and self-perceptions related to one's emotions, positioned at the lower levels of personality hierarchies (Petrides and Furnham, 2001; Petrides et al., 2007b, 2016; Petrides, 2011). Trait EI is evaluated using self-report questionnaires (Petrides and Furnham, 2001), and a variety of psychometric measures have been developed to assess it (e.g., Bar-On, 1997; Schutte et al., 1998). One prominent measure is the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2009), which is the focus of the present study.

The TEIQue and its short form, the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF), were constructed to adequately cover trait EI's sampling domain in line with trait EI theory (Pérez et al., 2005; Petrides, 2009, 2011). It operationalizes EI in accordance with the subjective nature and reporting of emotional experiences, and as a personality trait (Petrides et al., 2007b; Petrides, 2009, 2011). The measure comprises 15 facets which form four correlated factors, and can be further grouped to produce a global trait EI score (Petrides, 2009). Petrides (2009) defines these four factors as: *Well-Being* (well-being related feelings across time based around achievements, self-regard, and expectations), *Self-Control* (regulating and having control

over emotions, impulses, and stress), *Emotionality* (ability to perceive, express, and connect with emotions in self and others, which can be used in creating successful interpersonal relationships), and *Sociability* (being socially assertive and aware, managing others' emotions, and effectiveness in communication and participation in social situations).

Studies in Western countries utilizing the TEIQue have found numerous positive associations with global trait EI amongst undergraduate students, including higher resiliency (e.g., Vesely et al., 2014), greater proclivity to use adaptive coping strategies (e.g., Mikolajczak et al., 2008), and a positive relationship with academic performance (e.g., Sanchez-Ruiz et al., 2013; Petrides et al., 2018).

Cross-Cultural Differences in Trait Emotional Intelligence

Cultures vary on multiple dimensions, including individualistic versus collectivistic societies (Hofstede, 1980, 2001; Triandis, 1995). Individualistic societies (e.g., North American) tend toward looser connections between people with more personal independence from collectives, and people are more influenced by personal motivations and goals (Hofstede, 1980; Triandis, 1995; Suh et al., 1998; Hofstede et al., 2010). Collectivistic societies (e.g., China) are characterized by tighter connections between people and strong identification with one or more collective in-groups, and valuing and prioritizing the norms and goals of these groups often over personal goals (Hofstede, 1980; Triandis, 1995; Suh et al., 1998; Hofstede et al., 2010).

Evidence suggests that emotions and latent personality traits manifest differently across cultural environments. For example, in line with collectivistic values of preserving interpersonal harmony, Siu and Chang (2011) reported that a Chinese sample was likely to control feelings of stress related to close relationships using avoidance or detachment. Cross-cultural differences have been found in norms surrounding expression of emotions, called display rules (Ekman and Friesen, 1969; Caruso, 2008). Matsumoto (1990) found that negative emotional displays among ingroup members and positive emotions toward outgroups were considered more appropriate in an American sample compared to a Japanese sample. Cross-cultural comparisons of personality traits have found positive associations between individualism and extraversion, with higher levels of extraversion amongst participants from individualistic compared to collectivistic countries (Furnham and Cheng, 1999; McCrae, 2001, 2002; Hofstede and McCrae, 2004).

Measures developed to assess trait EI tend to be factorially robust when assessed in different countries and cultures. The factor structure defined by trait EI measures other than the TEIQue show reasonable replicability across collectivistic countries such as China (Li et al., 2012; Kong, 2017), Japan (Fukuda et al., 2011) and Korea (Fukuda et al., 2012). Studies that examine the factor structure of the long version of the TEIQue have generally found that the factor structure is replicated (apart from some minor deviations) in other countries (e.g., Mikolajczak et al., 2007; Freudenthaler et al., 2008; Martskvishvili et al., 2013; Aluja et al., 2016). Studies examining the long

version of the TEIQue in Chinese samples demonstrate partial replication of the factors. Mavroveli and Siu (2012) found a three-factor solution for the adolescent TEIQue, with sociability and emotionality combined to form a single factor. Gökçen et al. (2014) found a four-factor solution for the TEIQue. However, some of the facets did not load onto factors as expected.

There is mixed evidence in the research literature regarding cross-cultural comparisons of trait EI levels in more individualistic versus collectivistic countries (e.g., LaPalme et al., 2016). For example, Gökçen et al. (2014) found that British participants scored higher on global trait EI and on the four factors associated with the TEIQue compared to Chinese participants. Studies using other measures of trait EI have similarly found participants from a more individualistic country obtaining higher trait EI scores (Koydemir et al., 2013; Nozaki and Koyasu, 2016). However, another study using the TEIQue-SF found that the more collectivistic Cape Verdeans scored higher on global trait EI compared to Portuguese participants (Wilks et al., 2015). Using a different trait EI measure, a study comparing United States and Taiwanese academic leaders showed no significant differences in total EI, though some differences existed on subcomponent measures (Tang et al., 2010).

Present Study

Trait EI was largely defined and developed in Western contexts, thus raising a need to examine the construct within non-Western samples (e.g., Gangopadhyay and Mandal, 2008). The present study aims to do so by examining the factor structure of the frequently-used trait EI measure, the TEIQue-SF, in a sample of Chinese undergraduate students. Although the long-form version of the TEIQue has been previously examined in a Chinese sample (e.g., Gökçen et al., 2014), to our knowledge, no previous study has undertaken this task using the short-form version of a Chinese-translated TEIQue. Short-form scales make important contributions and provide practical benefits to psychological research. For example, they prevent participant disengagement and are useful for studies including several questionnaires or repeated applications of the same questionnaire over multiple sessions (Austin et al., 2018). In line with findings of good model fit of the TEIQue-SF factor structure in a Spanish sample (Laborde et al., 2016) and factor analytic findings for the long version of the TEIQue in a Chinese sample (e.g., Gökçen et al., 2014), we expect to find good model fit for the factor structure using a Chinese translation of the TEIQue-SF.

Cultural variations in trait EI will also be explored by assessing the cross-cultural replicability of the TEIQue-SF. Cross-cultural measurement invariance will be used to compare the more collectivistic Chinese sample with a more individualistic Canadian sample. Measurement invariance is a means of assessing the psychometric equivalence of a construct (i.e., trait EI as assessed by the TEIQue-SF) across different groups (Putnick and Bornstein, 2016). When a construct is invariant across groups, it indicates that the different groups are attributing the same meaning to that construct (Putnick and Bornstein, 2016). Establishing cross-cultural invariance is important for comparisons across cultures on some construct (Mullen, 1995; Libbrecht et al., 2014; LaPalme et al., 2016). While factorial

equivalence can be demonstrated within multiple cultures, it does not ensure measurement invariance of the measured construct across cultures (Byrne and Campbell, 1999; Byrne and Watkins, 2003). Therefore, a separate examination of measurement invariance of the TEIQue-SF is warranted. While several studies have examined the measurement invariance of other trait EI measures (e.g., Li et al., 2012), to our knowledge, no study has previously examined the cultural invariance of the TEIQue-SF in a Chinese and Canadian sample.

One comparative study using the long version of the TEIQue found that more individualistic participants scored higher on global and factor measures of trait EI (Gökçen et al., 2014). However, other studies making comparisons using participants from different countries or using different trait EI measures have found divergent results (e.g., Wilks et al., 2015). Based on inconsistencies in previous findings, the present study makes no specific hypotheses regarding individualistic-collectivistic group comparisons using the TEIQue-SF.

MATERIALS AND METHODS

Participants

The present study included samples of Chinese and Canadian undergraduate university students. The Chinese sample ($N = 585$, 89 men, 447 women, and 49 unreported) was recruited from four Chinese universities. Their ages ranged from 16 to 26 years ($M = 19.53$, $SD = 1.01$). The Canadian sample ($N = 638$, 181 males and 456 females, 1 unreported) were recruited from a large Canadian university. Their ages ranged from 17 to 43 years ($M = 18.50$; $SD = 2.14$).

The present study followed the ethical guidelines required by the Canadian and Chinese universities, respectively. Written informed consent was given by participants in the Chinese sample, and explicit informed consent was given by the Canadian subjects using an online format prior to proceeding to questionnaires. All subjects gave informed consent in accordance with the Declaration of Helsinki. There were no formal ethics board requirements at the Chinese universities for survey method studies, and rather this was handled internally within the department. Ethics approval for the Chinese sample was therefore not required as per the Beijing Normal University's guidelines and national regulations. With respect to the Canadian sample, ethical approval was given by the non-medical Western's Research Ethics Board at the University of Western Ontario.

Measures

For the Chinese sample, the trait EI data were obtained from a larger resiliency study (Wilson et al., 2018). The trait EI data for the Canadian sample was drawn from a larger personality study (Plouffe et al., in press). The trait EI measure has not been previously examined for either of these samples.

Trait Emotional Intelligence

The Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF; Petrides, 2009) is a 30-item measure that evaluates global trait EI, though it can also be used to assess the four trait EI

factors: Well-Being, Self-Control, Emotionality, and Sociability. As indicated by the TEIQue-SF scoring key, obtained from Petrides' university laboratory website, items 3, 14, 18, and 29 only contribute to global trait EI, and not to any of the four factors. Therefore, these items were only used to calculate global trait EI scores. Participants responded to items using a 7-point Likert scale ranging from 1 (*completely disagree* or *strongly disagree*) to 7 (*completely agree* or *strongly agree*).

For the Chinese sample, the TEIQue-SF was translated into Mandarin following the recommended steps by Hambleton and Lee (2013). Care was taken to maintain content and lexical equivalence. The translation was done by faculty and graduate students who were native Chinese speakers as well as being highly fluent in English. Back translations were performed to ensure equivalence of the meaning for each item. Specifically, two psychology graduate students independently translated the English version into Chinese, and the two translations were examined for differences. Any differences were discussed, and final decisions for the scale were made by one of the Chinese authors of this paper. The Chinese version of the TEIQue-SF was then translated back into English with the aid of a professor at a Chinese university who has taught English for over 30 years. The translation process confirmed proper translation of the TEIQue-SF into Mandarin, allowing for distribution of the TEIQue-SF to Mandarin-speaking participants. The Canadian participants completed the English version of the TEIQue-SF as published by Petrides (2009).

Data Analytic Strategy

The goal of the present study was twofold. The primary aim was to assess the factor structure of the TEIQue-SF in the Chinese sample, and the secondary aim was to evaluate cultural variations of the TEIQue-SF using cultural measurement invariance and mean comparisons. The factor structure for the TEIQue-SF used by Laborde et al. (2016) and Merino-Tejedor et al. (2018) was utilized in the present study. A one-factor model with the four trait EI factors (represented as indicators) loading onto global trait EI was tested using confirmatory factor analysis (CFA) in Mplus Version 7.4 (Muthén and Muthén, 1998-2015). When evaluating model fit, Root Mean Square Error of Approximation (RMSEA) values of 0.05 or below were considered good fit, values between 0.05 and 0.08 acceptable fit, and values between 0.08 and 0.10 were considered indicative of mediocre fit (Browne and Cudeck, 1993; MacCallum et al., 1996; Hu and Bentler, 1998). In line with Hu and Bentler's (1999) suggestions, cut-off values close to 0.95 were considered demonstrative of good fit concerning Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) values, and values below 0.08 were considered good fit regarding Standardized Root Mean Square Residuals (SRMR).

To assess cultural invariance of the TEIQue-SF, a series of CFA models were tested in hierarchical order using maximum likelihood estimation in Mplus Version 7.4 (Muthén and Muthén, 1998-2015). Configural invariance was assessed first in order to determine whether the basic organization of trait EI assessed with the TEIQue-SF (i.e., four trait EI factors well-being, self-control, emotionality, and sociability represented as

indicators loading onto a global trait EI latent factor) is found in both cultures (Putnick and Bornstein, 2016). Metric invariance was assessed next to ascertain whether there is equivalence of factor loadings (i.e., equivalence in how the four trait EI factors load onto the global latent trait EI factor) in both cultural groups. Finally, scalar invariance was investigated to determine whether there is equivalence of intercepts. Scalar invariance establishes the connection between observed and latent score findings, such that equal values on latent trait EI will result in the same values on the observed trait EI factors for both Canadian and Chinese individuals (see Milfont and Fischer, 2010). If scalar invariance is not found, a comparison of latent mean scores between groups may not be meaningful. For example, although the two countries might differ on the observed Sociability factor, this may not be meaningfully associated with differences between countries in levels of latent trait EI if scalar invariance is not satisfied (Putnick and Bornstein, 2016). To compare the configural, metric and scalar invariance models, χ^2 (at $p = 0.01$ significance level), CFI, and RMSEA difference tests were utilized. For these tests, Δ CFI values less than or equal to 0.01 in size, and Δ RMSEA values less than 0.015 in size, were utilized to indicate invariant models (Cheung and Rensvold, 2002; Chen, 2007).

RESULTS

Descriptive Statistics and Bivariate Correlations

Descriptive statistics, Cronbach's alphas, and bivariate correlations for the TEIQue-SF factor scores and total scores are presented for both the Chinese and Canadian data in **Table 1**. Means for both the Chinese and Canadian groups are similar to those found in previous studies (e.g., Herodotou et al., 2011; Laborde et al., 2016). Across both samples, the alpha coefficient for global trait EI was large ($\alpha = 0.88$). However, the values for the trait EI factors ranged from small ($\alpha = 0.47$) to large ($\alpha = 0.82$) in the Chinese sample, and from acceptable ($\alpha = 0.67$)

to large ($\alpha = 0.85$) in the Canadian sample. For both samples, the correlations between the factor and global TEIQue-SF scores were significant and positively related.

Confirmatory Factor Analysis of the Chinese TEIQue-SF

A model with the four trait EI indicators (i.e., Well-Being, Self-Control, Emotionality, Sociability) loading onto one global trait EI factor was tested in the present study using CFA with maximum likelihood robust estimation. When all fit indices were considered, the fit for the one-factor model was acceptable: $\chi^2(2) = 12.188$, RMSEA = 0.096 (90% CI = 0.049–0.151), CFI = 0.980, TLI = 0.939, SRMR = 0.024. The standardized factor loadings were generally strong, ranging from 0.58 to 0.79 (see **Figure 1**).

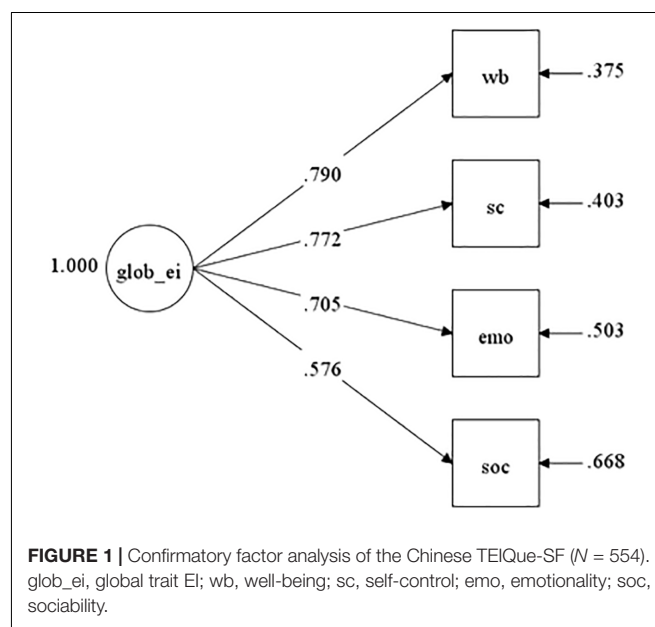


TABLE 1 | Descriptive Statistics, Coefficient Alphas, and Correlations for Chinese and English Versions of the TEIQue-SF.

Variable	Mean	SD	α	1	2	3	4	5
Chinese Sample								
1 Global trait EI	4.73	0.64	0.88	1.00				
2 Well-being	5.10	0.96	0.82	0.83*	1.00			
3 Self-control	4.53	0.80	0.65	0.81*	0.64*	1.00		
4 Emotionality	4.87	0.74	0.65	0.80*	0.55*	0.52*	1.00	
5 Sociability	4.32	0.68	0.47	0.70*	0.42*	0.44*	0.48*	1.00
Canadian Sample								
1 Global trait EI	4.73	0.69	0.88	1.00				
2 Well-being	5.17	1.04	0.85	0.84*	1.00			
3 Self-control	4.19	0.91	0.67	0.68*	0.50*	1.00		
4 Emotionality	4.79	0.85	0.67	0.73*	0.48*	0.28*	1.00	
5 Sociability	4.77	0.87	0.71	0.70*	0.48*	0.32*	0.40*	1.00

Listwise deletion used in correlation analysis for Chinese (N = 548) and Canadian (N = 633) data. * $p < 0.01$.

Measurement Invariance Across Cultures

To make cross-cultural comparisons and establish the generalizability of the TEIQue-SF, invariance of the factor structure of the TEIQue-SF must be established (Reise et al., 2000; Widaman and Reise, 1997). Therefore, nested CFA models were compared using both the Chinese and Canadian samples to determine whether measurement invariance of the TEIQue-SF was found across cultures (see **Table 2**). According to the CFI index, the configural model demonstrated acceptable fit $\chi^2_{(4)} = 28.24$; $p < 0.001$, RMSEA = 0.100 (90% confidence interval [CI] = 0.067–0.137), CFI = 0.981. Examination of the chi-squared change index showed that there was a significant difference between the metric model with constrained factor loadings and the configural model, $\Delta\chi^2_{(3)} = 19.08$, $p < 0.01$, though large sample sizes may have been responsible for this influence (Cheung and Rensvold, 2002). Although examinations of RMSEA change index showed non-significant differences between the models, $\Delta\text{RMSEA} = -0.002$, the CFI change index also showed significant differences between the models, $\Delta\text{CFI} = -0.013$. To test for partial metric invariance, an examination of the modification indices led to the decision to free the self-control factor. Subsequent chi square, RMSEA, and CFI difference tests were non-significant, providing support for partial metric invariance, $\Delta\chi^2_{(2)} = 7.80$, $\Delta\text{RMSEA} = -0.009$, and $\Delta\text{CFI} = -0.005$. Scalar invariance was tested only on metric-invariant loadings; therefore, Self-Control was left free to vary (Putnick and Bornstein, 2016). Findings of chi square, RMSEA, and CFI difference tests did not support scalar invariance across cultural groups, $\Delta\chi^2_{(2)} = 125.82$, $p < 0.01$, $\Delta\text{RMSEA} = 0.088$, and $\Delta\text{CFI} = -0.099$, which inhibits meaningful assessment of latent mean differences across cultural groups, and overall testing of group differences using the TEIQue-SF (Putnick and Bornstein, 2016).

A lack of measurement invariance indicates that trait scores on the TEIQue-SF are not comparable across the Chinese and Canadian samples assessed in the present study (Reise et al., 1993). Therefore, mean differences on this measure or correlations using this measure can be potentially misleading (Reise et al., 1993). Therefore, further analyses to investigate group mean differences on the TEIQue-SF between the two groups were not performed.

TABLE 2 | Cultural Measurement Invariance Fit Indices.

Model	χ^2 (df)	RMSEA	RMSEA 90% C.I.	CFI
1. Configural invariance	28.236* (4)	0.100	0.067–0.137	0.981
2. Metric invariance	47.314* (7)	0.098	0.072–0.125	0.968
3. Partial metric invariance	36.036* (6)	0.091	0.064–0.121	0.976
4. Partial scalar invariance	161.856* (8)	0.179	0.155–0.203	0.877

* $p < 0.001$.

DISCUSSION

Overall, the present study had two main purposes: (1) to determine whether the factor structure of the TEIQue-SF (Petrides, 2009) was upheld in a non-Western context, and (2) to evaluate whether cross-cultural differences exist in the conceptual interpretation of the TEIQue-SF. Results of the present study demonstrated that while the factor structure of the TEIQue-SF was replicated, there were differences in the meaning of latent trait EI when assessed in a more collectivistic context in comparison to a more individualistic sample.

The present study examined the robustness of the factor structure of the TEIQue-SF (Petrides, 2009) in a Chinese undergraduate sample. Trait EI has been primarily defined in a Western context, therefore requiring the need for the construct to be psychometrically validated in non-Western samples (e.g., Gangopadhyay and Mandal, 2008). This study aimed to do so by examining the fit of a one-factor model (i.e., global trait EI and Petrides' four trait EI factors) using the TEIQue-SF.

Results of the CFA demonstrated that the Mandarin translation of the TEIQue-SF had acceptable fit. Previous studies have cross-culturally replicated the factor structure of the TEIQue (e.g., Freudenthaler et al., 2008). While there are fewer studies similarly examining the factor structure of the TEIQue-SF, Laborde et al. (2016) and Merino-Tejedor et al. (2018) found evidence of good model fit for the TEIQue-SF in their Spanish samples. Additional studies that have investigated the factor structure of the TEIQue-SF have chosen to include items or facets in their CFA models (e.g., Jacobs et al., 2015; Snowden et al., 2015). The current study did not, following on Petrides (2009) suggestion that the TEIQue-SF was not designed to be factor analyzed at the item level or scored at the facet level.

Internal reliability analysis of the TEIQue-SF in the Chinese sample demonstrated high alpha scores on global trait EI, but scores were lower when assessed at the TEIQue factor level. While internal consistencies for factor scores on the short form are expected to be slightly lower (Petrides, 2009), the Sociability factor had lower than expected alpha values in the current study. Some other studies have also reported low alpha coefficients for Sociability on the TEIQue-SF (e.g., Petrides et al., 2010).

Findings that a measure like the TEIQue-SF has a similar factor structure within different cultural contexts do not guarantee that the measure will perform equivalently across cultures (Byrne and Campbell, 1999). Analysis of cultural invariance demonstrated that while configural and partial metric invariance for the TEIQue-SF were achieved, scalar invariance was not achieved across cultural groups. Therefore, the trait EI measure performs differently and has different meanings for Chinese participants in comparison to Canadian participants. Such a finding is important for moving forward with cross-cultural comparisons using this measure, and inhibits meaningful interpretation of trait EI comparisons in the present study.

One potential explanation for lack of invariance is measurement bias (Hong et al., 2003). Misunderstandings of items in different cultures or potential translational issues might serve as potential explanations. Previous studies have also reported cultural factors having an influence on responses

to questionnaires, which may affect invariance. For example, analysis of multiple countries revealed that individualism was negatively related to a middle response style and acquiescent responding (Harzing, 2006). Other studies have also found evidence for individuals from more collectivistic countries being more likely to endorse midpoint values, and having less extreme scores on scales compared to individualists (Chen et al., 1995; Takahashi et al., 2002). However, an examination of the data regarding means and standard deviations from both countries suggests these latter points regarding response style are not particularly applicable to the current study.

Differences across cultures in whether and/or to what extent emotionality, well-being, self-control, and sociability define latent trait EI across cultures may also serve as a potential explanation for findings of non-invariance. For example, self-control factor loadings were not equivalent across Chinese and Canadian samples in the present study. A possible explanation may be found in greater value ascribed to control over one's inner emotions and desires amongst more collectivistic individuals (Markus and Kitayama, 1991). In the development of their Asian American Values Scale, Kim et al. (2005) listed emotional self-control as a central value. This potentially suggests that self-control might be more strongly related to Chinese participants' self-perceptions of emotion-related competencies. Findings from the present study demonstrate a need for further exploration of how cultural differences account for different interpretations of trait EI.

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Limitations and Future Directions

Some limitations with the present study should be considered and used to guide future research. The present study's use of undergraduate participants made it possible to compare the Chinese sample to a demographically similar Canadian sample. Future studies, however, should also compare the psychometric properties of the TEIQue-SF among participants of different age brackets and different groups within a country. The present study also used a predominantly female sample, and future studies should recruit participants with a more equal gender balance. Differences in trait EI levels across different university faculties have been previously observed (e.g., Sanchez-Ruiz et al., 2010) which might warrant further study. Future cross-cultural research should include measures of an individual's individualism and collectivism to assess these relationships with trait EI, as well examinations of other cultural factors that might be driving these differences. Finally, our results showed that trait EI manifests differently across the two countries, and future research should examine reasons for this further.

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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Mediating Effect of Trait Emotional Intelligence Between the Behavioral Activation System (BAS)/Behavioral Inhibition System (BIS) and Positive and Negative Affect

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Gray (1970, 1981, 1987) proposed a behavioral motivation theory (Reinforcement Sensitivity Theory, RST), which describes the Behavioral Activation/Approach System (BAS) and the Behavioral Inhibition System (BIS). Some studies relate higher activation of BAS to positive affect, whereas BIS activation is linked to negative affect, particularly to high levels of anxiety and depression. Research data suggests that greater Trait Emotional Intelligence (TEI) influences optimal development of well-being and psychological adjustment, such as positive affective states. However, a recent study relates the motivational BIS/BAS systems with TEI, showing that high TEI is characterized by sensitivity to reward (BAS), and low TEI due to activation of the BIS system. The aim of this study was to explore how TEI may mediate the relationship between BIS/BAS sensitivity and positive and negative affect. Four-hundred and sixty-seven undergraduate students (385 females) were evaluated. TEI was evaluated with the Trait Meta-Mood Scale (TMMS). Affective states were measured with the Positive (PA) and Negative Affect (NA) Schedule, and BIS/BAS sensitivity was measured with The Sensitivity to Punishment (SP) and Sensitivity to Reward (SR) Questionnaire. The results reveal the influence of the two motivational systems on affective states, and show how this relationship is modified by and better explained through TEI. That is, a stronger approach to appetitive stimuli produces more positive affect, but a belief that one [does not] understand unpleasant emotions or that one analyzes them, or thinks that one cannot regulate or control emotions will reduce that positive state. Greater activation of inhibitory behaviors will produce greater negative affect, and this will increase when one perceives that one attends excessively to one's feelings or does not understand them or feels incapable of regulating them. Accordingly, although motivators could be a focus of interest for intervention, this study shows that the efficiency and profitability of these practical applications increases by adding TEI.

Keywords: emotional intelligence, TMMS-24, positive affect (PA), negative affect, reinforcement sensitivity theory, BIS/BAS

INTRODUCTION

From a neurobehavioral perspective, individual differences in personality traits emerge from the activity of certain brain systems. Eysenck's model (1967), perhaps the most representative within this perspective, is based precisely on the identification of a series of personality traits that are independent of each other: Extroversion-Introversion and Neuroticism-Stability. Different neural structures and mechanisms are related to the psychological differences associated with these traits. Thus, extroversion-introversion would be determined by the reactivity of the central nervous system; and neuroticism-emotional stability would be controlled by the cortical-limbic loop that connects the cerebral cortex with the autonomous nervous system (Eysenck, 1967).

The Reinforcement Sensitivity Theory (RST; Gray, 1970, 1981, 1987) incorporates motivational aspects in the explanation of personality, remodeling Eysenck's theoretical proposal and drawing on the fact that emotional situations are not only characterized by the intensity of the emotional arousal, but also by the motivational direction of the behavior depending on the appetitive or aversive signals present. This theory constituted a strong impulse for the biological study of personality, associating individual differences in diverse personality traits with variations in the reactivity of neurobehavioral systems related to motivational, emotional, and learning processes (Depue and Collins, 1999).

RST implies the existence of different neural systems specialized in detecting, processing, and responding to certain stimuli. Each type of stimulus will launch a specific neural system, activating motivational and emotional states, behavioral responses, etc (Corr, 2008a). Each specific brain system would be responsible for controlling concrete behaviors and emotions that would be associated with certain perceptions or cognitions (Corr, 2008b), while emphasizing emotional intensity and motivational direction. In turn, these systems could be interconnected to more general functions in broader contexts and modulated by general systems (like those of arousal and attention). Thus, for Gray, personality would be the outcome of different neural systems reactivity, and this could explain individual differences (Gray, 1970, 1982, 1993).

RST postulates two key dimensions related to Eysenck's model: Anxiety, ranging from the pole of Extroversion-Stability (low anxiety) to Introversion-Neuroticism (high anxiety); and Impulsivity, which ranges from the Introversion-Stability pole (low impulsivity) to Extroversion-Neuroticism (high impulsivity). The level of impulsivity is directly related to sensitivity to cues of reward and absence of punishment, whereas levels of anxiety are related to sensitivity to cues of punishment, no-reward, and novelty. Gray proposes that behaviors are dually determined by their sensitivity to cues related to the onset of positive reinforcement and their sensitivity to cues related to punishment. These sensitivities are governed, respectively, by two different brain systems, explaining responses in the face of positive or negative stimuli.

Behavioral Inhibition System/Behavioral Arousal System

On the one hand, the Behavioral Arousal System (BAS) "Let's go for it," is the brain system responsible for responding to conditioned and unconditioned stimuli that cue reward (appetitive) or the absence of punishment. When one of these stimuli is present, two effects occur in BAS-mediated behavior: a motivational effect, due to an increase in the arousal, which stimulates and redirects behavior along a spatial-temporal gradient toward the source of reinforcement; and an effect of learning, which redirects attention toward the reward stimulus, facilitating information processing and learning stimulus-stimulus and stimulus-response relations (Pickering and Gray, 2001; Pickering and Smillie, 2008). BAS helps to identify cues associated with positive reinforcement (and absence of punishment) and allows assigning value to the reinforcing stimuli present. BAS activity depends on the dopaminergic system and is composed of two interrelated subsystems: the dorsal striatum (caudate and putamen) and the ventral striatum (core accumbens). BAS activity is related to the development of positive affect or mood and impulsivity (Gray, 1987; Corr, 2004). BAS uses a series of processes (different, but related) to achieve its goals, such as reward reactivity and impulsivity as it approaches and captures the final reinforcer (Corr and Cooper, 2016). BAS arousal leads to the experience of hopeful excitement, it drives persistence to achieve the desired goals and a sense of joy when they are attained.

On the other hand is the Behavioral Inhibition System (BIS), which helps the organism to identify cues associated with punishment or the onset of negative events, assigns value to aversive events (other authors have also proposed similar ideas, for example Konorski, 1967; Lang et al., 1992). Like BAS, it is a feedback device (in this case negative), reacting to conditioned aversive stimuli and responding to cues of punishment, no-reward, or new stimuli. It acts by suppressing behavioral performance, and increases attention to the environment and novelty, so that the next action (identical or not to the interrupted action) is performed with greater intensity and speed. At the cognitive level, BIS predicts the next most likely event and compares it with the current event. The brain structures related to BIS are the septo hippocampal system, its monoaminergic afferents, and its neocortical projections toward the prefrontal cortex. BIS activity has been associated with the development of negative affect or mood and anxiety (Gray, 1987; Corr, 2004). BIS arousal is related to behaviors of passive avoidance, contributing to: the evaluation of risk and rumination, which may lead to the experience of anxiety. In summary, whereas BAS has been associated with the experience of positive affect (PA), BIS is related to the experience of negative affect (NA) (Corr, 2008a,b).

Various self-report instruments have been developed to study the individual differences in BIS/BAS reactivity. Initially, some authors have used Eysenck's Personality Inventory (Eysenck and Eysenck, 1975), assuming that the scales of Extroversion and Impulsivity of that instrument are equivalent to the BAS construct, and that the scale of Neuroticism measures something "rather similar" to BIS. Other researchers, in contrast, have

sought to develop their own instruments to assess the BIS/BAS profile, such as the Appetitive Motivation Scale (Jackson and Smillie, 2004) or the Generalized Reward and Punishment Expectancy Scales (Ball and Zuckerman, 1990; Corr, 2001). But the most widely used are the Behavioral Inhibition/Behavioral Activation System Scales (BIS/BAS Scales; Carver and White, 1994) and the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia et al., 2001).

Originally, BIS-BAS are functionally independent, although in one development of the theory, Gray and McNaughton (2000) proposed their interdependence, turning the mechanism of avoidance into a Fight-Flight-Freeze System (FFFS), which modulates reactions to all aversive stimuli (conditioned or not) and produces avoidance and escape behaviors; high FFFS reactivity is associated with levels of fear and avoidance behaviors. According to Gray and McNaughton, BAS remains relatively unchanged, mediating the reactions to appetitive stimuli and approach behavior, whereas BIS is responsible for detecting and resolving conflict (between approach and avoidance), beyond sensitivity to punishment itself.

Individual differences in personality and behavior would be based on differences in the reactivity of these systems, such that an individual may be highly sensitive in both systems, whereas others may have greater sensitivity in one of the two systems. Different types of BIS/BAS sensitivity is associated with specific clinical pathologies. For example, people with a particularly sensitive BIS are prone to present problems of anxiety and depression (Johnson et al., 2003; Leen-Feldner et al., 2004; Maack et al., 2012; Hundt et al., 2013), a tendency to worry or to anxious rumination (Corr and McNaughton, 2008) as the result of excessive attention to cues related to negative events. High BAS reactivity is associated with orientation toward reward and impulsivity. BAS is also linked to positive affect (Meyer and Hofmann, 2005). Hence, people with a very sensitive BAS and not very skilled at identifying cues associated with punishment would be particularly vulnerable to the development of addictive behaviors (Knyazev, 2004; Pardo et al., 2007; Hundt et al., 2008) as a result of excessively valuing the immediate reinforcing properties, but not adequately appraising the long-term effects.

Affective States and Emotional Intelligence

Affective states are conceptualized as two independent dimensions or factors that determine emotional experiences. On the one hand, positive affect (PA) indicates that an individual feels excited, alert, and active and, on another hand, negative affect (NA) may reflect fatigue, sadness, and mental and physical exhaustion (Watson et al., 1988; Sandín et al., 1999; Gray and Watson, 2007). The expression of this type of experiences is considered important in physical, emotional, and social health risk prevention. Certain disorders, such as anxiety and depression, share high levels of negative affect, whereas low levels of positive affect are only related to depression (Sandín et al., 1999). For this reason, research must incorporate the study of both dimensions.

When referring to physical, emotional, and social health risk prevention, many studies consider emotional intelligence (EI) as a transcendental variable, as it has been determined

that individuals with adequate perception of emotion management present optimal development of well-being and good psychological adjustment (Petrides et al., 2007; Schutte et al., 2007; Martins et al., 2010; Salguero et al., 2011; Fernández-Berrocá et al., 2012; Mestre et al., 2017) and of low levels of negative affect and high levels of positive affect (Gohm and Clore, 2002; Palmer et al., 2002; Extremera and Fernández-Berrocá, 2005; Extremera and Rey, 2016).

The term EI was coined by Salovey and Mayer (1990). These authors postulate the structure of EI as a model of four branches or interrelated skills, comprising the skill to perceive, appraise, and express emotions; the skill to access and/or generate feelings that facilitate thought; the skill to understand emotions; and the skill to regulate emotions (Mayer and Salovey, 1997).

Since this first approach, other models have emerged, attempting to conceptualize EI from different perspectives (Mestre and Fernández-Berrocá, 2007). They can be classified generally as skills models and mixed or trait models. Skills models consider EI as the ability to process emotional information to improve and guide thoughts. Mixed or trait models consider EI as stable personality traits, behavioral tendencies, and self-perceived abilities (Petrides, 2010).

Different methods to assess the EI construct have emerged over the years. The most commonly methods used are self-report questionnaires and evaluations by observers or 360° (Extremera et al., 2004; Mestre and Guil, 2006). Specifically, among the self-report instruments, the most widely used has been the Trait Meta-Mood Scale developed by Salovey et al. (1995). This meta-knowledge trait scale provides a perceived EI index or Trait Emotional Intelligence (TEI), reporting people's perception of their skills to attend to, clarify, and repair their own emotional states.

BIS/BAS and EI

As RST is a neuropsychological theory that expresses the personality in terms of emotion, motivation, and learning (Corr, 2008a), it seems to be the most adequate framework to investigate EI. Bacon and Corr (2017) proposed the first study, empirically confirming the relations between EI and RST, reporting that people with low EI are more restless and take more precautions in rewarding environments, whereas people with high EI experience less motivational conflict (Corr, 2008a). Bacon and Corr also observed that people with high EI are more positive and more resilient, they are characterized by being goal driven (BAS) and they experience lower levels of negative feelings like fear, frustration, or sadness (BIS).

Within the EI dimensions, Self-control is the most closely related to the RST variables. People who obtain high scores are more likely to regulate their emotions and behaviors effectively, concentrate on achieving their goals, be more receptive to the perspective of rewards for their efforts, but they would not act impulsively to obtain them. Other EI dimensions, such as Well-being, Emotion, and Sociability, are also positive in terms of attitude, affect, and relations with others, contributing to the link established between EI and favorable life results, but they are less related to the RST (Bacon and Corr, 2017).

BIS/BAS, EI and Affective States

In short, only the study of Bacon and Corr (2017) showed that high TEI is characterized by sensitivity to reward (BAS) and low TEI by BIS activation and previous studies (Meyer and Hofmann, 2005; Hundt et al., 2013; Li et al., 2015) observed BIS was associated with negative mood and emotions whereas BAS was associated with positive experiences. Due to these findings, two independent models have been planned, one for each system proposed by the RST. But we do not know how TEI mediates the relation between the motivational systems (BIS/BAS) and affective states.

Hence, the goal of this study is to explore how TEI (Attention, Clarity, and Emotional Repair) can mediate the relation between BIS/BAS and Positive and Negative Affect. For this purpose, two mediation models were designed: Model A examines the effect of SR or BAS on PA, and Model B examines the effect of SP or BIS on NA. Both mediation analyses were performed using TEI as the mediator. In the first model, we hypothesized that greater BAS activation would be associated with higher levels of EI, which, in turn, would be associated with greater PA. In the second model, our hypothesis was that greater BIS activation would be associated with lower levels of EI, which, in turn, would be associated with greater NA.

MATERIALS AND METHODS

Participants

The sample consisted of 467 undergraduate students, 385 women (82.4%) and 82 men (17.56%). The mean age was 21.79 years ($SD = 5.19$). The participants were from the University of Huelva, Spain. They were studying Psychology (87.15%), Psychopedagogy (12.43%), Social Education (0.21%) and Tourism (0.21%). A total of the sample 57.6% were studying first, 8.99% second, 13.28% third, 16.06% fourth and finally 4.07% fifth.

Procedure

Participation in the study was voluntary and confidential. The study was carried out in compliance with the Declaration of Helsinki, and all participants signed the informed consent. The students completed the different online self-report questionnaires and were rewarded with course credits.

Measures

Trait Meta-Mood Scale (Salovey et al., 1995)

TEI was evaluated by the Spanish version of the Trait Meta-Mood Scale (TMMS; Fernández-Berrocal et al., 2004). This questionnaire evaluates the perception of or beliefs about one's emotional abilities. This scale contains 24 items, rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). It is divided into three dimensions: Emotional Attention (ability to identify one's own emotions and those of others and know how to express them), Emotional Clarity (understanding emotions), and Emotional Repair or Regulation (ability to handle emotions), with each dimension containing 8 items. The reported reliability and validity indexes are adequate (Fernández-Berrocal et al., 2004). In our sample, Cronbach's alpha for each dimension

was as follows: Emotional Attention $\alpha = 0.88$; Emotional Clarity $\alpha = 0.90$, and Emotional Repair $\alpha = 0.87$.

The Sensitivity to Punishment and Sensitivity to Reward (Carver and White, 1994)

BIS/BAS sensitivity was measured by the Spanish version of The Sensitivity to Punishment (SP) and Sensitivity to Reward (SR) Questionnaire (SPSRQ; Torrubia et al., 2001). It consists of 48 dichotomous items (Yes-No) and is divided into two scales: Sensitivity to Punishment (SP), which consists of 24 items considered measures of BIS, and Sensitivity to Reward (SR) as a measure of BAS. The reliability of the scale is adequate, with the SP scale showing an alpha of 0.83 and the SR scale an alpha of 0.76 (Caseras et al., 2003). In this sample, the reliability indices were 0.78 for the SP subscale and 0.77 for the SR scale.

Positive and Negative Affect Schedule (Watson et al., 1988)

Affective states were measured through the Spanish version of the Positive (PA) and Negative Affect (NA) Schedule (PANAS; Sandín et al., 1999). This scale is a widely used self-report measure, developed to evaluate these two dimensions independently. The original version presents adequate indicators of internal consistency for both dimensions (Watson et al., 1988). Each sub-factor showed adequate reliability in the present sample: PA $\alpha = 0.88$ and NA $\alpha = 0.82$.

Statistical Analysis

The analyses were carried out using the SPSS package (version 20.0; IBM, Chicago, IL). In the preliminary analyses, descriptive statistics and internal consistency were calculated with Cronbach's alpha. Pearson correlations between the study variables were also calculated, and Student's *t*-test was used to determine sex differences. In order to verify the influence of sex and age on the proposed models, linear hierarchical regressions were performed in which sex and age were entered first (as control variables). All mediation analyses described below were estimated with the PROCESS macro (Hayes, 2013) using SPSS 20 software. We used Model 6 to examine the direct and indirect effect of two mediation models; Model A examines the effect of SR or BAS on PA, and Model B examines the effect of SP or BIS on NA. Mediation analyses were conducted using TEI as a mediator. To verify which of the indirect effects was the most important, we performed specific contrasts for indirect effects. As a statistical significance criterion, we used the 95% confidence interval (CI) generated by the bias-corrected bootstrap method set to 10,000 reiterations.

RESULTS

Preliminary Analyses

Table 1 presents the descriptive statistics of the research variables and their internal consistency.

Table 2 shows the Pearson correlations among the main variables in our study. According to Model A, Sensitivity

TABLE 1 | Descriptive statistics and Cronbach's α values of sensitivity to punishment/sensitivity to reward, positive affect/negative affect, and trait emotional intelligence.

	<i>M</i>	<i>SD</i>	Cronbach's α
Emotional attention	29.14	5.21	0.88
Emotional clarity	29.05	5.4	0.90
Emotional repair	29.26	5.64	0.87
Sensitivity to punishment	10.78	5.13	0.78
Sensitivity to reward	9.75	4.25	0.77
Negative affect	19.03	7.24	0.88
Positive affect	29.57	6.6	0.82

TABLE 2 | Pearson correlations among sensitivity to punishment/sensitivity to reward, positive affect/negative affect, trait emotional intelligence, and age.

	1	2	3	4	5	6	7
1. Emotional attention	–						
2. Emotional clarity	0.13**	–					
3. Emotional repair	0.01	0.31**	–				
4. Sensitivity to punishment	0.25**	–0.33**	–0.35**	–			
5. Sensitivity to reward	0.05	–0.13**	–0.02	0.06	–		
6. Negative affect	0.30**	–0.27**	–0.28**	0.30**	0.17**	–	
7. Positive affect	0.15**	0.18**	0.35**	–0.21**	0.18**	0.29**	–
8. Age	–0.04	0.13**	0.07	–0.16**	–0.09	0.06	0.07

** $p < 0.001$; $N = 467$.

to Reward was positively associated with Positive Affect and negatively with Emotional Clarity in all participants. Moreover, Positive Affect had positive associations with all TEI dimensions. For Model B, Sensitivity to Punishment showed significant positive relations with Negative Affect and Emotional Attention and negative associations with Clarity and Emotional Repair. Negative Affect was also negatively associated with Clarity and Emotional Repair and positively with Emotional Attention. Finally, results showed significant positive associations between Attention and Clarity and between Clarity and Emotional Repair.

Table 3 presents the descriptive statistics for men and women. There were statistically significant sex differences for the SR and PA variables.

Due to the sex differences and the significant correlation between age and Emotional Clarity, various linear regression analyses were carried out to verify the influence of these variables in the two proposed models. In Model A, we determined whether SR and the TEI dimensions are related to PA after controlling for the influence of sex and age. The model generated was significant, $F_{(6,460)} = 17.83$, $p = 0.000$, with an adjusted $R^2 = 0.189$, but neither sex nor age were associated with PA ($p > 0.05$). For Model B, another regression analysis was performed to determine whether SP and the TEI dimensions are related to NA after controlling for the influence of age. Analyses showed a significant model, $F_{(5,461)} = 28.25$, $p = 0.000$, with an adjusted $R^2 = 0.235$. Results show that age was not associated with NA ($p > 0.05$).

TABLE 3 | Descriptive statistics for men and women and Student's t -test.

	Females		Males		<i>t</i>	<i>gI</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Emotional attention	29.23	5.27	28.68	4.91	0.87	465	0.385
Emotional clarity	28.98	5.51	29.37	4.87	–0.581	465	0.562
Emotional repair	29.19	5.83	29.61	4.69	–0.704	139.88	0.483
Sensitivity to punishment	10.87	5.03	10.37	5.59	0.812	465	0.417
Sensitivity to reward	9.4	4.2	11.38	4.15	–3.88	465	0.000**
Negative affect	18.89	7.37	19.71	6.61	–0.93	465	0.353
Positive affect	29.26	6.71	31	5.87	–2.17	465	0.030*

** $p < 0.001$; * $p < 0.05$.

Mediation Analyses

In this study, for Model A, SR was considered the first variable (predictor, X) and PA as the outcome (Y). In Model B, SP was considered the first variable (predictor, X) and NA the outcome (Y). Emotional Attention (M_1), Emotional Clarity (M_2), and Emotional Repair (M_3) were considered the mediator variables for both models.

As illustrated in **Figures 1, 2**, total effect (c) refers to the relationship between SR/SP and PA/NA, respectively, without controlling for the mediators; direct effect (c') refers to the relationship between SR/SP and PA/NA, respectively, after controlling for the mediators; total indirect effect (a) represents the association between the predictors SR/SP and three mediators (a_1 , a_2 , and a_3); and total indirect effect (b) refers to the role of the three mediators in the relationship with PA/NA, respectively (b_1 , b_2 , and b_3). Total indirect effect (d) refers to the relationship of the three mediators with each other (d_{21} , d_{32} , and d_{31}), and specific indirect effect (a_1b_1 , a_2b_2 , and/or a_3b_3) refers to the role of a specific mediator in the relationship between SR/SP and PA/NA, respectively.

The first model (A) evaluated the possible mediation of TEI (Attention, Clarity, and Repair) in the relationship between SR and PA. In the first regression, SR accounted for 3.09% of the unique variance in PA ($R^2 = 0.03098$, $F = 14.824$, $p < 0.01$). However, 18.17% of the total amount of variance was accounted for by the global model, which included SR and the three proposed TEI mediators ($R^2 = 0.1817$, $F = 35.956$, $p < 0.01$).

The values provided in **Table 4** show that the total effect (c) and the direct effect (c') of SR on PA were significant. As the regression coefficient estimates, based on the 95% CI of the point estimate did not contain zero—evidence of the mediation of indirect effects—, we obtained two specific indirect effects through (1) the Emotional Clarity relationships ($\text{Ind5} = a_2b_2$), where greater SR was associated with lower Emotional Clarity which was, in turn, associated with lower PA; and (2) the Emotional Clarity and Emotional Repair relationships ($\text{Ind6} = a_2d_{32}b_3$), where greater SR was associated with lower Emotional Clarity and lower Emotional Repair which, in turn, were associated with lower PA (**Figure 3**). To verify which of the indirect effects is more important, we

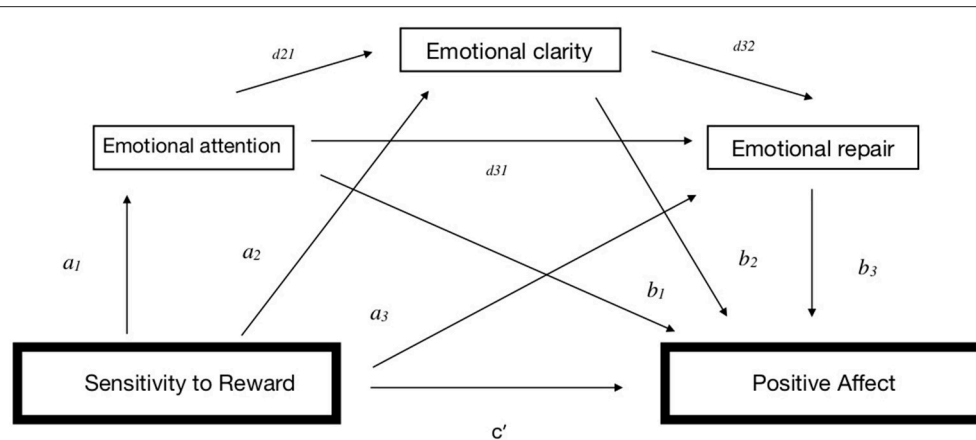


FIGURE 1 | Indirect effects for Model A.

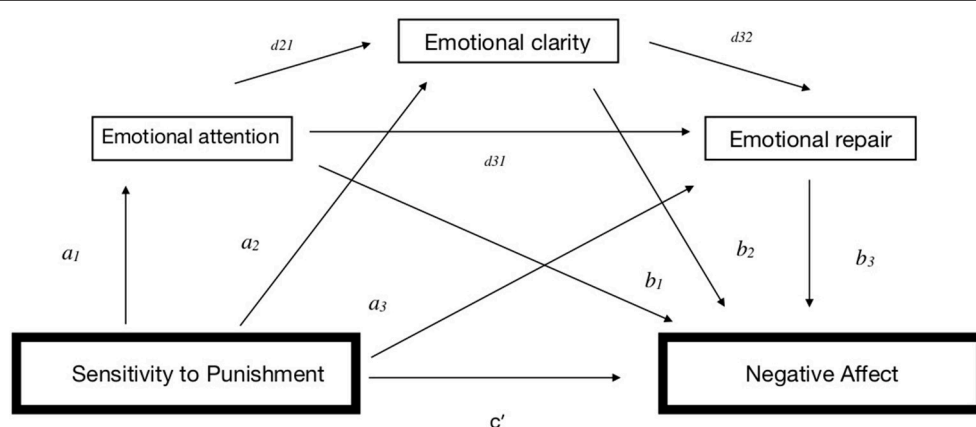


FIGURE 2 | Indirect effects for Model B.

performed specific contrasts of the indirect effects (Table 4) and observed that C19 (comparing Ind5 with Ind6) was not statistically significant, $\beta = 0.022$, $SE = 0.0121$, 95% CI $[-0.0210, 0.0285]$. Therefore, both indirect effects are equally important.

Regarding Model B, the analyses show that SP accounted for 8.83% of the unique variance of NA ($R^2 = 0.0883$, $F = 45.011$, $p < 0.01$), but 23.45% of the total variance was accounted for by the global model ($R^2 = 0.2345$, $F = 35.384$, $p < 0.01$). The values provided in Table 5 show that the total effect (c) of SC on NA was significant, and the direct effect (c') of SR on PA was no significant. We obtained three specific indirect effects, all of them with the same weight: (1) through the Emotional Attention (Ind1 = a_1b_1), in which greater SP was associated with more Emotional Attention, which, in turn, was associated with more NA (2); through Emotional Clarity (Ind5 = a_2b_2); and through (3) Emotional Repair (Ind7 = a_3b_3), in which greater SP was associated with lower Emotional Clarity or Repair, which, in turn, were associated with greater NA (see Figure 4).

DISCUSSION

In the present work, we analyzed the mediation of TEI (Attention, Clarity, and Emotional Repair) in the relationship between BIS/BAS and affective states. For this purpose, two mediation models were designed: Model A examined the effect of SR or BAS on PA, and Model B examined the effect of SP or BIS on NA. Both mediation analyses were performed using TEI as the mediator.

Our preliminary analyses suggest that BAS activity is related to the increase of PA or mood (Corr, 2004). It confirms that this system drives people to achieve their desired goals, leading to feelings of joy and positive mood when they attain them. However, the opposite occurs when people are more sensitive to BIS, which is related to a greater experience of negative mood. Due to their high negative affect and its link to certain disorders like anxiety and depression (Sandín et al., 1999), these people would be more likely to develop this type of psychopathology (Johnson et al., 2003; Leen-Feldner et al., 2004; Corr and McNaughton, 2008; Maack et al., 2012; Hundt et al., 2013).

TABLE 4 | Path coefficients, total effect, direct effect, indirect effect and main specific indirect effect contrast definitions, and 95% bias-corrected confidence interval predicting Positive affect scores ($N = 467$).

Path	Coefficient	SE	BootLLCI	BootULCI	<i>t</i>	<i>p</i>
Total effect (<i>c</i>)	0.2727	0.0708	0.1335	0.4119	3.85	0.000
Direct effect (<i>c'</i>)	0.2911	0.0661	0.1612	0.4209	4.40	0.000
<i>a</i> ₁	0.0673	0.0567	−0.0441	0.1786	1.18	0.236
<i>a</i> ₂	−0.1766	0.0579	−0.2905	−0.0628	−3.04	0.002
<i>a</i> ₃	0.0305	0.0593	−0.0861	0.1470	0.5136	0.608
<i>b</i> ₁	0.1570	0.0540	0.0509	0.2631	2.90	0.004
<i>b</i> ₂	0.1124	0.0551	0.0041	0.2207	2.03	0.042
<i>b</i> ₃	0.3788	0.0518	0.1612	0.4209	4.40	0.000
<i>d</i> ₂₁	0.1420	0.0473	0.0490	0.2350	2.99	0.003
<i>d</i> ₃₁	−0.0319	0.0484	−0.1271	0.0633	−0.659	0.510
<i>d</i> ₃₂	0.3291	0.0471	0.2366	0.4215	6.99	0.000
Indirect effects	Effect	SE	BootLLCI	BootULCI		
Total indirect effect	−0.0183	0.0318	−0.0807	0.0447		
Ind5: <i>a</i> ₂ <i>b</i> ₂	−0.0199	0.0119	−0.0508	−0.0026		
Ind6: <i>a</i> ₂ <i>d</i> ₃₂ <i>b</i> ₃	−0.0220	0.0087	−0.0432	−0.0083		
Specific indirect effect contrast definitions	Effect	SE	BootLLCI	BootULCI		
(C19) Ind5 minus Ind6	0.0022	0.0121	−0.0210	0.0285		

BootLLCI, bootstrapping lower limit confidence interval; BootULCI, bootstrapping upper limit confidence interval; SE, standard error.

Model: 6.

Y: Positive Affect.

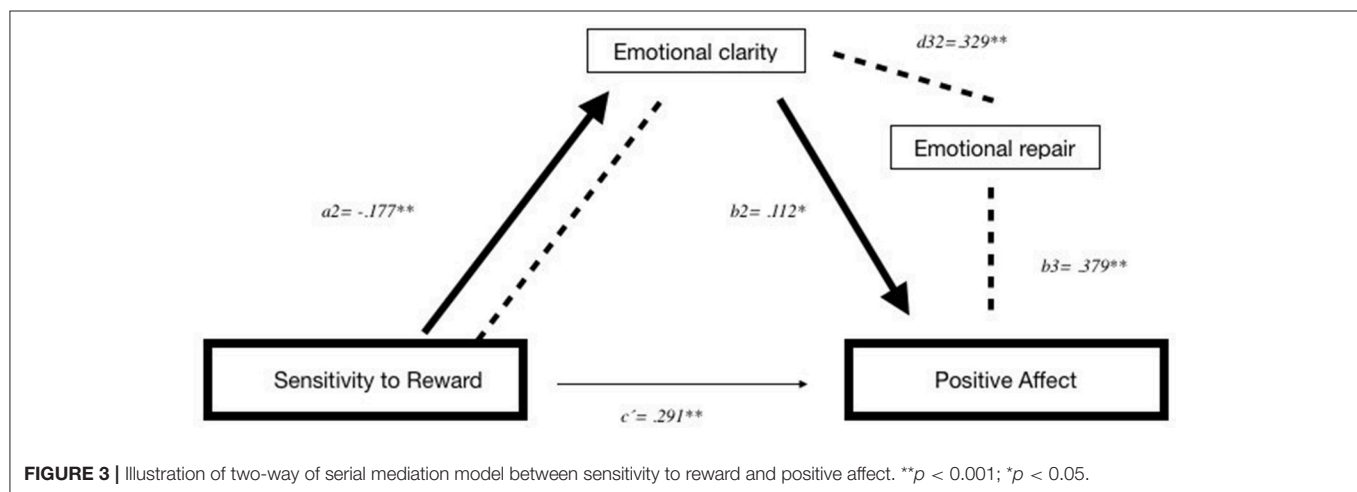
X: Sensitivity to Punishment.

M1: Emotional attention.

M2: Emotional clarity.

M3: Emotional repair.

$N = 467$.



Moreover, our results partially confirm the findings of Bacon and Corr (2017) concerning the relations between TEI and the RST, because people with low EI are more nervous and cautious in rewarding environments, that is, they have greater BIS activation. However, we did not find the same result with regard to people with high EI being more goal-directed, because we found a negative relation between SR and Emotional Clarity. We must take into account that the assessment instruments in our study are different from those used by Bacon and Corr (2017), both for measuring EI and the construct of RST.

Nevertheless, our results show that TEI is associated with a positive mood and low EI is related to a negative

mood, as in other studies (Gohm and Clore, 2002; Palmer et al., 2002; Extremera and Fernández-Berrocá, 2005; Extremera and Rey, 2016).

With the idea of expanding the previous works, we focused on exploring the role of TEI as a mediator, in order to better understand the real process that takes place between the systems of personality according to the RST, TEI, and the emotional state.

In the first model, we hypothesized that greater BAS activation would be associated with higher levels of TEI, which would be related to greater PA. In this regard, our data confirm that if people are more receptive to appetitive stimulation, this leads to a more positive affective state. But its explanatory power

TABLE 5 | Path coefficients, total effect, direct effect, indirect effect and main specific indirect effect contrast definitions, and 95% bias-corrected confidence interval predicting negative affect scores ($N = 467$).

Path	Coefficient	SE	BootLLCI	BootULCI	<i>t</i>	<i>p</i>
Total effect (<i>c</i>)	0.4192	0.0625	0.2964	0.5420	6.71	0.000
Direct effect (<i>c'</i>)	0.1085	0.0666	−0.0224	0.2394	1.63	0.104
<i>a</i> ₁	0.2581	0.0455	0.1687	0.3475	5.67	0.000
<i>a</i> ₂	−0.4032	0.0465	−0.4945	−0.3119	−8.68	0.000
<i>a</i> ₃	−0.3225	0.0521	−0.4249	−0.2202	−6.19	0.000
<i>b</i> ₁	0.4390	0.0603	0.3205	0.5575	7.28	0.000
<i>b</i> ₂	−0.3130	0.0606	−0.4321	−0.1939	−5.16	0.000
<i>b</i> ₃	−0.2380	0.0571	−0.3503	−0.1258	−4.17	0.000
<i>d</i> ₂₁	0.2351	0.0458	0.1451	0.3251	5.13	0.000
<i>d</i> ₃₁	0.0657	0.0489	−0.0305	0.1619	1.34	0.180
<i>d</i> ₃₂	0.2139	0.0483	0.1191	0.3088	4.43	0.000
Indirect effects	Effect	SE	BootLLCI	BootULCI		
Total indirect effect	0.3107	0.0454	0.2292	0.4075		
Ind1: <i>a</i> ₁ <i>b</i> ₁	0.1133	0.0268	0.0679	0.1746		
Ind2: <i>a</i> ₁ <i>b</i> ₂	−0.0190	0.0063	−0.0351	−0.0097		
Ind4: <i>a</i> ₁ <i>d</i> ₂₁ <i>d</i> ₃₂ <i>b</i> ₃	−0.0031	0.0015	−0.0077	−0.0011		
Ind5 = <i>a</i> ₂ <i>b</i> ₂	0.1262	0.0295	0.0743	0.1887		
Ind6 = <i>a</i> ₂ <i>d</i> ₃₂ <i>b</i> ₃	0.0205	0.0086	0.0079	0.0427		
Ind7 = <i>a</i> ₃ <i>b</i> ₃	0.0768	0.0241	0.0351	0.1314		
Specific indirect effect contrast definitions	Effect	SE	BootLLCI	BootULCI		
(C1) Ind1 minus Ind2	0.1323	0.0301	0.0811	0.2010		
(C3) Ind1 minus Ind4	0.1164	0.0274	0.0700	0.1790		
(C5) Ind1 minus Ind6	0.0928	0.0273	0.0459	0.1552		
(C8) Ind2 minus Ind4	−0.0159	0.0060	−0.0313	−0.0070		
(C9) Ind2 minus Ind5	−0.1452	0.0336	−0.2175	−0.0856		
(C10) Ind2 minus Ind6	−0.0395	0.0103	−0.0636	−0.0229		
(C11) Ind2 minus Ind7	−0.0958	0.0246	−0.1506	−0.0531		
(C16) Ind4 minus Ind5	−0.1293	0.0293	−0.1914	−0.0778		
(C17) Ind4 minus Ind6	−0.0236	0.0099	−0.0491	−0.0091		
(C18) Ind4 minus Ind7	−0.0799	0.0248	−0.1352	−0.0367		
(C19) Ind5 minus Ind6	0.1057	0.0313	0.0502	0.1729		
(C21) Ind6 minus Ind7	−0.0562	0.0219	−0.1100	−0.0217		

BootLLCI, bootstrapping lower limit confidence interval; BootULCI, bootstrapping upper limit confidence interval; SE, standard error.

Model: 6.

Y: Negative Affect.

X: Sensitivity to Punishment.

M1: Emotional attention.

M2: Emotional clarity.

M3: Emotional repair.

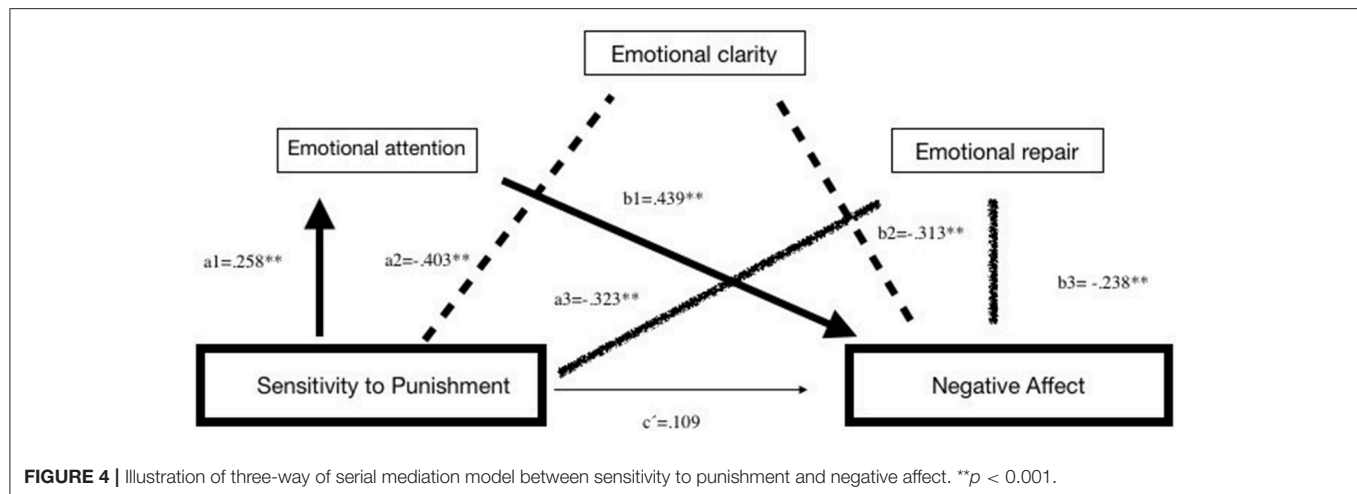
$N = 467$.

significantly increases, rising from 3.09 to 18.17%, when people think they do not understand their emotions, or they analyze them excessively or think they are incapable of regulating or controlling them. And consequently, that positive state will decrease. In this case, we note that inadequate beliefs about one's emotional abilities, such as clarity and regulation, can change the direction of the relation between BAS and pleasant experiences of joy or positive emotions (Meyer and Hofmann, 2005; Corr, 2008a,b).

In the second model, our hypothesis was that greater BIS activation would be associated with lower levels of TEI, which, in turn, would be related to more NA. To confirm this hypothesis, we focused on the analyses of the indirect effects that emerge

through emotional clarity and repair, because they reaffirm that higher activation of the inhibitory behaviors (BIS) can produce greater NA, and that this relation increases if people cannot understand or regulate their emotions. Therefore, this follows the lines proposed by various authors regarding how BIS activation is related to the behaviors of passive avoidance, contributing to the evaluation of risk and rumination, which, in turn, can lead to the experience of anxiety and which is associated with lower TEI (Corr, 2008a,b; Bacon and Corr, 2017).

However, this positive relation between SP and NA also increases if people pay excessive attention to their feelings, that is, they have a high level of emotional attention. These data would contradict our prior comments. Some studies support



that high attention to emotions produces or are related to the tendency to ruminate and its possible harmful effects (Extremera and Fernández-Berrocal, 2005).

This study has some limitations, for example, those associated with the use of self-reports for data collection, besides the limitations of the cross-sectional studies and sex ratio should also be included. We recommend expanding the sample and including other study populations in order to increase the representativeness and generalizability of the data.

In future research, we propose that the studied constructs be assessed with other scales based on the RST and with other measurement instruments of EI that are supported by the skills models.

In spite of the limitations, this study makes a significant contribution to understanding the processes established between TEI, the motivational systems (BIS/BAS), and affective states. In short, the results shed light on the involvement of two motivational systems in emotional states, and how this relation is changed and better explained by TEI. Consequently, although motivators may be a focus of interest for interventions, this study shows that the addition of the TEI construct

could increase the efficiency and the profitability of these practical applications.

AUTHOR CONTRIBUTIONS

AM-C developed the study design, survey creation, performed the collection, and the data analysis and writing of manuscript. JA-B contributed to the interpretation and writing of the manuscript and approved the final version of the manuscript for submission. AZ contributed to project design, performed the collection and manuscript revision. RG contributed to project design and data analysis, data preparation and coding and writing the manuscript, and approved the final version of the manuscript for submission.

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Pathways Into Psychosocial Adjustment in Children: Modeling the Effects of Trait Emotional Intelligence, Social-Emotional Problems, and Gender

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Trait Emotional intelligence (Trait EI) can be understood as a personality trait related to individual differences in recognition, processing, and the regulation of emotionally charged information. Trait EI has been considered a variable of great importance in determining psychosocial adjustment. However, most research on Trait EI has focused on adult and adolescent populations, while very few studies have explored its influence on children. The aim of this study was to analyze possible pathways into psychosocial adjustment in children by examining the combined effects of Trait EI and emotional and social problems. It also aimed to assess the possible mediating role of gender in this relationship. A total of 268 Spanish children participated in this study, ranging in age from 8 to 12 years (mean age = 10.09, *SD* = 1.32, 45.10% male). Selected measures were applied through a web-based survey called DetectaWeb. The regression and mediation/moderation analyses confirmed that psychosocial adjustment in children was determined by Trait EI directly and by emotional and social problems in an indirect way. Together, the three variables explained 46% of the variance in psychosocial adjustment, although Trait EI was the most powerful predictor (44%), demonstrating incremental validity over and above social and emotional problems. In addition, gender was shown to be a moderating variable between Trait EI and psychosocial adjustment; for girls specifically, lower Trait EI scores were a determinant of lower levels of psychosocial adjustment, regardless of emotional and social problems. It can be concluded that the identified pathways provide keys for emotional education interventions aimed at promoting psychosocial adjustment, well-being, and good mental health among children. Our findings support the buffer role of Trait EI against maladjustment risk in children, but more clearly in girls.

Keywords: emotional intelligence, psychosocial adjustment, social acceptance/rejection, childhood, gender, emotional education

INTRODUCTION

According to the World Health Organization [WHO] (1948) classical definition, health is understood as a state of complete physical, mental, and social well-being, and not just the absence of disease or infirmity. This definition includes such diverse aspects as physical health, mental health, well-being, and psychosocial adjustment and is consistent with the biopsychosocial model that includes biological, psychological, and social factors to understand health and illness (Engel, 1977).

Psychosocial adjustment or adaptation refers to people's capacity to adapt to the environment, which implies that the individual has sufficient mechanisms to feel good, integrate, respond adequately to the demands of the environment, and achieve his or her objectives (Madariaga et al., 2014). In childhood, psychosocial adjustment often refers to adaptation and functioning in some of the main areas that characterize this stage: family and school settings.

Among the determinants of child psychosocial adjustment, the role of emotional intelligence (EI) as a protective or promoting factor and the role of emotional and social problems as risk factors or negatively associated factors have been investigated.

Despite varying definitions of EI, however, the general consensus is that the construct is useful for identifying the necessary skills for understanding and regulating emotions, which could direct behavior and thoughts and enhance performance (Mikolajczak et al., 2015; Santos et al., 2018).

Trait Emotional Intelligence and Health

A large meta-analysis by Martins et al. (2010; see also Petrides et al., 2007) established that EI is a positive predictor of mental health, especially if it is measured through particular self-reports instruments such as the Trait Emotional Intelligence Questionnaire (TEIQue). Extensive available evidence suggests EI is a buffer of stressful circumstances for mental health in adolescents and adults (e.g., Petrides et al., 2017; Davis, 2018).

According to the Keefer et al. (2018) explanation of the pathways from EI to health, high-EI individuals: (a) Have a healthier emotional and physiological stress response; (b) Are less likely to avoid, ignore, or distract themselves from the stressful situation as the primary way of coping, and more likely to deal with the stressor directly, thereby shortening the duration of the stressful experience; (c) Are less likely to passively dwell on the stressful situation or numb their feelings with substances, which might compound the health risks; and (d) They use more constructive ways of coping with health threats and chronic illnesses. Nevertheless, although this relationship between EI and health is well established for young people and adults already, it has hardly been replicated in children until now.

An overcome controversy in conceptualizing the construct of EI has given rise to the proliferation of various theoretical models (Vesely Maillefer et al., 2018). Despite this ongoing debate, two main research streams are recognized in the field of EI, namely, EI as a personality trait (i.e., Trait Emotional Intelligence or TEI) and EI as a cognitive ability (i.e., Ability EI or AEI) (Barchard et al., 2016). Specifically, this study is based on one of the most scientifically supported models

currently available in both educational and clinical settings, the TEI theory proposed by Petrides and Furnham (2001) and reviewed by Petrides et al. (2016). According to this model of EI, TEI is a constellation of affective self-perceptions (i.e., trait emotional self-efficacy) and dispositions which facilitate emotional competence in everyday life (e.g., Kotsou et al., 2011; Mikolajczak et al., 2015); it is considered to provide a more comprehensive operationalization of the affect-related aspects of personality than the general Big Five models (Pérez-González and Sanchez-Ruiz, 2014; Vernon et al., 2008). In short, TEI can be understood as a personality trait that captures individual differences in recognition, processing, and the regulation of emotionally charged information, with generally adaptive effects for social efficiency and emotional well-being (e.g., Pérez-González and Sanchez-Ruiz, 2014; Petrides et al., 2016; Lea et al., 2018).

The study of TEI has aroused great interest in the scientific community over the last two decades for two main reasons. The first is that TEI has been associated with higher levels of psychosocial adjustment, which has been interpreted in very different ways (as general adaptation levels, psychological well-being, mental and physical health, emotional adjustment, and life satisfaction) through both correlational and experimental studies in both non-clinical and clinical samples (e.g., Martins et al., 2010; Andrei and Petrides, 2013; Costa et al., 2014; Laborde et al., 2014; Resurrección et al., 2014; Barchard et al., 2016; Petrides et al., 2017; Lea et al., 2018). A rich line of these investigations is based on the assessment of TEI through the TEIQue forms, which is directly based on the TEI theory (Petrides et al., 2016). The second reason is that research has demonstrated that TEI is not totally fixed after adolescence, since it has been shown to be modifiable through psychoeducational intervention (i.e., emotional education), with an average improvement about 15%, which is also reflected in biological changes, such as a 14% drop in diurnal cortisol secretion in Kotsou et al. (2011) study and a 9.7% drop in glycated hemoglobin in Karahan and Yalcin (2009) study, as summarized by recent comprehensive reviews of the literature (Pérez-González and Qualter, 2018) and meta-analyses (Hodzic et al., 2018; Mattingly and Kraiger, 2019).

It is necessary to emphasize that so far the TEIQue for Children, namely Child Full and Short Forms (TEIQue-CF and TEIQue-CSF, respectively), is the only EI measure based on a sampling domain that has been specifically developed for children, rather than on an expedient adaptation of the adult sampling domain, which would have been unsuitable for catching the development characteristics of children (Mavroveli et al., 2008; Banjac et al., 2016).

Studies using children samples have generally found a positive relationship between TEI and a variety of psychosocial adjustment markers, such as, higher academic achievement, better peer relations and social competence, such as nominations from peers and teachers for positive social attributes, like leadership and kindness (Petrides et al., 2006; Mavroveli et al., 2008; Agnoli et al., 2012; Andrei et al., 2015; Banjac et al., 2016). Likewise, these studies have also demonstrated a risk profile in children with low levels of TEI, expressed in the form of psychopathology, anxiety, special education needs, or

truancy rates (e.g., Banjac et al., 2016; Petrides et al., 2016; Stassart et al., 2017).

Some studies have supported the utility of TEI (assessed via TEIQue) in the prediction of criteria related to health and socioemotional well-being across samples of adults, adolescents, and children (Andrei et al., 2014). Despite this, there has been little consolidated research carried out on the combined effects of TEI and social-emotional problems on psychosocial adjustment specifically in populations of children. Particularly, there is little available research that has explored the mediating effect of gender on the relationships between TEI and child psychosocial adjustment.

Social and Emotional Problems

One determining aspect of child psychosocial adjustment and complete well-being, both present and future, involves peer relationships (Mavroveli et al., 2009; Inglés et al., 2010; Domitrovich et al., 2017). Being socially accepted and having friends is associated with good adaptation, personal well-being, increased school performance, high self-esteem, and a positive and pleasant feeling within the group (Wentzel, 2003).

However, not all children enjoy positive social interactions with their peers; peer rejection situations remain a reality in most classrooms and are considered a risk condition for developing psychosocial adjustment problems in childhood, as in later stages of life. Students involved in rejection situations often show a less adaptive psychosocial profile, in terms of life satisfaction, as well as depressive symptomatology, among other aspects of maladaptation. In addition, those children who fail to develop adequate emotional competence will find it more difficult to adapt and will continue to be more vulnerable to social rejection (e.g., Denham et al., 2003; Buck, 2014).

Concerning emotional problems, the consequences of suffering from emotional problems, such as anxiety and depression, are well documented as correlates of low levels of psychosocial functioning and adjustment. Consequently, some consequences associated with a sad, angry, and/or anxious mood are also associated with low self-esteem and self-confidence; personal, social, and school imbalances; and a higher probability of presenting externalizing problems and disruptive behaviors (Aluja and Blanch, 2004; Park et al., 2010; Reinke et al., 2012).

Relationship Between TEI and Emotional and Social Problems

Although good emotional functioning and problems in emotional and social functioning have been analyzed as determinants of psychosocial adjustment, few studies have attempted to analyze the relationships of mediation and moderation between these variables when predicting psychosocial adjustment in children. In particular, the specific relationship between the TEI and emotional and social problems has been analyzed.

Thus, some research has highlighted the influence of EI on social relations, given its role in enabling empathy

and bonding with other people. In the adolescent stage, students who are more skilled in identifying the feelings of others can use this information to show empathy and/or regulate their own emotions, as well as finding ways to better adapt their behavior to social situations, which can improve social acceptance and lead to more satisfactory relationships with peers (Palomera et al., 2012; Mancini et al., 2017).

Accordingly, children with greater emotional awareness, one of the main constituents of EI, tend to be more popular among their peers, and show more empathic and pro-social behaviors, as well as experience more positive social relationships (Garner, 2010; Von Salisch et al., 2014; Finlon et al., 2015). An association has also been established between a deficit in emotional awareness and social and personal maladjustment, school problems, and aggressiveness (Veirman et al., 2011). EI plays an important role in emotional problems, given that a high EI is associated with less social stress, anxiety, depression, and clinical imbalance in young people (e.g., Barraca and Fernández, 2006).

Gender Differences in TEI, Social and Emotional Problems, and Psychosocial Adjustment

The scientific literature has revealed the existence of gender differences in TEI, social and emotional problems, and psychosocial adjustment, as well as in the relationship between them. Regarding gender differences in EI, research shows that the degree of precision in the emotional perception of others is an indicator of adjustment, especially in boys (Palomera et al., 2012). Girls, on the other hand, usually perceive and recognize emotional expressions better than boys (Boyatzis et al., 1993).

In relation to emotional problems in boys, most studies agree that girls score higher in the symptoms of internalized disorders (anxiety and depression, in the form of dissatisfaction with themselves, shyness, and greater feelings of sadness, anguish, or shame) (e.g., García-Olcina et al., 2014; Del Barrio and Carrasco, 2016; Losada et al., 2017). With regard to psychosocial adjustment, studies indicate a slight tendency for girls to show more personal maladjustment. In addition, according to Nolen-Hoeksema and Girgus (1994), after adolescence, girls are twice as likely to suffer from certain emotional problems, including depression and reduced self-esteem, self-efficacy, and satisfaction with life. Furthermore, some studies have showed that gender moderates the association of TEI with actual social status for early adolescents, and with perceived social status for children. Therefore, TEI predicts perceived social acceptance only for female children and adolescent (Andrei et al., 2015). On the other hand, boys present more problems of adjustment at the social level and more problems of an externalizing nature (reflected in a lack of discipline and aggressive behavior) (e.g., Keiley et al., 2010). Nevertheless, this issue is still controversial because some studies show that child maladjustment is not related to age or gender (Chen et al., 2014).

The Present Study

There is no doubt that psychosocial adjustment is a complex phenomenon, given the diverse range of variables involved. This study aims to provide evidence of the direct influence of the TEI on child psychosocial adjustment, and its indirect (mediational) influence through indicators of emotional (emotional problems) and social (acceptance/social rejection) adjustment. In addition, this study will examine whether gender has a moderating effect on the relationship between TEI and the level of psychosocial adjustment in a sample of Spanish children.

Based on our previous review of the literature and according to our rationale, we advanced the following hypotheses: (1) TEI will be significantly and directly associated with psychosocial adjustment; (2) TEI will explain part of psychosocial adjustment through its positive relationship with emotional and social adjustment; (3) The direct and indirect relationship between the TEI and psychosocial adjustment will be moderated by gender.

In this way, this study will provide evidences to identify key elements to support the implementation of actions to prevent psychosocial maladjustment, through the early identification and intervention programs in schools and homes.

MATERIALS AND METHODS

A total of 268 boys and girls aged 8–12 participated in this study ($M = 10.09$ years, $SD = 1.32$). The children were students in the 3rd, 4th, 5th, and 6th grades of Primary Education, attending two public educational centers in the Province of Alicante (Spain). Of the participants, 121 (45.10%) were male; the sample showed a mostly medium socioeconomic level ($n = 57$, 21.3% low; $n = 123$, 46.6% medium; and $n = 84$, 31.3% high). No significant relationship of interdependence between gender and age probability distributions was found ($\chi^2 = 9.89$, $p = 0.08$; Cramer's $V = 0.19$, $p = 0.08$). There were likewise no significant relationships between gender and socioeconomic level ($\chi^2 = 1.74$, $p = 0.42$; Cramer's $V = 0.08$; $p = 0.42$) or age and socioeconomic level ($\chi^2 = 12.49$, $p = 0.25$; Cramer's $V = 0.22$; $p = 0.25$).

Assessment Instruments

Sociodemographic Characteristics

- Age, gender, nationality, and descriptive information about socio-economic status (SES) were collected. Specifically, we administered *ad hoc* items for age and gender, and a specific SES measure, the Family Affluence Scale (FAS).
- Family Affluence Scale (FAS; Currie et al., 1997). This instrument is a measure of socioeconomic level. The FAS assesses household purchasing power or family wealth and consists of four items relating to family car ownership, having one's own (unshared) room, the number of computers at home, and the number of times the child has been on vacation during the past year. The FAS is scored in categories ranging from 0 to 7: low (0–3), intermediate (4–5), and high (6–7). The scale was developed to reliably estimate family SES in (young) children, using questions they are likely to understand. It

has shown good criterion and construct validity in previous studies (Boyce et al., 2006).

Psychosocial Adjustment (Mental Health and Well-Being)

- KIDSCREEN-10 Index (Ravens-Sieberer and The KIDSCREEN Group Europe, 2006). This 10-item questionnaire assesses the subjective Health-Related Quality of Life (HRQL) and well-being in children and adolescents aged 8–18. For each item, five answer categories ranging from “never” to “always” or from “not at all” to “extremely” are provided. The 10 items of the KIDSCREEN-10 Index address affective symptoms of depressed mood: cognitive symptoms of disturbed concentration; psycho-vegetative aspects of vitality, energy, and feeling well; and psychosocial aspects correlated with mental health, such as the ability to experience fun with friends or getting along well at school. The index provides good discriminatory power, good internal consistency (Cronbach's $\alpha = 0.82$) and test-retest stability ($r = 0.73$; ICC = 0.72) (Aymerich et al., 2005).

Trait Emotional Intelligence

- Trait Emotional Intelligence Questionnaire-Child Short Form (TEIQue-CSF; Mavroveli et al., 2008), Spanish adaptation by Piqueras et al. (2017c). This questionnaire is designed to measure global TEI in children between 8 and 12; it includes 36 items, rated using a five-point Likert scale (1 = “strongly disagree” to 5 = “strongly agree”). The total score indicates global TEI. This questionnaire is available, free of charge for academic research purposes, from the London Psychometric Laboratory. In this sample, the internal consistency was 0.84.

Emotional Problems

- Revised Child Anxiety and Depression Scale, 30-item version (RCADS-30; Chorpita et al., 2000; Spanish version by Sandin et al., 2010). This is a reduced 30-item version of the RCADS, a self-report for evaluating anxiety and depression in children and adolescents. The scale comprises 30 items and 6 subscales for evaluating specific anxiety disorder symptoms; the present study has used the total score only. The scale ranges from 0 to 3 (corresponding to “never,” “sometimes,” “often,” and “always,” respectively). The scale has shown excellent psychometric properties, equivalent to the full version, with a Spanish population ($\alpha = 0.87$) (Sandin et al., 2010; Piqueras et al., 2017b). For this sample, the alpha coefficients for the total score were 0.89.

Social Problems

- Sociometric Questionnaire for Children and Pre-adolescents (Cuestionario Sociométrico para Niños y Preadolescentes; CSN and CSP; Diaz-Aguado, 1995). This questionnaire is based on the “nominations method,” in which children are asked to name the three boys or girls in their group whom they are most likely to play with and to give reasons for their elections and rejections. They provide a rate of rejections and elections: between the number of possible rejections/elections and the total number of children.

DESIGN AND PROCEDURE

The sampling method was the intentional or convenience method. The inclusion criteria considered for the selection of schools were as follows: (1) to be a primary school located in the province of Alicante and (2) to have obtained authorization from the school management team to participate in the research. The inclusion criteria used to select children were: (1) to be in the second or third grade of primary education and (2) to have obtained the parents or the legal guardians' signed informed-consent document that was approved by the Ethical Committee of University. Informed consent was not obtained from each individual participants included in the study because all of them were under 12 years of age, and Spanish legislation concerning the informed consent of the minor in health does require only the paternal approval and consent for this type of studies.

The children were told that the object of study was important and invited to participate on a voluntary basis; the confidentiality of their data was guaranteed. This approach obtained good participation in general. They were asked to provide socio-demographic data; the instructions for each of the battery tests were explained. The investigators who administered the tests responded to all questions and doubts that arose. The battery of tests took approximately 1 h to complete. Selected measures were applied through a web-based survey called DetectaWeb (further information in Piqueras et al., 2017a).

The design and execution of the research conformed to national and international ethical standards established for scientific research, receiving the approval of the Ethical Committee (Organo Evaluador de Proyectos) of the Miguel Hernandez University of Elche, reference number: DPS. JPR. 01.16.

STATISTICAL ANALYSIS

First, preliminary analyses were carried out on the descriptive statistics. Secondly, analyses of the relationship between EI, emotional problems, and social acceptance and rejection were carried out using Pearson's correlation coefficient, following Cohen (1988, 1992) recommendations to consider a correlation as indicative of a small (less than 0.29), medium (between 0.30 and 0.49) or large (0.50 or greater) effect size. Thirdly, to investigate the validity of EI, emotional problems, and acceptance and social rejection, as factors that could be used to determine psychosocial adjustment, we conducted four-step hierarchical regression analyses. We also conducted regression analyses to examine the role of emotional problems and acceptance and social rejection as mediators of the link between EI and psychosocial adjustment, based on the recommendations of Baron and Kenny (1986). A hierarchical regression analysis was conducted to examine a mediation/moderation model using the PROCESS tool (Hayes, 2013). To directly test our proposed mediation/moderation model (Figure 1), we used Model 14 in PROCESS to develop and analyze the role of gender in our previous mediational model.

RESULTS

Descriptive Statistics and Correlations Between Key Variables

Descriptive statistics and inter-correlations for the study variables are shown in Table 1. Psychosocial adjustment was both positively and statistically related to TEI and social acceptance; it was negatively related to negative emotional symptoms and social rejection. TEI was both positively and statistically associated with social acceptance and negatively associated with negative emotional symptoms and social rejection. Finally, negative emotional symptoms were positively and statistically associated with social rejection.

We found a large effect between TEI and Emotional Problems and between TEI and Psychosocial Adjustment; there was a moderate effect between social acceptance and rejection, emotional problems and psychosocial adjustment, and peer acceptance and psychosocial adjustment.

Analyses of Hierarchical Regression

To examine the validity of TEI, negative emotional symptoms, and acceptance and rejection as determinants of psychosocial adjustment, we conducted a four-step hierarchical regression (see Table 2).

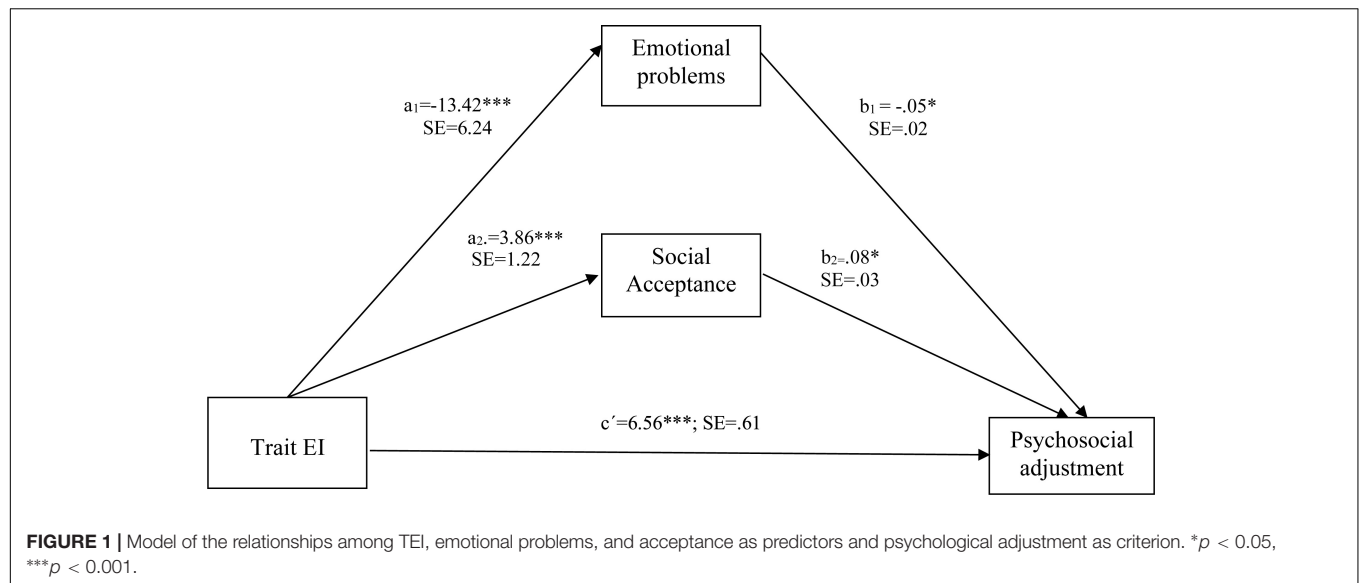
The determinant variables were gender, TEI, negative emotional symptoms, and acceptance and rejection. The dependent variable was psychosocial adjustment. We conducted the regression by first entering gender into the model, followed by TEI and negative emotional symptoms, and finally by acceptance and rejection.

The results of the regression model are shown in Table 2. Gender was not a significant determinant of psychosocial adjustment. TEI, added to the models during the second step, proved to be a significant determinant of psychosocial adjustment ($\Delta R^2 = 0.432$), with higher scores in TEI determining higher psychosocial adjustment. Negative emotional symptoms proved to be a significant determinant of psychosocial adjustment ($\Delta R^2 = 0.444$). The last step in the model included acceptance and rejection, but just the former proved to be a significant determinant of psychosocial adjustment ($\Delta R^2 = 0.463$).

Mediation/Moderation Analyses

Previous analyses of regression have shown that when TEI, negative emotional symptoms, and social acceptance and rejection are simultaneously included in the model, these variables account for 46% of the variance in psychosocial adjustment, when gender has been controlled for (see Table 2).

This result suggests that both constructs are relevant in determining the psychosocial adjustment of children; to assess this idea, we constructed a mediation/moderation model to test the relationship between these variables. First, we investigated the hypothesis that negative emotional symptoms and social acceptance and rejection can be an important mechanism in the relationship between TEI and psychosocial adjustment in children.

**TABLE 1 |** Descriptive statistics and inter-correlations among the measures.

	Mean	SD	1	2	3	4	5
(1) TEI	3.71	0.49	—				
(2) Emotional symptoms	28.29	13.66	-0.507**	—			
(3) Social acceptance	9.91	7.98	0.227**	-0.097	—		
(4) Social rejection	5.78	8.83	-0.163**	0.207**	-0.333**	—	
(5) Psychosocial adjustment	41.65	5.73	0.647**	-0.420**	0.292**	-0.174**	—

TEI, Trait Emotional Intelligence; ** $p < 0.01$.

TABLE 2 | Analyses of hierarchical regression.

	B	SE	B	R ²	ΔR ²	F(df)
Step 1				0.003	-0.001	0.693 (1,265)
Gender	0.587	0.705	0.051			
Step 2				0.436**	0.432**	102.177*** (2,264)
Gender	1.354	0.534	0.118			
TEI	7.726	0.542	0.662***			
Step 3				0.450**	0.444**	71.850*** (3,263)
Gender	1.182	0.532	0.103			
TEI	6.964	0.611	0.597***			
Emotional symptoms	-0.057	0.022	-0.136***			
Step 4				0.473**	0.463**	46.827*** (5,261)
Gender	1.115	0.524	0.097			
TEI	6.561	0.614	0.562***			
Emotional symptoms	-0.055	0.022	-0.132**			
Social acceptance	0.088	0.035	0.123**			
Social rejection	-0.040	0.031	-0.061			

TEI, Trait Emotional Intelligence; ** $p < 0.01$, *** $p < 0.001$.

In particular, we tested whether negative emotional symptoms and acceptance and social rejection mediate the relationship between TEI and psychosocial adjustment (see Table 3).

As can be seen in Route C, Figure 1, this mediation/moderation analysis showed that children with

higher TEI had better psychosocial adjustment. In addition, Route A, in Figure 1 shows that TEI was negatively associated with emotional problems and positively associated with social acceptance, suggesting that children with a higher level of TEI have fewer emotional problems and higher levels of social

TABLE 3 | Summary of multiple mediation/moderation analyses of trait emotional intelligence and psychosocial adjustment (5,000 bootstrap samples).

Independent variable (IV)	Mediators	Dependent variable (DV)	Effect of IV on M (a)	Effect of M on DV (b)	Total effect (c)	Direct effect (c')	Indirect effect (c-c')	Effect on DV through proposed mediators covariates	(CI) 95%
TEI		Psychosocial adjustment			7.72*	6.56***	1.16*	Gender: 1.11*	
	Emotional problems		-13.42***	-0.05*			0.74*		0.1481 to 0.14973
	Social acceptance		3.86***	0.08*			-0.34*		0.0965 to 0.7330
	Social rejection		-0.26	-0.04			0.01		-0.0818 to 0.2257

* $p < 0.05$, *** $p < 0.001$.

acceptance. Finally, as can be seen in Route B in **Figure 1**, emotional problems were negatively related to psychosocial adjustment, while social acceptance was positively related to psychosocial adjustment.

Using an indirect procedure, 95% CI bootstrapped confirmed that TEI exerted an indirect, positive, and significant effect on psychosocial adjustment through emotional problems and social acceptance. This result suggests that emotional problems and social acceptance partially mediate the association between TEI and psychosocial adjustment. Since previous research indicates that emotional problems, social acceptance, and rejection may be influenced by gender, with girls reporting higher scores for emotional problems (García-Olcina et al., 2014; Del Barrio and Carrasco, 2016), this study tested the role of gender as a possible covariate of the observed robust link between TEI and psychosocial adjustment (**Table 3**), which was significant.

DISCUSSION

The aim of this study was to examine how TEI, emotional problems, and social acceptance and rejection affected the psychosocial adjustment of children. As a further step, this study examined whether emotional problems, social acceptance, and rejection play a role in mediating the relationship between TEI and psychosocial adjustment, and whether gender is a moderating variable in this relationship.

Multiple regression and mediation/moderation analyses revealed the way in which psychosocial adjustment in children was determined by TEI, emotional problems, and social acceptance. In particular, higher scores in TEI and social acceptance seemed to predict better psychosocial adjustment. Likewise, a higher score on emotional problems seemed to predict a worse psychosocial adjustment. These findings are consistent with our first hypothesis; although relatively few studies have evaluated the specific relationship between EI and psychosocial adjustment in children, the results of a study with adolescents reveal a relationship between higher levels of TEI and better psychosocial adjustment (Palomera et al., 2012). Another study carried out on the adolescent

and adult population has revealed that high TEI is associated with the absence of social stress, anxiety, and depression (Barraca and Fernández, 2006). Mateu-Martínez (2017) studied children between the ages of 8 and 12 and found that social acceptance was more closely related to TEI, and less closely related to the symptomatology of emotional problems, such as anxiety and depression. By contrast, social rejection is related to emotional problems that can be considered indicators of imbalance, such as symptoms of social phobia, depression, and low self-esteem. Nonetheless, social rejection was not significant in our model as a predictor of psychosocial adjustment in the presence of TEI, emotional problems and social acceptance as competing predictors.

Interestingly, the present study found that emotional problems and social acceptance play a role in moderating, at least in part, the association between TEI and psychosocial adjustment. Higher TEI levels in children are therefore related to higher levels of psychosocial adjustment through lower emotional problem scores, a finding consistent with our second hypothesis.

Emotional problems have been shown to be a moderating variable in a wide range of outcomes (Aluja and Blanch, 2004; Park et al., 2010; Reinke et al., 2012; Bernaras et al., 2013). However, in our opinion, this is the first study to look at this moderation effect in children. The present study has found that emotional problems partially mediate the relationship between TEI and psychosocial adjustment in children. In terms of educational and clinical implications, this moderation effect is of critical importance, since it opens the door to new lines of intervention that focus on improving emotional problems in the educational and clinical settings of these populations.

In educational and clinical settings, the ultimate goal of emotional education interventions is to promote psychosocial adjustment and well-being of children. Emotional education programs in primary school students provoked a significant improvement in emotional competences, social relationships, and psychosocial adjustment (i.e., Filella-Guiu et al., 2014; Cejudo, 2017). Our results point to the need to consider the presence of emotional and social problems in such interventions. Therefore, any intervention should evaluate these dimensions, as well as include, among the objectives of the programs, the

development of emotional and social competences to overcome these difficulties.

Similarly, social acceptance plays a role in moderating the partnership between TEI and psychosocial adjustment. Therefore, higher TEI levels in children are related to higher levels of psychosocial adjustment, through higher social acceptance scores, a finding that is consistent with our second hypothesis and other studies with children (Petrides et al., 2006; Mavroveli et al., 2008; Agnoli et al., 2012; Andrei et al., 2015; Banjac et al., 2016) and with adolescents (Povedano et al., 2012; Mancini et al., 2017) in which children and adolescents involved in rejection situations showed less adaptive psychosocial profiles and those most vulnerable to social rejection are those who do not succeed in developing adequate levels of TEI, presenting more difficulties.

Future research should focus on whether EI programs for children could reduce the children's symptoms of emotional problems and improve their relationships with peers, benefiting both present and future child psychosocial adjustment. There is already some evidence regarding the efficacy of this type of intervention, for example, in the Mateu-Martínez (2017), which observed improvements in psychological strength variables related to both short-term and long-term emotional adjustment. The adjustment reduced symptoms of emotional problems, suggesting that this may be a promising field for future interventions with children.

Similarly, future research should also focus on seeking additional mediators between TEI and psychosocial adjustment during childhood. For example, some indicators of school adjustment are academic achievement and classroom behavior. In perceptual attributes associated with social acceptance and rejection, children guided their rejection of behaviors that annoyed others to lower intellectual capacity, basing their choices on aspects related to helping behaviors, or to considering a partner more intelligent, which can be a protective factor for children in the academic environment (Mateu-Martínez, 2017).

In the present study, gender emerged as a moderator of the link between TEI and psychosocial adjustment, which is consistent with our third hypothesis. Specifically, for the girls in this study, lower TEI scores determined lower levels of psychosocial adjustment, regardless of emotional problems or social acceptance and rejection. These results are consistent with those previously reported in the literature, along with the assertion that gender is one of the individual factors that can predict differences in psychosocial adjustment (Palomera et al., 2012). Gender differences also suggest potentially novel areas of research, as there is still no clear consensus on the association between gender-specific relationships and psychosocial adjustment. Generally, girls receive a more emotion-focused education, while boys are taught to reduce certain emotions (Fivush et al., 2000; Sánchez-Núñez et al., 2008).

Of paramount importance is to emphasize that our non-clinical sample was composed of children, a population where there have been considerably fewer studies and where prevention is easier than in older individuals. In fact, childhood is an ideal time to train and modify undesirable behavior patterns. Despite

our findings, we are aware of the desirability of replicating these studies with a larger sample and wider range of ages, to enable these results to be widely generalized.

On the other hand, the exclusive use of self-reporting measures may be another limitation in terms of assessment, as social desirability and premeditated bias may affect responses to the questionnaires of social and emotional problems. Anyway, it should be noted this is not the case for the assessment of TEI, given its nature as a combination of self-efficacy and affective-personality dispositions requires the use of self-reports (see Pérez et al., 2005). Despite the various potential sources of error in this type of instrument, compared to other standardized techniques, self-reports remain valid and reliable measures. As different authors, such as Lundqvist et al. (2010) or Górriz et al. (2015), have pointed out, they are the best source of information when assessing internalized problems. Participants find it more convenient to explore their own thoughts and feelings, given that they have direct knowledge of their own inner states. Their answers are considered reliable from the age of eight onwards (Lundqvist et al., 2010; Górriz et al., 2015). Future researchers are therefore advised to replicate this research structure, including assessment measures completed by different informants, such as families and teachers, in order to achieve a better understanding of the problem and its scope, covering so the identity and reputation components of personality (e.g., Hogan, 1983).

Following the proposal made by Martins et al. (2010), based on the model of this investigation, the present study used the short version for children of the TEIQue (Mavroveli et al., 2008), one of the most widely used measures of TEI (Di Fabio and Kenny, 2016). However, in studies conducted using the adult version of this instrument, the TEIQue appears to be more related to intrapersonal EI aspects and well-being, and to a lesser extent interpersonal EI; it would therefore be useful for EI instruments to explore both aspects equally.

In line with the limitations found in similar studies, it would be advisable to design longitudinal studies using children and adolescents between 8 and 18 years of age, from different regions of the same country. Likewise, we studied concurrent relationships between predictors and criteria, given both were assessed in the same time. We also recommend using a combined variety of assessment measures, including self-reports and others-reports, which have high reliability and validity, in addition to objective measures. It may be useful to add new variables that are significant to child psychosocial adjustment, such as family and school adjustment. These could include academic performance or classroom behavior (Filella-Guiu et al., 2014; Cejudo, 2017; Pérez-González and Qualter, 2018).

CONCLUSION

Our results replicate in children the positive association between TEI and well-being previously observed in young people and adults, over and above the predictive power of social and emotional problems (e.g., Martins et al., 2010; Petrides et al., 2016, 2017). In particular, this study empirically supports the interpretation of TEI as a buffer of stressful circumstances for

psychosocial adjustment in children, what could constitute an advantage for the later development in youth and adults. One of the main contributions of this study is that it focuses on child population, since most previous research has been carried out on adults or adolescents, bypassing the study of childhood. Research carried out on EI and psychosocial adjustment in children is still incipient (Mavroveli et al., 2008), despite the personal and social consequences of a deficit development in certain areas (emotional, cognitive, and social) or the problems of imbalance at this evolutionary stage (Lahaye et al., 2013; Eastabrook et al., 2014; Rowsell et al., 2014).

These research findings show that TEI and emotional problems and social acceptance are both determinants of psychosocial adjustment in children aged 8–12, supporting the idea that these factors are fundamental to understanding psychosocial adjustment. In addition, emotional problems and social acceptance play a role in moderating the relationship between TEI and psychosocial adjustment, mainly for girls in the present sample. This finding is consistent with Andrei et al. (2015)'s study, who found that gender moderates the association of TEI with actual social status, predicting TEI perceived social acceptance only for female children and adolescent (Andrei et al., 2015). Future studies are needed to replicate these findings and to further explore the effects of gender on TEI linkages, emotional problems, social acceptance and rejection, and psychosocial adjustment.

Finally, this study provides a new vision for understanding the effects of TEI and socio-emotional problems on child

psychosocial adjustment. From an applied perspective, research into and knowledge of the factors that influence TEI can help to develop tools and interventions to promote positive aspects and to help children adapt during times of conflict or evolutionary transitions (Goldner and Scharf, 2013). More specifically, their relationship with different emotional and social variables can mediate psychosocial adjustment. In this sense, it would be interesting to design emotional education programs to promote TEI of children, including those variables that research has identified as most relevant, in order to prevent problems of maladjustment in childhood. Concerning the gender differences observed in the mediation/moderation analyses, lower TEI scores determined lower levels of psychosocial adjustment specifically in girls. Given this finding, our study suggests that girls in age group 8–12 could constitute a preferential prevention group in emotional education because of their greater potential vulnerability to the effects of low levels of emotional competence.

AUTHOR CONTRIBUTIONS

OM-M conceived of the study, participated in the data collection, led the preparations, and wrote the first draft of the manuscript. JC and J-CP-G analyzed the data and wrote the first draft of the manuscript. JP conceived of the study, analyzed the data, and contributed to writing the manuscript. All authors contributed to interpreting the data, helped to draft and revise the manuscript, and read and approved the final manuscript.

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Facing Anxiety, Growing Up. Trait Emotional Intelligence as a Mediator of the Relationship Between Self-Esteem and University Anxiety

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The current study analyzed how trait emotional intelligence (trait EI) mediates the relationship between self-esteem and state anxiety and trait anxiety. The sample was composed of 153 undergraduate students from the University of Cádiz, Spain (71.9% women and 28.1% men). Students completed measures of self-esteem, state anxiety, trait anxiety, and trait EI. Mediation analyses were completed with three trait EI dimensions (EA, emotional attention; EC, emotional clarity; and MR, mood repair) as mediating variables, self-esteem as the independent variable, and state anxiety and trait anxiety as the dependent ones. Our results confirmed that self-esteem scores explained and predicted both, state and trait anxiety values (13% for state and 21% for trait anxiety). This explanatory capacity is increased by 8% when accounting for all trait EI dimensions. Considering state anxiety, the results of the direct effects showed that a decrease in their levels is predicted through the increases in the levels of both, self-esteem and MR. Regarding trait anxiety, the results of the direct effects showed that a decrease in their levels is predicted, in addition to an increment of self-esteem and MR values, by an increase of EC and a decrease of EA. Conversely, indirect effects revealed that higher levels of self-esteem were associated with worse scores in EA and worse MR, which in turn would enhance both state and trait anxiety levels. Moreover, regarding trait anxiety higher levels of self-esteem were associated with worse scores in EA and worse EC, therefore increasing trait anxiety levels. As shown, the negative association found between self-esteem and EA becomes a key element. The effect of self-esteem on EA and the influence that the latter had on EC and MR exerts an indirect mediated effect with the power to invert the influence that self-esteem wields on both types of anxiety. In this sense, the apparent protective role of self-esteem changed, turning into a risk factor that promotes higher anxiety values.

Keywords: trait emotional intelligence, state anxiety, trait anxiety, self-esteem, emotion regulation

INTRODUCTION

University stage appears as a period of significant change, in which the transition from adolescence to adulthood, academic pressures, and different social and personal responsibilities arise. Besides, new evaluation systems and fear of failure can awake negative feelings that may alter academic performance. Hence, the efforts that students make to acclimate to this new context can cause undesirable side effects. In this sense, and according to the World Health Organization [WHO], 2017, in Spain, 2,408,700 people were affected by anxiety disorders in 2017. Precisely, this report pointed out university students as a risk group due to the academic, personal, psychological, social, and strain levels they have to face.

Anxiety is an emotional reaction that appears when people face unknown, aversive or anticipated events and is aggravated when a person experiences extended, unresolved or multiple stressors (Lazarus and Folkman, 1984). However, while mild anxiety may have a positive influence on academic outcomes, increasing efficiency, and intellectual functioning, high levels are detrimental to academic performance and may result in maladaptive behaviors. According to Spielberger (1966, 1972, 1989), to adequately conceptualize this construct, it is crucial to discriminate between anxiety as an emotional state and anxiety as a personality trait. As the State-Trait Anxiety Theory posits (Cattell and Scheier, 1961), state anxiety refers to an immediate emotional state, transient and modifiable in time that causes tension and activation of the autonomic nervous system. For example, the fact of facing an exam as a specific situation can raise state anxiety levels, caused by the fear of failure before that event occurs. In turn, trait anxiety is defined as a propensity to be anxious. It is a stable personality trait, determined by an inclination to perceive (or not) stimuli as threatening (Spielberger, 1972, 1980; Spielberger and Díaz-Guerrero, 1975). Students with high levels of trait anxiety perceive a broader range of situations as hostile and are more predisposed to suffer from state anxiety with a higher frequency and intensity.

The research focused on the incidence and the effect of anxiety on psychological adjustment to the university environment has shown diverse results. This diversity is probably due to the different measurement instruments used that differ in the way of approaching this construct. In this sense, while some authors have focused on the negative influence of test anxiety, characterized as occasional anxiety and similar to the state anxiety construct developed by Cattell and Scheier (1961), others based their research on a stable disposition to be anxious, comparable to trait anxiety. However, we rarely found studies that explicitly distinguish between these two types of anxiety. Therefore, it is crucial to discriminate between these two constructs to determine which psychosocial variables act as protection and (or) risk factors to state and trait anxiety. This would provide empirical support to design distinct interventions aimed to decrease students' anxiety when facing both, general and specific situations.

In this sense, self-esteem is one of the constructs more often linked to anxiety (Sowislo and Orth, 2013). One of the most accepted definitions is Rosenberg (1965), who describes

self-esteem as the feeling of satisfaction and the confidence that people have in themselves (Pearlin, 1989). Besides, and according to the Terror Management Theory (Greenberg et al., 1986), self-esteem can act as a protective factor against anxiety, given that the perception that one is good (self-esteem) has the defensive goal of minimizing anxiety, serving, thus, as a control mechanism against terror. More recently, Manna et al. (2016) explored the relationship between self-esteem, anxiety, and depression, and evaluated two main models: *the scar model*, where depression and anxiety can be a consequence of low self-esteem; and *the vulnerability model*, in which low self-esteem predicted depression and anxiety. The findings suggested that the effects of self-esteem on depression and anxiety were significantly higher than the effects of anxiety and depression on self-esteem.

The empirical evidence seems to confirm both, Terror Management Theory and vulnerability model (Sowislo and Orth, 2013; Liu et al., 2014; Bajaj et al., 2016) stressing that high self-esteem is a protective factor against mental health problems in young adults and adolescents (Wilburn and Smith, 2005; Sharaf et al., 2009). In addition, the literature also highlights the importance of self-esteem when it comes to manifest both trait and state anxiety (Cardenal Hernández and Díaz Morales, 2000; Garaigordobil et al., 2003; Núñez et al., 2006). In this sense, Fathi-Ashtiani et al. (2007) pointed out that an adequate self-concept and an inclination to high levels of self-esteem not only protected from state but from trait anxiety. In a Spanish sample, Cabanach et al. (2015) noted that when the student's self-assessment is low, the risk of perceiving factors in the academic context as threats increased. In addition, and more recently, Jirdehi et al. (2018) pointed out that low levels of self-esteem might have multiple negative consequences. Following these authors, a person with low self-esteem shows difficulties expressing their interests and rights what in turn leads to feelings of anguish, frustration, and stress, unlike those who displayed higher self-esteem levels that show greater success in their actions.

Likewise, research on emotion has demonstrated the importance of emotion regulation in the adaptation process and well-being (e.g., Gil-Orlarte et al., 2009; Peña-Sarrionandia et al., 2015; Mayer et al., 2016; Mestre et al., 2017). In fact, emotional dysregulation can increase anxiety, produce a lack of social competence, and may undermine decision-making processes (Loewenstein and Lerner, 2003; Wills et al., 2016; Hartman et al., 2017). In this sense, trait emotional intelligence (trait EI) appears as an important protective factor against anxiety among university students. Trait EI refers to the self-perception of our emotional abilities, that is, how good we think we are in terms of understanding, regulating, and expressing our emotions responsible for maintaining an adequate level of well-being (Petrides et al., 2016). More specifically, trait EI describes the self-perceptions of our emotional world (Petrides et al., 2018). Besides, Bandura and his colleagues found that beliefs in own's emotional abilities (self-efficacy) was related, prospectively, with less depressive symptoms and more pro-social behaviors (Bandura et al., 2003; Caprara et al., 2008). Similarly, Tamir et al. (2007) found that self-efficacy perceptions in emotion regulation, measured early in the first year among college students, was associated with less negative emotions, more

positive emotions, greater psychological well-being, and lower levels of depression at the end of the year (see also Goldin et al., 2012). Recently, Bigman et al. (2016) demonstrated that positive expectations in emotion regulation are equally powerful modifying the way people regulate their emotions and their feelings. Hence, beliefs about success in emotion regulation are positively associated with desirable emotional outcomes. One of the most widely used instruments to evaluate trait EI is the Trait Meta-Mood Scale (TMMS, Salovey et al., 1995). TMMS is a self-reported measure, composed of three subscales: *emotional attention* (EA) that refers to the self-perceptions regarding the degree to which an individual attends to his or her emotional experiences, *emotional clarity* (EC) that refers to self-perceptions concerning how clearly people understand own and other's emotional states, and *mood repair* (MR) that represents the self-perceptions regarding the ability to adequately manage emotions. Therefore, this instrument assesses the perception that a person has about their own ability to attend, understand and modify their emotional states.

Research concerning trait EI (assessed with TMMS) and anxiety is abundant, although we have found different empirical results depending on the trait EI dimension evaluated. With regard to EA, literature does not show consensus on the role played by this construct in anxiety disorders. In this sense, we found studies that suggested a negative relationship between EA and social anxiety. According to Turk et al. (2005), socially anxious students reported a greater difficulty in dealing with emotions in a sample of 766 undergraduate students. There are also studies that indicate the potentially detrimental effect of EA, relating it with greater affective instability and emotional variability (Thompson et al., 2009; Thompson, 2011). Likewise, in a Spanish university sample, Pena and Losada (2017) suggested that high EA is not necessarily beneficial, showing a positive relationship between EA and state anxiety. However, Ghorbani et al. (2002) and Salovey et al. (2002) found no relationship between social anxiety and EA. Regarding the above mention, Butler et al. (2006) emphasized the need to further investigate this relationship in order to determine whether greater EA is linked (or not) to positive outcomes in the context of anxiety disorders.

Concerning EC research has highlighted its importance on emotion regulation, since the ability to clearly identify one's emotions is the first step for a successful emotion regulation and coping (Butler et al., 2006). In this case, most of the studies agree to establish a negative relationship between this construct and anxiety levels. Specifically, lower levels of EC have been related to worse psychosocial adjustment (e.g., Salguero et al., 2012) and higher levels of anxiety (Ghorbani et al., 2002). On the contrary, greater EC has been linked to positive coping, greater well-being (Gohm and Clore, 2002), and less anxiety (Salovey et al., 2002; O'Toole et al., 2013; Thompson et al., 2017).

Finally, regarding the belief in one's ability to regulate emotional states, the literature points out positive correlations between expectations in successful emotion regulation and emotional results (Bigman et al., 2016) finding a negative relationship between MR and anxiety (Ghorbani et al., 2002). Specifically, in the university context, it has been found that students who expected to be more successful in regulating

their negative emotions displayed lower test anxiety, had better test performance, and presented fewer depressive symptoms (Catanzaro and Mearns, 1990). Altogether, these results seem to confirm a well-established relationship between self-esteem and trait EI (Cheung et al., 2015), supporting the hypothesis that self-perceptions regarding emotional abilities are an essential contributor to psychological adjustment (Fernández-Berrocá et al., 2006; Petrides et al., 2016).

Hence, while it is well known the direct relationships between the self-esteem, trait EI, and anxiety, so far there is no empirical evidence about the mechanism through which trait EI (EA, EC, and MR) mediates the relationship between self-esteem and state and trait anxiety. Hence, the goal of the present study is to develop and test a model that considered EA, EC, and MR as mediator variables that enhance the effects of self-esteem on state and trait anxiety in university students.

MATERIALS AND METHODS

Participants and Procedure

Participants were 153 undergraduate students divided into first cycle of studies (first and second year) and second cycle of studies (third and fourth study years). Students were selected by quota sampling from Social Sciences Degree Program of the University of Cádiz, Spain. Precisely, students were attending to Psychology and Human Resources Degree. The majority of students were women (71.9%) and the average age was 21.38 (range = 18–48, $SD = 3.76$). Participants were given a paper-and-pencil questionnaire with all the scales presented at the same time. Students had no time limitation and the questionnaires were completed during their leisure time. Participation was anonymous and voluntary. Data were collected following the general principles and the ethical research standards of the American Psychological Association (APA). An ethics approval was not required as per the University of Cádiz's guidelines and national regulations. All subjects gave written informed consent in accordance with the Declaration of Helsinki. They received no financial compensation for participation in the study.

Instruments

Trait and State Anxiety

Trait and state anxiety were assessed with the Spanish adaptation of the State-Trait Anxiety Inventory (STAI, Spielberger et al., 2011). The STAI has 40 items, 20 items allocated to each of the two independent anxiety scales: state and trait anxiety. Responses for the state anxiety scale assesses the intensity of current feelings "at this moment" on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*very much so*). Responses for the trait anxiety scale measures the frequency of feelings "in general" on a 4-point Likert scale ranging from 0 (*almost never*) to 3 (*almost always*). State anxiety example items were "I am tense; I am worried" and "I feel calm; I feel secure." Trait anxiety items include "I worry too much over something that really doesn't matter" and "I am content; I am a steady person." Higher scores indicate greater anxiety levels. The psychometric properties of this instrument have been provided, in general, good results, both in the original

version and in the Spanish adaptation with Cronbach alphas above 0.80. In the current sample, reliability coefficients were 0.89 for trait anxiety and 0.92 for state anxiety.

Self-Esteem

Self-esteem was assessed with the Spanish adaptation of the Rosenberg's Self-esteem Scale (RSES, Rosenberg, 1965). This instrument is composed of 10 items that measure global self-worth by measuring both, positive and negative feelings about the self. The RSES contains an equal number of positively (e.g., people feeling satisfied with life) and negatively (e.g., people feeling they are failures) worded items. The scale is believed to be unidimensional. Responses were given on a 4-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Example items were "I feel that I am a person of worth, at least on an equal plane with others" and "I certainly feel useless at times." Higher scores indicate greater self-esteem levels. Several studies have shown their psychometric properties, supporting their use in different languages (Rosenberg, 1965; Silber and Tippet, 1965; Kaplan and Pokorny, 1969; Kernis et al., 1991; Hagborg, 1993; Vázquez Morejón et al., 2004). Cronbach alpha in the present study was 0.88.

Trait Emotional Intelligence

Trait Emotional Intelligence was assessed with the Spanish version of Trait-Meta Mood Scale (TMMS-24, Fernández-Berrocá et al., 1998). The original scale was developed by Salovey et al. (1995). This is a self-report instrument and evaluates the extent to which people reflect upon their moods. TMMS-24 comprised 24 items that include three key dimensions of emotional intelligence: EA (eight items), EC (eight items), and MR (eight items). EA refers to the ability to attend and to express moods and emotions, EC is the ability to understand and differentiate moods and emotions, and MR denotes the ability to maintain positive emotions in order to repair negative ones (Salovey et al., 1995). Responses were given on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*totally agree*). Example items were "I often think about my feelings" and "I pay a lot of attention to how I feel." Higher scores indicate greater trait EI levels. The Spanish adaptation showed an internal consistency, for all subscales, above 0.85. Cronbach alphas for each of the subscales in the present study were 0.90 for EA, 0.90 for EC, and 0.85 for MR.

Statistical Analysis

Preliminary analyses were carried out to compute descriptive statistics, internal consistencies, bivariate correlations, and hierarchical regression analyses using SPSS software (version 20.0; IBM, Chicago, IL, United States). To determine whether EA, EC, and MR mediated the relationship between the self-esteem and state and trait anxiety, serial mediation analyses were performed using Model 6 in the PROCESS tool (Hayes, 2018). PROCESS is an SPSS macro for mediation, moderation, and conditional process modeling that allows for one independent variable, one dependent variable, and more than one simultaneous mediator variables. To verify which indirect effect had more statistical weight, we performed specific contrasts

for indirect effects. As a statistical significance criterion, we used the 95% confidence interval (CI) generated by the bias-corrected bootstrap method set to 10,000 reiterations.

RESULTS

Descriptive Statistics and Analysis of Variance

Table 1 displays reliability coefficients, descriptive statistics for the total sample and correlations among all variables involved in the study. State and trait anxiety average levels are under the theoretical mean, while all other variables are above it. Internal consistencies of all scales administered were above 0.85. As expected, state and trait anxiety were significantly and negatively correlated with self-esteem. Moreover, both anxiety types were negatively correlated with EC and MR while trait anxiety was positively associated with EA. Finally, age was significantly and positively correlated with self-esteem.

Two hierarchical regressions were conducted for each outcome variable to check whether EA, EC, MR, and self-esteem predicted state and trait anxiety after controlling for the influence of age, gender, degree, and year of studies (first and second cycle). At step 1, we entered age, gender, degree, and year of studies as control variables, and at step 2 EA, EC, MR, and self-esteem as predictor variables. The results of the hierarchical regression 1 (outcome variable state anxiety) indicated that the four predictors explained 21.1% of the variance ($R^2 = 0.21$, $F[8,142] = 5.31$, $p < 0.01$). It was found that self-esteem significantly predicted state anxiety ($\beta = -0.24$, $p < 0.01$), as did MR ($\beta = -0.29$, $p < 0.01$). Gender, age, academic domain, and year of studies were not associated with state anxiety. The results of the hierarchical regression 2 (outcome variable trait anxiety) indicated that the four predictors explained 50.4% of the variance ($R^2 = 0.50$, $F[8,142] = 21.91$, $p < 0.01$). It was found that self-esteem significantly predicted trait anxiety ($\beta = -0.53$, $p < 0.01$), as did EA ($\beta = 0.24$, $p < 0.01$), and MR ($\beta = -0.19$, $p < 0.01$). Gender, age, academic domain, and year of studies were not associated with trait anxiety.

Mediation Analysis

To further analyze the relationship between all variables studied, mediation analyses were conducted to test whether EA, EC, and MR mediated the relationship between self-esteem and state and trait anxiety. Specifically, two serial mediation models were proposed. Model A included EA, EC, and MR as mediator variables, self-esteem as the independent variable, and state anxiety as the dependent one. In turn, Model B included the same mediators and independent variable but trait anxiety as the dependent one. In serial mediation, mediators have a direct effect on each other and it is assumed that the independent variable (self-esteem) affects the mediators in a serial manner (Hayes, 2013), lastly influencing the dependent variables.

Regarding model A (**Table 2**), the total amount of variance explained by the overall model was 21% ($R^2 = 0.21$). Specifically, the analysis revealed that self-esteem accounted for 13% of the unique variance of state anxiety ($R^2 = 0.13$; $c: B = -0.31$,

$p = 0.000$). Considering the direct effects, self-esteem (c' : $\beta = -0.16$, $p = 0.03$) and MR (b_3 : $\beta = -0.20$, $p = 0.001$) were negatively related to state anxiety, suggesting that students with higher levels of self-esteem and higher levels of MR showed low levels of trait anxiety. Neither attention nor clarity

showed statistically significant direct effects. Other statistically significant direct effects linked self-esteem with a decrease in EA (a_1 : $\beta = -0.24$, $p = 0.032$) and an increase in EC (a_2 : $\beta = 0.51$, $p = 0.000$) and MR (a_3 : $\beta = 0.51$, $p = 0.000$). Moreover, EA was positively related to EC (d_{21} : $\beta = 0.14$,

TABLE 1 | Descriptive statistics for total sample, Cronbach's α values, and correlations among all study variables.

Variables	M	SD	α	Correlations									
				1	2	3	4	5	6	7	8	9	1
State	0.82	0.51		1	—	—	—	—	—	—	—	—	—
Trait	1.01	0.49		0.62**	1	—	—	—	—	—	—	—	—
Age	21.72	3.76		-0.00	-0.11	1	—	—	—	—	—	—	—
Sex				0.02	-0.15	0.15	1	—	—	—	—	—	—
Year				0.06	-0.14	0.31**	0.37**	1	—	—	—	—	—
Degree				0.13	-0.03	0.28**	0.26**	0.26**	1	—	—	—	—
SFE	3.17	0.59	0.88	-0.36**	-0.67**	0.21*	0.10	0.23**	0.23**	1	—	—	—
EA	3.41	0.82	0.90	0.02	0.26**	-0.10	-0.04	-0.21*	-0.20*	-0.17**	1	—	—
EC	3.40	0.77	0.90	-0.27**	-0.38**	0.12	0.11	0.18	-0.41	0.37**	0.09	1	—
MR	3.47	0.75	0.85	-0.42**	-0.45**	0.09	-0.01	-0.01	-0.04	0.48**	0.17**	0.46**	1

** $p < 0.01$ (2-tailed); * $p < 0.05$ (2-tailed); State, state anxiety; Trait, trait anxiety; Year, cycle of studies; Degree, academic degree; SFE, self-esteem; EA, emotional attention; EC, emotional clarity; MR, mood repair.

TABLE 2 | Serial Mediator Model A: Model summary, total effect, direct effect, indirect effect, and main specific indirect effect contrast definitions.

Model Summary	R^2	MSE	F	$df1$	$df2$	p (sig.)	
Total effect model	0.2126	0.21	9.99	4.00	148.00	0.000	
SFE on state	0.1317	0.2270	22.89	1.00	151.00	0.000	
						95% CI	
	Path	Coefficient	BootSE	T	P	BootLL	BootUL
Total effect of SFE on state, without accounting for EA, EC and MR	C	−0.3151	0.06	−4.78	0.000	−0.44	−0.18
Total effect of SFE on state, when accounting for EA, EC and MR	c'	−0.1638	0.07	−2.13	0.034	−0.31	−0.01
Direct effect of SFE on EA	a_1	−0.2415	0.11	−2.15	0.032	−0.46	−0.02
Direct effect of SFE on EC	a_2	0.5119	0.09	5.15	0.000	0.31	0.70
Direct effect of SFE on MR	a_3	0.5130	0.09	5.60	0.000	0.33	0.69
Direct effect of MR on state	b_3	−0.2084	0.06	−3.33	0.001	−0.33	−0.08
Direct effect of EA on EC	d_{21}	0.1452	0.07	2.04	0.042	0.00	0.28
Direct effect of EA on MR	d_{31}	0.1929	0.06	3.15	0.002	0.07	0.31
Direct effect of EC on MR	d_{32}	0.2915	0.06	4.20	0.000	0.15	0.42
Indirect effect							
Ind ₃ via EA and MR	$a_1 d_{31} b_3$	0.0097	0.00			0.00	0.03
Ind ₄ via EA, EC, and MR	$a_1 d_{21} d_{32} b$	0.0021	0.00			0.00	0.00
Ind ₆ via EC and MR	$a_2 d_{32} b_3$	−0.0311	0.01			−0.07	−0.00
Ind ₇ via MR	$a_3 b_3$	−0.1069	0.04			−0.20	−0.03
Specific indirect effect contrast definitions							
Ind ₃ minus Ind ₄	$C12$	0.0076	0.0067			0.00	0.03
Ind ₃ minus Ind ₆	$C14$	0.0408	0.0180			0.01	0.08
Ind ₃ minus Ind ₇	$C15$	0.1166	0.0447			0.04	0.21
Ind ₄ minus Ind ₆	$C17$	0.0332	0.0165			0.01	0.07
Ind ₄ minus Ind ₇	$C18$	0.1091	0.0421			0.03	0.20
Ind ₆ minus Ind ₇	$C21$	0.0758	0.0363			0.01	0.16

Coefficient non-standardized B coefficients; BootSE, bootstrapping standard errors; CI, bias-corrected and accelerated 95% confidence interval; BootLL, bootstrapping lower limit; BootUL, bootstrapping upper limit. State, state anxiety; SFE, self-esteem; EA, emotional attention; EC, emotional clarity; MR, mood repair.

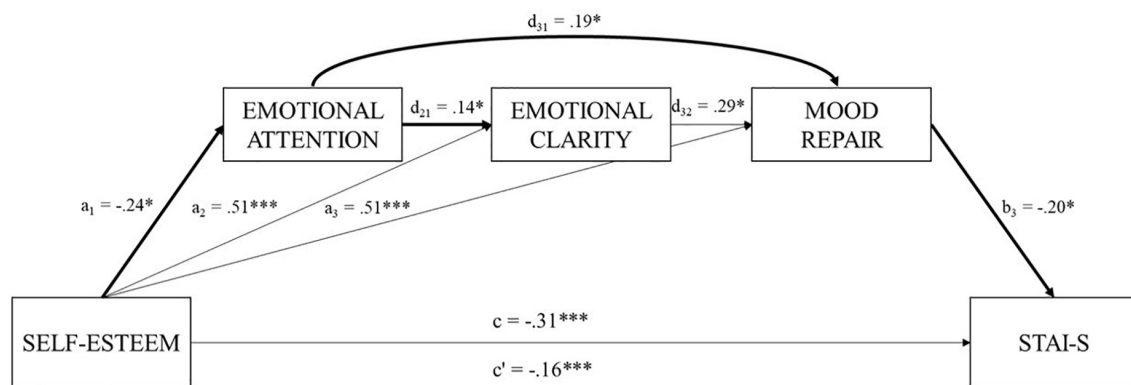


FIGURE 1 | Illustration of the direct and indirect effects model for serial mediation model. In this model EA, EC, and MR mediate the relationship between self-esteem and state anxiety.

$p = 0.042$) and MR ($d_{31}: \beta = 0.19, p = 0.002$), and EC to MR ($d_{32}: \beta = 0.29, p = 0.000$).

Four specific indirect effects presented statistical significance in model A (95% bias-corrected CI). Indirect effect 3 ($ind_3 = a_1 d_{31} b_{31}$), revealed that greater self-esteem was associated with higher levels of state anxiety acting serially through EA and MR ($\beta = 0.0097$; $SE = 0.00$; 95% CI = 0.00, 0.03). Indirect effect 4 ($ind_4 = a_1 d_{21} d_{32} b$) showed that higher levels of self-esteem also increased state anxiety values but by acting serially through EA, EC, and MR ($\beta = 0.0021$; $SE = 0.00$; 95% CI: 0.00, 0.00). Indirect effect 6 ($ind_6 = a_2 d_{32} b_{33}$) showed that higher levels self-esteem were associated with better scores in EC and better MR, which in turn, decrease state anxiety levels ($\beta = -0.0311$; $SE = 0.01$; 95% CI: $-0.07, -0.00$). Finally, indirect effect 7 ($ind_7 = a_3 b_{33}$), revealed that greater levels of self-esteem were associated with higher levels of MR what in turn decreased state anxiety values ($\beta = -0.1069$, $SE = 0.04$, 95% CI: $-0.20, -0.03$). The analysis diagram of model A is shown in **Figure 1**.

To determine which of the indirect effects had more statistical weight, we performed contrast analyses between mediators. **Table 2** shows the statistically significant contrasts with a CI of 95%. Considering the sign of the coefficients, the analyses showed that the effect of self-esteem on state anxiety acting serially through EA and ME (ind_3) is the greatest indirect effects. Hence, students with higher levels of self-esteem pay less attention to their emotions what contributed to lower their MR levels hence increasing their state anxiety.

Regarding model B (**Table 3**), the total amount of variance explained by the overall model, including self-esteem and the mediator variables, was 52% ($R^2 = 0.52$). Specifically, the analysis revealed that self-esteem accounted for 45% of the unique variance of trait anxiety ($R^2 = 0.45$; $c: B = -0.56, p = 0.000$). Considering the direct effects, self-esteem ($c': \beta = -0.41, p = 0.034$), EC ($b_2: \beta = -0.08, p = 0.046$), and MR ($b_3: \beta = -0.12, p = 0.009$) are negatively related to trait anxiety, suggesting that students with higher levels of self-esteem, higher levels of EC, and higher levels of MR reported lower levels of trait anxiety. On the contrary, higher levels of EA were associated with an increase on trait anxiety ($b_1: \beta = 0.13, p = 0.000$). Other statistically significant

direct effects showed that self-esteem is negatively related to EA ($a_1: \beta = -0.24, p = 0.032$) and positively related to EC ($a_2: \beta = 0.51, p = 0.000$) and MR ($a_3: \beta = 0.51, p = 0.000$). Moreover, EA was positively associated with EC ($d_{21}: \beta = 0.15, p = 0.042$) and MR ($d_{31}: \beta = 0.19, p = 0.002$), and EC to MR ($d_{32}: \beta = 0.29, p = 0.000$).

Seven specific indirect effects presented statistical significance in model B (95% bias-corrected CI). Indirect effect 1 ($Ind_1 = a_1 b_{11}$), revealed that higher levels self-esteem decrease EA values and, in turn, trait anxiety levels are diminished ($\beta = -0.0314$; $SE = 0.02$; 95% CI = $-0.08, -0.00$). Indirect effect 2 ($Ind_2 = a_1 d_{21} b_2$) showed that greater levels of self-esteem increased trait anxiety values by acting serially through EA and EC ($\beta = 0.0030$; $SE = 0.00$; 95% CI: 0.00, 0.01). Indirect effect 3 ($Ind_3 = a_2 d_{31} b_3$) indicated that higher levels self-esteem were associated with low scores in EA and low MR, which in turn, increase trait anxiety levels ($\beta = -0.0311$; $SE = 0.01$; 95% CI: $-0.07, -0.00$). Indirect effect 4 ($Ind_4 = a_2 d_{21} d_{32} b_3$) showed that higher levels of self-esteem increased trait anxiety values, acting serially through all three mediators (EA, EC, and MR) ($\beta = 0.0013, SE = 0.00, 95\% CI: -0.00, 0.00$). Indirect effect 5 ($Ind_5 = a_2 b_2$) revealed that high self-esteem enhances EC levels, sequentially decreasing trait anxiety values. Indirect effect 6 ($Ind_6 = a_2 d_{32} b_3$) indicated that higher self-esteem was associated with lower levels of trait anxiety acting serially through MR ($\beta = -0.0634, SE = 0.00, 95\% CI: 0.15, 0.45$). Finally, indirect effect 7 ($ind_7 = a_3 b_{33}$), revealed that greater levels of self-esteem were associated with higher levels of MR what, in turn, decreased trait anxiety values ($\beta = -0.1069, SE = 0.04, 95\% CI: -0.20, -0.03$). The analysis diagram of model B is shown in **Figure 2**.

To determine which of the indirect effects had more statistical weight, we performed contrast analyses between mediators. **Table 3** shows the statistically significant contrasts with a CI of 95%. Considering the sign of the coefficients, the analyses showed that two of the indirect effects had higher statistical weight: (1) The relationship of self-esteem on trait anxiety through EA and EC ($Ind_2 = a_1 d_{21} b_2$) and, (2) The effect of self-esteem on trait anxiety through EA and MR ($Ind_3 = a_2 d_{31} b_3$). Hence, these results indicated that, on the one hand, students with higher levels of self-esteem presented lower levels of EA and lower levels of

EC what, in turn, increased trait anxiety values. On the other hand, participants with higher levels of self-esteem showed lower levels of EA and lower levels of MR what, in turn, increased trait anxiety values.

DISCUSSION

Literature up to date has been focused on the direct relationship between self-esteem, trait EI, and anxiety (Manna et al., 2016; Hartman et al., 2017; Mestre et al., 2017). However, little is known

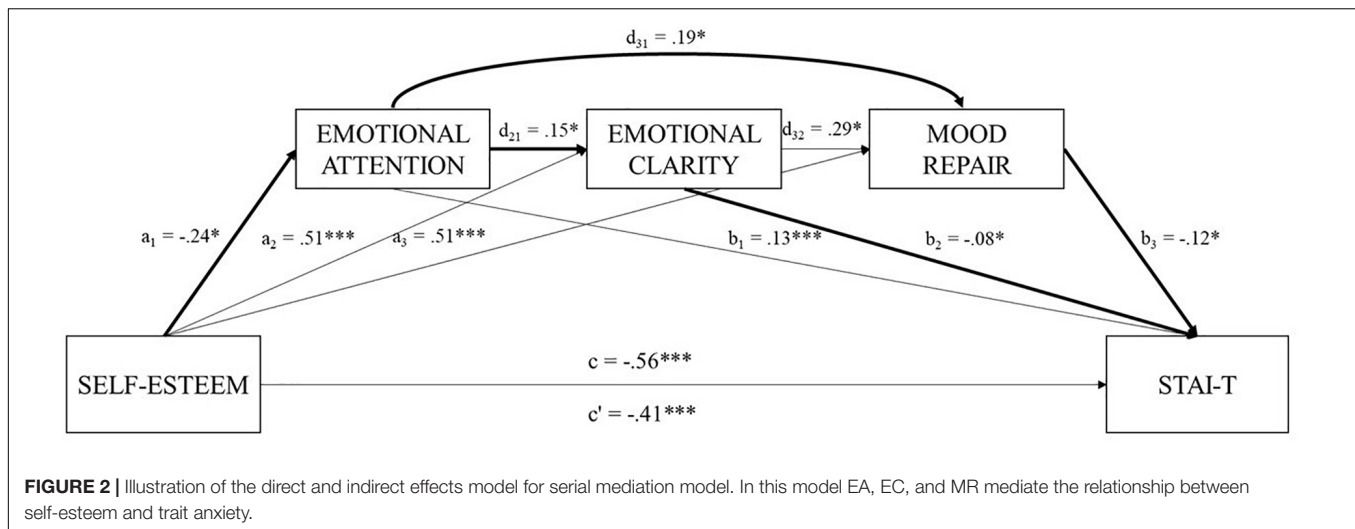
about the role of trait EI as a mediator of the relationship between self-esteem and anxiety. To the best of our knowledge, this is the first study that provides evidence about this mediation process differentiating between state and trait. Moreover, this research expands existing knowledge by exploring a model that considered trait EI (EA, EC, and MR) as mediator variable that enhances the effects of self-esteem on both types of anxiety among a sample of university students from the University of Cádiz.

With regard to the sample's characteristics, the analyses showed that students displayed low levels of state and trait anxiety, relatively high self-esteem, and adequate levels of EA,

TABLE 3 | Serial Mediator Model B: Model summary, total effect, direct effect, indirect effect, and main specific indirect effect contrast definitions.

Model Summary	R ²	MSE	F	df1	df2	p (sig.)	
Total effect model	0.5231	0.1182	40.58	4.00	148.00	0.000	
SFE on trait	0.4497	0.1337	123.40	1.00	151.00	0.000	
						95% CI	
	Path	Coefficient	SE	T	P	BootLL	BootUL
Total effect of SFE on trait, without accounting for EA, EC and MR	C	−0.5613	0.0505	−11.10	0.000	−0.66	−0.46
Total effect of SFE on trait, when accounting for EA, EC and MR	c′	−0.4149	0.0576	−7.20	0.000	−0.52	−0.30
Direct effect of SFE on EA	a ₁	−0.2415	0.1120	−2.16	0.032	−0.46	−0.02
Direct effect of SFE on EC	a ₂	0.5119	0.0993	5.16	0.000	0.32	0.71
Direct effect of SFE on MR	a ₃	0.5130	0.0915	5.61	0.000	0.33	0.69
Direct effect of EA on trait	b ₁	0.1302	0.0361	3.60	0.000	0.06	0.20
Direct effect of EC on trait	b ₂	−0.0844	0.0420	−2.01	0.046	−0.16	−0.00
Direct effect of MR on trait	b ₃	−0.1235	0.0469	−2.63	0.009	−0.21	−0.03
Direct effect of EA on EC	d ₂₁	0.1452	0.0700	2.04	0.042	0.00	0.28
Direct effect of EA on MR	d ₃₁	0.1929	0.0600	3.15	0.002	0.07	0.31
Direct effect of EC on MR	d ₃₂	0.2915	0.0600	4.20	0.000	0.15	0.42
Indirect effect							
Ind ₁ via EA	a ₁ b ₁	−0.0314	0.0210			−0.08	−0.00
Ind ₂ via EA and EC	a ₁ d ₂₁ b ₂	0.0030	0.0031			0.00	0.01
Ind ₃ via EA and MR	a ₁ d ₃₁ b ₃	0.0058	0.0045			0.00	0.02
Ind ₄ via EA, EC, and MR	a ₂ d ₂₁ d ₃₂ b ₃	0.0013	0.0013			0.00	0.00
Ind ₅ via EC	a ₂ b ₂	−0.0432	0.0242			−0.10	−0.00
Ind ₆ via EC and MR	a ₂ d ₃₂ b ₃	−0.0184	0.0099			−0.04	−0.00
Ind ₇ via MR	a ₃ b ₃	−0.0634	0.0301			−0.13	−0.01
Specific indirect effect contrast definitions							
Ind ₃ minus Ind ₂	C1	0.0076	0.0067			0.00	0.03
Ind ₁ minus Ind ₃	C2	0.0408	0.0180			0.01	0.08
Ind ₁ minus Ind ₄	C3	0.1166	0.0447			0.04	0.21
Ind ₂ minus Ind ₅	C9	0.0332	0.0165			0.01	0.07
Ind ₂ minus Ind ₆	C10	0.1091	0.0421			0.03	0.20
Ind ₂ minus Ind ₇	C11	0.0758	0.0363			0.01	0.16
Ind ₃ minus Ind ₄	C12	0.0045	0.0042			0.00	0.02
Ind ₂ minus Ind ₅	C13	0.0489	0.0241			0.01	0.10
Ind ₃ minus Ind ₆	C14	0.0242	0.0120			0.00	0.05
Ind ₃ minus Ind ₇	C15	0.0691	0.0323			0.01	0.14
Ind ₄ minus Ind ₅	C16	0.0445	0.0243			0.00	0.10
Ind ₄ minus Ind ₆	C17	0.0197	0.0107			0.00	0.04
Ind ₄ minus Ind ₇	C18	0.0646	0.0305			0.01	0.13
Ind ₆ minus Ind ₇	C21	0.0449	0.0253			0.00	0.10

Coefficient non-standardized B coefficients; BootSE, bootstrapping standard errors; CI, bias-corrected and accelerated 95% confidence interval; BootLL, bootstrapping lower limit; BootUL, bootstrapping upper limit. Trait, trait anxiety; SFE, self-esteem; EA, emotional attention; EC, emotional clarity; MR, mood repair.



EC, and MR for both men and women. Likewise, as the literature reflects, there are no statistically significant differences in the levels of anxiety, self-esteem, and trait EI dimensions according to the gender (Joseph and Newman, 2010; Tang and Sun, 2018). A positive and statistically significant correlation between age and self-esteem was found, indicating that the older the age of the students, the greater the self-esteem levels. However, as the hierarchical regression analysis showed, this relationship did not affect the effect of self-esteem and trait EI on state and trait anxiety.

Additionally, our results are consistent with Spielberger's differentiation between anxiety as an emotional state (state anxiety) and anxiety as a personality trait (trait anxiety) (Spielberger, 1966, 1972, 1989). As Cattell and Scheier (1961) pointed out, the experience of an immediate emotional state, transient and modifiable in time, is not the same as having a more or less stable personality trait, determined by a tendency to perceive or not certain stimuli as threatening (Spielberger, 1972, 1989; Spielberger and Díaz-Guerrero, 1975). In this sense, and as confirmed by the positive and statistically significant correlations between state and trait anxiety obtained, individuals with higher levels of trait anxiety are more susceptible to stress, responding to several situations as if they were dangerous or threatening, showing state anxiety more frequently and with greater intensity than those with low trait anxiety (Spielberger et al., 1970).

Regarding the relationship between self-esteem and anxiety, we found common influence processes for state and trait anxiety. Our results confirmed that self-esteem scores explained and predicted both, state and trait anxiety values (Sowislo and Orth, 2013; Bajaj et al., 2016). This explanatory capacity is increased by 8% when accounting for trait EI subscales (EA, EC, and MR). However, the percentage of variance explained by self-esteem varied depending on the type of anxiety studied. Regarding state anxiety, the explanatory power of self-esteem was 13% and increased up to 21% when including trait EI dimensions. In relation to trait anxiety, the explanatory power of self-esteem

in trait anxiety was 45% and increased up to 53% when introducing EA, EC, and MR.

Considering the direct relationships, we found differences depending on the trait EI dimensions and the type of anxiety involved. For state anxiety, the direct effects showed that a decrease in their levels is predicted through the increases in the levels of both, self-esteem and MR. Therefore, university students from our sample who rely on their own abilities to cope with threatening situations and who perceive themselves able to repair their emotional states experienced lower levels of state anxiety. These results are in line with Bigman et al. (2016) who found that positive expectations regarding emotion regulation lead to desired emotional outcomes. Regarding trait anxiety, the results of the direct effects revealed that a decrease in their levels is predicted, in addition to an increment of self-esteem and MR values, by an increase of EC and a decrease of EA. Hence, students in this research who trust in their own abilities to face hostile situations, who do not pay much attention to their emotions but who believe in their competencies to clearly perceive and repair their emotional states, showed lower levels of trait anxiety. On the contrary, sample undergraduates who pay much attention to their emotional states will present higher levels of trait anxiety. These findings, especially the results of trait anxiety, are in accordance with previous research revealing positive and direct relationships between EA and anxiety, and negative ones between EC and MR anxious responses (Aradilla-Herrero et al., 2014; Gómez-Díaz et al., 2017; Pena and Losada, 2017).

Regarding the statistically significant indirect effects found in our preliminary research, it is confirmed the negative relationship between self-esteem and anxiety found in the literature (Salovey et al., 2002; Cheung et al., 2015; Edo-Gual et al., 2015). In this line, we again find common elements in the process by which trait EI influence the role of self-esteem as a protective factor against state and trait anxiety. In both types of anxiety, the ability of self-esteem to reduce anxiety levels is enhanced by the effect that the former exerts on EC

and EC on MR. Besides, high self-esteem is associated with a decrease in EA values, what in turn reduce trait anxiety levels. However, contrast analyses seem to revealed that the indirect effect of self-esteem on anxiety, acting serially through EA and MR, is the highest indirect effects for both, state and trait anxiety. Therefore, sample students with higher levels of self-esteem paid less attention to their emotions, which contributed to lower their MR levels, hence increasing state and trait anxiety values. With regard to trait anxiety, another indirect effect also stood out for its greater statistical weight and did not differ statistically from the previous one. Precisely, this indirect path is the relationship of self-esteem on trait anxiety through EA and EC. These results indicated that sample students with higher levels of self-esteem presented lower levels of EA and lower levels of EC what, in turn, increased trait anxiety values.

Given the positive relationship between all the three dimensions of trait EI evaluated (EA, EC, and MR), the negative association found between self-esteem and EA is a determinant element. The preliminary results of the mediation models showed that the effect of self-esteem on EA, and the influence that the latter had on EC and MR, wields an indirect mediated effect with the power to change the effect that self-esteem wields on both types of anxiety. In this sense, when higher levels of self-esteem are associated with lower EA, the protective role of self-esteem becomes a risk factor, given that ignoring current emotional states influence on how clearly sample subjects perceive and repair them, which leads to an increase in state and trait anxiety.

Our preliminary results partially support the Terror Management Theory (Greenberg et al., 1986) since we have found that self-esteem has a direct and mediated negative relationship with both state and trait anxiety. Students from our sample with high self-esteem may have more positive attitudes toward life. Therefore, anxiety buffers, such as self-esteem, allow undergraduates to cope with fears more easily (Hansen et al., 2010). However, sample individuals with higher levels of self-consciousness sometimes have a more negative life perspective than those with reduced self-awareness (Taubman-Ben-Ari and Noy, 2010). In this sense, self-esteem can operate in the opposite way.

Following the Theory of Cognitive Dissonance (Festinger, 1957) high levels of self-esteem can also predict lower EA values. According to this theory, two thoughts, relevant to the person, can be consonant if one follows the other naturally (e.g., if I trust my abilities, I feel satisfied with myself and with my competencies, and I will have lower anxiety levels). But these thoughts can also be dissonant if one comes into conflict with the other (e.g., if I want to trust my abilities, I need to know myself and my emotional states, but if I attend to my emotional states I will have more anxiety). The dissonant thoughts imply an uncomfortable psychological state that leads people to reduce this dissonance. In this sense, holding beliefs, even after they are proven to be defective, creates a cognitive dissonance regarding current information and past behavior, and the way to alleviate is simply rejecting new information. Hence,

people will avoid attending to some information, such as their emotional states, and will focus on increasing their self-esteem to reduce anxiety levels. However, and as the data of this preliminary study showed, the desired effects are not reached, but the opposite. The sign of the influence of self-esteem on anxiety is reversed, turning it from a protection factor to a risk factor, due to the effect of EA on EC and MR, dimensions directly related to anxiety. In this respect, given our results, we consider that the most appropriate way to decrease anxiety levels for sample students (both state and trait anxiety) is to modify the idea that paying attention to our emotional states inevitably leads us to be aware of potential threats making us doubting about our abilities to face them. Hence, to modify our emotional states is necessary to clearly perceive our emotions and its causes (Lopes et al., 2012; Mestre et al., 2016, 2017).

The model generated to explore the mechanism by which trait EI (EA, EC, and MR) mediate the relationship between self-esteem and anxiety seems to be more elaborate for trait than for state anxiety and would encompass it. Therefore, the elements that act as protection and (or) risk factors for trait anxiety embrace the ones that act as protection and (or) risk factors for state anxiety. In this line of reasoning, the design of intervention programs aimed at enhancing the protective effect of self-esteem and trait EI on anxiety in university students from our sample should begin focusing on reducing trait anxiety, since this would result in a decrease of state anxiety. Therefore, we consider that strategies aimed at increasing self-esteem, EC, and MR should be incorporated early on. However, it is essential to include strategies to encourage sample students to pay adequate attention to their emotions. The opposite could reverse the protective ability of high self-esteem turning it into a risk factor, given that low levels of EA serially and directly affects EC and MR, which would increase both state and trait anxiety.

This research is not exempted from limitations, such as those associated with the use of self-report in the data collection besides the limitations of cross-sectional studies. Likewise, it will be necessary to increase the sample size and to test this model in other populations, in order to generalize our results.

However, despite the limitations, this study makes a considerable contribution exploring the mechanisms through which the feeling of satisfaction with oneself influences both the way of perceiving and responding to certain stimuli and potential threats and how this relationship is modified and explained better through the trait EI. Consequently, although self-esteem levels are a focus of interest for interventions, this study showed that including trait EI (EA, EC, and MR) increase the efficiency and profitability of these practical applications.

Finally, future research should focus on assessing the constructs studied using instruments based on ability models. Moreover, Monte Carlo simulation should be perform to determine the statistical power of indirect effects. It is important to note the need to investigate the levels of EA that prevent from the harmful effects that it may have on protective factors such as

self-esteem, EC, and MR. In this sense, it is crucial to explore from which levels EA affects anxiety, as well as the levels from which EA affect the relationship between self-esteem, EC, and MR on both state and trait anxiety.

ETHICS STATEMENT

All the procedures carried out in this study with human participants were developed in accordance with the ethical standards of the National Research Committee and with the Declaration of Helsinki of 1964 and its subsequent amendments or comparable ethical standards. Written informed consent was obtained from all individual participants included in the study. There is no conflict of interest linked to any of the authors associated with this study.

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AUTHOR CONTRIBUTIONS

RG developed the study design, survey creation, performed the data collection and the data analysis, and contributed to writing the manuscript. RG-M contributed to data interpretation and writing the manuscript, and approved the final version of the manuscript. AZ contributed to project design and administration, manuscript revision. Finally, AM-C and PG-O contributed to the project design, data analysis, and writing the manuscript.

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Parameters as Trait Indicators: Exploring a Complementary Neurocomputational Approach to Conceptualizing and Measuring Trait Differences in Emotional Intelligence

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Current assessments of trait emotional intelligence (EI) rely on self-report inventories. While this approach has seen considerable success, a complementary approach allowing objective assessment of EI-relevant traits would provide some potential advantages. Among others, one potential advantage is that it would aid in emerging efforts to assess the brain basis of trait EI, where self-reported competency levels do not always match real-world behavior. In this paper, we review recent experimental paradigms in computational cognitive neuroscience (CCN), which allow behavioral estimates of individual differences in range of parameter values within computational models of neurocognitive processes. Based on this review, we illustrate how several of these parameters appear to correspond well to EI-relevant traits (i.e., differences in mood stability, stress vulnerability, self-control, and flexibility, among others). In contrast, although estimated objectively, these parameters do not correspond well to the optimal performance abilities assessed within competing “ability models” of EI. We suggest that adapting this approach from CCN—by treating parameter value estimates as objective trait EI measures—could (1) provide novel research directions, (2) aid in characterizing the neural basis of trait EI, and (3) offer a promising complementary assessment method.

Keywords: trait emotional intelligence, computational neuroscience, reinforcement learning, Bayesian brain, computational modeling, assessment

INTRODUCTION

The trait model of emotional intelligence (EI) conceptualizes EI as a set of self-perceived competencies, such as high adaptability, high stress tolerance, high optimism, and low impulsiveness, among others (Pérez et al., 2005; Petrides et al., 2016). In this approach, self-report inventories are used that ask people to evaluate their own attributes in this domain, similar to the self-report inventories used to assess personality variables (e.g., Austin et al., 2004). Many measures of EI have been developed within this model, with

the Bar-On Emotional Quotient Inventory (EQ-i) and the Trait Emotional Intelligence Questionnaire (TEIQue) representing two prominent examples (e.g., see Bar-On, 2004; Mikolajczak et al., 2007).

Higher trait EI scores on such measures have previously been associated with better social adjustment (Engelberg and Sjöberg, 2004), better recovery from traumatic experience (Hunt and Evans, 2004), a stronger attentional bias toward positive affective stimuli (Lea et al., 2018), higher levels of extraversion, conscientiousness, openness, and agreeableness, and lower levels of neuroticism (Warwick and Nettelbeck, 2004; van der Linden et al., 2017), as well as with a generally more positive mood (Schutte et al., 2002; but see Spence et al., 2004). Higher trait EI scores have also been linked to lower work-related stress (Dulewicz et al., 2003), a lower likelihood of reporting symptoms diagnostic of some psychological disorders (Hemmati et al., 2004), and lower symptom severity in clinical samples (Petrides et al., 2017).

While the aforementioned findings were based on associations with other self-report measures, significant relationships have also been found with a few objective measures. For example, those with higher self-reported trait EI show faster facial emotion recognition (Austin, 2004), as well as better job performance and better indices of health (Martins et al., 2010; O'Boyle et al., 2011), than those scoring lower on this trait. A few previous studies using functional magnetic resonance imaging (fMRI) have also shown that trait EI scores are correlated with functional and/or structural differences in the prefrontal cortex, insula, and amygdala (Killgore and Yurgelun-Todd, 2007; Takeuchi et al., 2011, 2013; Killgore et al., 2012, 2013; Smith et al., 2016). This growing body of work supports the validity and importance of the trait EI construct.

One theoretical difficulty in using this subjective-rating approach to measure trait EI, however, is that individuals' self-evaluations can be inaccurate. For example, the relationships observed between trait and performance-based or third-party observer measures of EI tend to be weak (e.g., $r = 0.20$ to 0.30 ; Carney and Harrigan, 2003; Brackett et al., 2006; Goldenberg et al., 2006; Brannick et al., 2009; Webb et al., 2013). Other work has also found, for example, that people who rate their own social sensitivity highly receive much lower ratings from third-party observers (Carney and Harrigan, 2003). Another concern is that associations between trait EI scores and self-reported personality measures are quite robust (Warwick and Nettelbeck, 2004; De Raad, 2005), and recent suggestions have been made that trait EI scores might primarily reflect a general latent personality factor associated with lower neuroticism and higher extraversion, openness, conscientiousness, and agreeableness (van der Linden et al., 2017). On one hand, this link between trait EI and basic personality dimensions may provide support for its biological basis, as the observed correlations appear to be due (in part) to shared genetic and neuroscientific underpinnings (Vernon et al., 2008; Mikolajczak et al., 2010; Petrides et al., 2016). On the other hand, however, if the trait EI construct is intended to track true individual differences in social/emotional competencies over and above those measured by broad personality variables, one might not

expect such differences to be so strongly associated with those personality variables; this also raises the concern that these strong associations could in part reflect shared self-report variance. These issues highlight the potential usefulness of more objective measures of an individual's traits.

This is especially true in the context of the increasing neuroscience research on trait EI (and on the potential to use neural/biological measures as markers of improvements in EI; Pérez-González and Qualter, 2018) referred to above, as certain theoretical difficulties arise in correctly interpreting such neuroimaging results. For example, when differences in neural responses are associated with objective performance differences, these neural responses are typically interpretable as reflecting underlying differences in relevant neural processes (Smith et al., 2018). For instance, in the distinct "ability model" of EI (Mayer et al., 2003), which instead conceptualizes EI as a set of abilities assessed by task performance (e.g., the ability to recognize and regulate emotions), brain activity associated with better task performance can be plausibly linked to processes contributing to the use of those abilities. The objective nature of the ability model has been one of its most valuable features, which has led to its common use in EI research and its conceptualization as similar to other traditional metrics of cognitive intelligence (Mayer et al., 2001). (Note: Drawbacks to this approach have also been highlighted, however (Roberts et al., 2001, 2006; Matthews et al., 2007; Fiori et al., 2014; Smith et al., 2018); for example, many ability EI measures use consensus scoring (as opposed to having objective accuracy metrics) and therefore cannot include difficult items that could appropriately measure above average levels of EI.)

In contrast, trait EI scores most directly reflect individuals' *beliefs* (self-assessments or self-perceptions) about themselves, and those beliefs need not co-vary highly with objective assessment (beliefs about oneself can nonetheless have important influences on brain and behavior, however; e.g., see Smith et al., 2016). In addition, subjective ratings of trait EI are often understood to reflect *typical* (or habitual) performance in real-world situations as opposed to the *optimal* (i.e., highly motivated, goal-directed) performance assessed in laboratory tasks and other objective performance measures of EI-related abilities. As such, interpreting the meaning of neuroimaging findings regarding trait EI can be less straightforward because the neural basis of subjective beliefs and of typical performance are likely different than the neural basis of optimal performance assessed objectively (for a recent example attempt to interpret distinct neural correlates of trait and performance measures of EI, see Smith et al., 2016). Further research in the field of trait EI could be enhanced, therefore, by developing methods to measure such traits with more objective metrics.

Based on these considerations, the present paper explores one possible way in which EI-relevant traits could be assessed objectively, derived from the field of computational cognitive neuroscience (CCN). Briefly, we present the thesis that the notion of "model parameters" in CCN represents a novel way to think about psychological traits in the field of EI research. As we will describe below, these parameters can be estimated for individual participants in objective behavioral tasks and

therefore do not rely on self-report. Yet, they reflect stable individual differences with a different character than the performance abilities assessed by ability EI models. Thus, they provide a potential framework in which trait-like factors, that have more easily interpretable neural underpinnings, can be assessed in an objective manner. This builds on previous work that has suggested ways in which neuroimaging measures could also be used to more objectively assess differences in EI-relevant traits (e.g., assessing more or less adaptive “affective styles” based on differences in asymmetric prefrontal activation and amygdala responses; Davidson and Irwin, 1999; Davidson, 2004; Davidson and Begley, 2012).

In the following sections, we will expand upon the thesis that computational neuroscience measures can be used to assess socio-emotional traits and then provide several examples of specific model parameters that have been derived in recent research, which appear to overlap with, or at least be highly relevant to, the emotional competencies associated with trait EI. Ultimately, we will argue that expanding on this approach within the field of EI research could represent a promising avenue for future studies.

COMPUTATIONAL COGNITIVE NEUROSCIENCE

The field of CCN starts with the premise that neural networks within the brain implement information processing mechanisms that can be described by mathematical equations. It then focuses on creating and testing mathematical models and their ability to account for human behavior and brain activity. There is a wide range of different types of models used within this field, many working at different levels of description. For example, some of this work has focused primarily on the use of mathematical models of cognition (typically based on Bayes’ theorem in probability theory), with little emphasis on underlying neural implementation (e.g., see Kemp et al., 2007; Xu and Tenenbaum, 2007a,b; Perfors et al., 2011). Other work has focused on algorithms capable of learning to behave optimally in the context of seeking reward and avoiding punishment, which has included considerable focus on brain mechanisms (Sutton and Barto, 1998; Frank, 2011; Dolan and Dayan, 2013; Gershman, 2017). Finally, there is a growing body of work on what has been called the “free-energy principle” (Friston, 2010), which has provided concrete neural models (at the level of interconnected neurons and their dynamics) of perception/attention (Friston, 2005; Kiebel et al., 2008; Feldman and Friston, 2010; Parr and Friston, 2017), learning and decision-making (Friston et al., 2016, 2017), emotion and visceral regulation (Pezzulo et al., 2015; Seth and Friston, 2016; Stephan et al., 2016; Smith et al., 2017; Owens et al., 2018), and skeletomotor control (Friston et al., 2010).

According to these CCN models, the brain must store and use stable values for a range of parameters (e.g., expected levels of reward in a particular situation, prior expectations about what is most likely to be perceived, etc.). Some of the parameter values stored in the brain may be inherited, while others are

plausibly learned from experience (perhaps early experience especially), and they need not be identical across individuals. Further, although many may be slowly altered through further learning, such parameters can often be treated as stable individual differences. Broadly speaking, by storing and using specific values for a range of different parameters, the brain is thought of as implementing an “internal model” of the world that an individual uses to guide perception, bodily regulation, and behavior.

Of primary relevance to the present paper, multiple parameter values within an individual’s internal model may relate in important ways to trait differences in EI-relevant competencies. Further, behavioral paradigms have been created that can estimate these parameters for individual participants, providing useful trait-like information. In what follows, we will review previous work in which such experimental paradigms have been used to estimate individual differences in some specific parameter values, and we will demonstrate why these are more plausibly considered traits than abilities. We will then illustrate how mapping trait differences in these parameter values to trait differences in EI may provide conceptual and empirical tools capable of advancing research on trait EI. To be clear, the work we will review does not offer a complete list of EI-relevant parameters. Our goal is instead to demonstrate how such an approach could be expanded to assess other EI-relevant traits in a novel manner.

SPECIFIC EXAMPLE PARAMETERS RELEVANT TO TRAIT EI

Mood Stability

The first parameter we will consider corresponds to trait differences in mood stability, based on a recent body of work within the literature on reward learning (Eldar and Niv, 2015; Eldar et al., 2016, 2018; Mason et al., 2017). Briefly, the computational models used in this work highlight an important interaction between mood stability and the way events involving reward or loss are processed. Specifically, this work has shown that (1) mood is improved after repeatedly experiencing greater reward than expected, and (2) outcomes are perceived as more rewarding when a person is in a good mood relative to when they are in a bad mood. In symmetric fashion, losses are perceived as worse when someone is in a bad mood, and the repeated experience of unexpected loss further worsens mood. This two-way interaction may be helpful in improving the efficiency of reward learning in certain environments, but it also creates the potential for positive feedback loops that can lead to mood instability.

In the mathematical equations used by Eldar and colleagues to model these processes, one particular parameter (f) controls the strength of the effect that mood has on perception of subsequent outcomes (i.e., higher f -values lead good mood to more strongly amplify perceived reward and bad mood to more strongly amplify perceived losses). Using a behavioral task combining mood induction and reward learning, they were able to estimate the best-fit values of f for each participant. They subsequently found that those participants with higher

f -values were also more susceptible to mood instability (assessed using the hypomanic personality scale; Eckblad and Chapman, 1986) and that the associated amplified responses to reward corresponded to altered activation of striatal reward systems in the brain (Eldar and Niv, 2015). Briefly, this instability arises with higher f -values because reward (positive reward prediction-error) and mood amplify each other until expected rewards are unattainable, leading to losses (negative reward prediction-errors) and mood reductions that in turn amplify each other (and the cycle continues).

In this first example, the parameter value for f , although measured objectively, is not plausibly understood as a measure of task performance. Instead, it reflects a trait difference in vulnerability to mood instability that can be understood in mathematical and mechanistic neural terms. That is, it reflects the fact that positive mood amplifies perceived reward too much and negative mood amplifies perceived negative outcomes too much, corresponding to amplified neural responses in reward learning systems. Given that mood stability is an EI-relevant trait, this objective means of assessing this trait appears highly relevant. For example, f appears strongly related to the Emotion Regulation facet on the TEIQue and could also overlap somewhat with other TEIQue facets and factors, such as trait happiness, adaptability, well-being, and self-control. It could also relate to certain scales and subscales on the Bar-On EQ-i, such as adaptability, general mood, flexibility, and happiness. The potential relationships between f and the aforementioned EI traits have not yet been examined, representing one interesting direction for future research.

Stress Vulnerability

The second parameter we will consider corresponds to trait differences in stress vulnerability. This is based on a recent study of uncertainty learning (de Berker et al., 2016), which linked differences in particular aspects of uncertainty-related behavior to differences in autonomic and endocrine responses associated with stress. In this study, individuals had to repeatedly guess the probability of receiving a shock after seeing various stimuli. Importantly, the probabilities shifted unpredictably over time. Based on behavior in this task, one of the parameters estimated by their computational model for each participant (ϑ) captures trait differences in expected levels of a specific type of uncertainty called “metavolatility.” Specifically, higher ϑ -values can be thought of as indexing stronger implicit expectations that the world is unstable (i.e., greater general uncertainty about the stability of learned relationships between events). Interestingly, they found that individuals with higher ϑ -values reported greater chronic life stress (assessed using the perceived stress scale; Cohen et al., 1983).

Individual differences in ϑ therefore reflect something like trait differences in vulnerability to stress (i.e., due to differences in implicit beliefs about world stability), and it also does not map onto any straightforward performance ability. This therefore provides another example of an objectively measureable individual difference variable relevant to trait EI. For example, ϑ appears strongly related to the stress management facet on the TEIQue

and could also overlap somewhat with other TEIQue facets and factors, such as emotion regulation, trait happiness, adaptability, well-being, and self-control. It appears strongly related to the stress management scale and stress tolerance subscale on the EQ-i and could also overlap somewhat with other EQ-i scales/subscales, such as adaptability, general mood, flexibility, and happiness. Future research should examine whether these potential relationships exist.

Optimism

The third parameter we will consider corresponds to trait differences in optimism, based on a recent study of expectation learning (Stankevicius et al., 2014). In this study, individuals were exposed to stimuli that were either followed by reward or no reward on each trial with a probability fixed for each stimulus (but differing for different stimuli), which was unknown to participants. After a few presentations of a given stimulus, participants were instructed to maximize reward by choosing either that stimulus or a novel stimulus with an explicitly indicated probability of reward. Using a mathematical model that assumed optimal probabilistic (Bayesian) inference, participants' behavior could be used to estimate a set of beta-distribution parameters (α , β) that can be combined to measure each participant's mean prior expectation of receiving future rewards ($\alpha/(\alpha + \beta)$). Subsequently, they found that ($\alpha/(\alpha + \beta)$) values were significantly positively correlated with trait optimism (assessed using the Life Orientation Test-Revised [LOT-R]; Hirsch et al., 2010), but that they did not correlate with several other personality variables.

Thus, this parameter represents an objective behavioral measure of trait differences in optimism, conceptualized computationally as stored prior expectations about the quantitative probability of receiving future rewards (i.e., likely related to brain regions involved in reward prediction, such as the anterior cingulate, basal ganglia, dopaminergic midbrain, and ventral/medial prefrontal cortex; Niv et al., 2007; Dolan and Dayan, 2013; Silvetti et al., 2014). This parameter appears strongly related to the trait optimism facet on the TEIQue and could also overlap somewhat with other TEIQue facets and factors, such as trait happiness, self-motivation, and well-being. It also appears strongly related to the optimism subscale on the EQ-i and could overlap somewhat with other EQ-i scales/subscales as well, such as adaptability, general mood, flexibility, and happiness. As with the other parameters already discussed, future trait EI research will be necessary to investigate these relationships.

Flexibility and Self-Control

A fourth set of parameters we will consider correspond to overlapping traits that could be described as self-control, patience, flexibility, or goal-directedness. This broad idea has been assessed within reinforcement learning studies on “model-based” and “model-free” decision-making algorithms (Daw et al., 2005, 2011; Kool et al., 2016; Gershman, 2017). Briefly, model-based decision-making algorithms mathematically characterize a goal-directed process in which one consciously imagines a number

of probable outcomes based on different action choices and then selects the action with the best expected outcome. This process is psychologically flexible, but computationally expensive and cognitively effortful. In contrast, model-free algorithms mathematically characterize a process in which habitual behaviors are learned based on statistical patterns of better and worse outcomes in past experience. Psychologically, one simply feels an impulse or automatic tendency to act a certain way in a given situation, because it has tended to lead to better outcomes in the past—although an individual need not be aware of this reason (e.g., similar to the implicit statistical learning observed in tasks such as the Iowa Gambling Task; Bechara et al., 1997; Gupta et al., 2011; Alkozei et al., 2018). Model-based and model-free algorithms appear to operate in a parallel and interactive fashion in the brain (e.g., model-based algorithms appear to primarily engage the dorsolateral prefrontal cortex and dorsomedial striatum, whereas model-free algorithms instead primarily engage ventral/lateral striatal regions), and it is thought that they compete for control of action (Daw et al., 2005). Most relevant to the present discussion, decision-making tasks (Kool et al., 2016) have been developed that assess quantitative individual differences in (i.e., parameter values describing) the default tendency to engage in model-based (flexible, goal-directed) or model-free (rigid, impulsive) decision making. Those that have higher “model-based” parameter values will therefore tend to be more flexible and goal-directed and less impulsive. It is worth emphasizing that these parameter values do not necessarily reflect a person’s *ability* to engage in the controlled/deliberative type of cognition associated with model-based algorithms; instead, they are better understood to reflect the degree to which an individual will *typically* engage in this type of cognition when it would be beneficial.

A related set of parameters has also been assessed within neural “active inference” models that are based on the free-energy principle (i.e., according to this principle, individuals act so as to minimize an information-theoretic quantity related to surprise; Schwartenbeck et al., 2015; Schwartenbeck and Friston, 2016; Parr and Friston, 2017; Friston et al., 2018). One parameter, called *policy precision*, encodes an individual’s *a priori* confidence that one action option will be better than others; this parameter is linked to dopaminergic signaling in these models (Parr and Friston, 2018). Higher policy precision values entail that behavior is more deterministic (i.e., less random). A second parameter in these models, called *transition precision*, encodes an individual’s *a priori* confidence in the predictability of future events; this parameter is linked to noradrenergic signaling in active inference models (Parr and Friston, 2018). Higher transition precision values indicate the implicit belief that distant future states are more predictable, entailing more goal-directed (i.e., more patient, less impulsive) decision-making strategies (e.g., being willing to forego smaller rewards now to receive larger rewards later—which only makes sense if the more distant rewards are predictable enough to “bet on”; Mirza et al., 2019). Different combinations of policy and transition precision values can therefore characterize an individual’s tendencies toward acting randomly and impulsively vs. acting in a more patient and controlled manner.

As such, these overlapping parameters appear strongly related to the (low) impulsiveness facet, self-motivation facet, and self-control factor on the TEIQue and could also overlap somewhat with the adaptability facet. They also appear strongly related to the impulse control, flexibility, and problem solving subscales on the EQ-i and could also overlap somewhat with the broader adaptability scale. In addition, given that some other self-reported EI skills (e.g., regulating/managing the emotions of self and others) make use of controlled/effortful cognition, those with greater tendencies to engage in these processes (as assessed by the aforementioned parameter estimates) might appear to show greater skills levels in typical situations. While these parameters appear to be similar to the constructs measured by traditional self-report measures of trait EI, these associations remain to be tested through empirical research.

The Influence of Automatic Affective Action Tendencies

The fifth parameter we will consider corresponds to trait differences in the influence of affective valence on behavior, based on recent work in reinforcement learning (Guitart-Masip et al., 2012, 2014). Briefly, this work has illustrated interactions between the expected valence (pleasantness or unpleasantness) of outcomes and behavioral tendencies when trying to achieve those outcomes (i.e., which may correspond to interactions between brain regions encoding value/valence (e.g., ventral/medial prefrontal cortex) and regions controlling action (e.g., striatum); see Guitart-Masip et al., 2014). More specifically, expected pleasant outcomes appear to promote Pavlovian (biologically pre-specified) approach behaviors, whereas expected unpleasant outcomes promote Pavlovian inhibition or avoidance behaviors. This can lead to suboptimal responses in situations where, for example, long-term success requires approaching situations to avoid unpleasant outcomes (e.g., requiring inhibition of biologically prepared inhibition/escape tendencies).

Importantly, individuals differ in the degree to which expected valence influences their behavior in this manner. One task designed to assess this interaction between valence and behavior is the orthogonalized go/no-go task (Crockett et al., 2009). In this task, individuals either have to act or inhibit an action (go and no-go, respectively) to either win or to avoid losing something of value (i.e., four combinations, each in a different task condition). In this task, some individuals perform worse than others, with varying levels of impaired learning/performance in the “go to avoid losing” and “no-go to win” conditions (i.e., relative to the other two conditions where valence and automatic behavior agree; e.g., see Guitart-Masip et al., 2012; Chowdhury et al., 2013). Individual differences in the ability to learn/perform in these conditions where valence and action disagree (i.e., individual differences in parameters describing the strength of the interaction between valence and action) have been used as measures of psychological flexibility (e.g., to examine individual differences in flexibility between younger and older adults; Chowdhury et al., 2013).

There is a range of circumstances in which this could pertain to EI-relevant traits. For example, there are social circumstances

in which one must approach uncomfortable social and workplace situations to avoid even more unpleasant long-term outcomes. More generally, this objectively measurable trait difference could theoretically correspond closely with the (low) impulsiveness facet, emotion regulation facet, and self-control factor on the TEIQue and could also overlap somewhat with other TEIQue facets, such as self-motivation and adaptability. It also appears strongly related to the flexibility and impulse control subscales on the EQ-i and could also overlap somewhat with its broader adaptability scale. Yet, no study to date has attempted to link trait EI scores to this objective measure of behavioral flexibility in affective contexts.

Cognitive Flexibility in Reality Testing

The final parameter we will consider corresponds to trait differences in the degree to which people are cognitively flexible and test their beliefs before acting on them. In decision-making research, this has been studied in the context of the “explore/exploit dilemma” (Sutton and Barto, 1998; Berger-Tal et al., 2014), which refers to the difficult problem of deciding when to trust (and act on) a previously learned model of the world (“exploiting”) and when to first check (before acting) to make sure that model of the world is still accurate (“exploring”). In neuroscience research, evidence suggests that both noradrenergic and dopaminergic signaling play a role in modulating how (and how flexibly) individuals solve this problem (Aston-Jones and Cohen, 2005; Beeler et al., 2014).

Solving this problem adaptively is highly relevant to psychopathology and its treatment (Addicott et al., 2017). For example, individuals with early adversity may learn a maladaptive model of social interactions (e.g., “people will always hurt me and take advantage of me if I show emotional vulnerability”) that, while true of their childhood environment, is not true of their broader social environment in adulthood. Similarly, individuals with mood and anxiety disorders often have acquired maladaptive socio-emotional beliefs (e.g., “no one would want to be my friend”). In both cases, habitually acting on such beliefs can prevent the ability to learn a more adaptive model; for example, by socially isolating one’s self or being preemptively cold and defensive during social interactions, one can inadvertently elicit reactions from others that maintain those maladaptive beliefs. In both cases, evidence-based psychotherapeutic interventions (Hayes and Smith, 2005; Barlow et al., 2016)—and exposure techniques in particular—also focus on countering maladaptive cognitive/behavioral habits by promoting more flexible, exploration-based cognition and behavior as a way of promoting more adaptive learning (e.g., “let yourself show some emotional vulnerability and see if it goes the way you expect”).

There are a number of tasks within the reinforcement learning literature that have been used to assess this type of flexible reality testing (reviewed in Addicott et al., 2017). As one illustrative example, a task called the “horizon task” asks participants to make a series of choices between two slot machines with the goal of maximizing earnings, after having seen different numbers of examples of previous payouts from

each of the two machines (Wilson et al., 2014). To estimate trait differences in a “goal-directed exploration” parameter, participants’ early choices in this task can be examined when they are given more vs. less information about previous payouts from one slot machine or the other. Interestingly, while individuals high in goal-directed exploration tend to first “test out” the slot machine that they know less about, those lower in this trait tend to just pick the one with higher past payouts and stick to it (i.e., regardless of how many past payouts they have seen). Thus, those with higher goal-directed exploration parameter values appear more sensitive to uncertainty and try to gather more information before “jumping to a conclusion” too quickly—often leading to better overall performance.

Although primarily studied thus far in the context of simple gambling tasks, trait differences in goal-directed exploration during decision-making are of clear relevance to intelligent, adaptive, and flexible social and emotional responding. Conceptually, this trait difference appears related to the (low) impulsiveness facet and adaptability facet of the TEIQue. It also appears strongly related to the reality testing subscale of the EQ-i, as well as other components of its adaptability scale (i.e., flexibility and impulse control). However, no study to date has attempted to link trait EI scores to this objective measure of flexibility and reality testing; adapting such tasks to study goal-directed exploration in explicitly socioemotional contexts is also an important future research direction.

A BROADER PERSPECTIVE ON MODEL PARAMETERS AND TRAIT EI

In the previous section, we provided several specific examples of parameter values that can be experimentally estimated for individuals and that could plausibly relate to trait differences in a range of EI-related competencies. We also demonstrated why they correspond much more closely to the notion of traits than to the notion of specific task performance abilities (or to typical as opposed to optimal behavior). However, the examples provided above certainly do not provide comprehensive coverage of EI-relevant traits. For example, they do not appear to correspond directly to traits such as self-esteem, assertiveness, emotional awareness, interpersonal relationship competencies, among others (i.e., although they could certainly have indirect influences on these other traits; e.g., optimism parameters could promote self-esteem, and parameters related to patience, self-control, cognitive flexibility, and low impulsiveness could aid in interpersonal relationships, etc.). Given this lack of complete coverage, our claim is not that the tasks described above could exhaustively assess trait EI in an objective manner. Our claim is instead that these examples from CCN may provide a blueprint for ways in which one could design tasks to assess other trait EI facets, and that doing so could both avoid potential issues linked to self-report and also facilitate neuroscience research on trait EI. The resources for doing so can also be further clarified by giving broader consideration toward other general parameters that must be stored unconsciously within any

plausibly human mind. In fact, there are some general categories of parameter estimates that are necessary for perception and action, which have clear relevance to EI competencies. We consider a few below.

Prior Probability and Precision Estimates

The sensory input received by the brain is known to be noisy and ambiguous. Put another way, there are always multiple possible causes of the same sensory input. As such, the brain must be equipped with (and be capable of updating) prior expectations (i.e., stored probability values typically referred to as “priors”) about which causes are more likely than others in general and use these expectations to infer the most likely cause of any particular pattern of sensory input (i.e., similar to the example of optimism and prior expectations of future reward above). As there are a vast number of possible causes out in the world that interact in complex ways, this entails that the brain must store a large number of priors. This is the general basis for a large number of current probabilistic (Bayesian) models of brain function (Knill and Pouget, 2004; Friston, 2010). Not all of these priors may relate to trait EI; however, several plausibly do (e.g., for specific theoretical applications to social perception/behavior, see Diaconescu et al., 2014; Friston and Frith, 2015; Sevgi et al., 2016).

As one example, consider a woman who observes a man with a neutral facial expression. As such expressions are more or less consistent with a range of emotional states, prior expectations will play an important role in emotion recognition competencies (e.g., expectations about what facial features correspond to what emotions, about what emotions are more likely in general, and about what emotions are more likely in a particular situation). For instance, if the woman has a prior expectation that people typically tend to feel happy, then—all else being equal—the woman would perhaps perceive the man’s neutral expression as indicating mild happiness. In contrast, a different prior expectation could promote the perception of a range of other emotions. Prior expectations can also be specific to context. For example, assume the man is observed at a family gathering. If the woman has a prior expectation that family gatherings are generally enjoyable, then she would likely perceive the man as happy; in contrast, if she expects that family gatherings are often awkward and tense, the man might instead be perceived as anxious or annoyed.

Individuals with prior expectations that are better calibrated to their social/cultural environment would therefore be expected to have higher competence in the domain of emotion perception. More generally, for most trait EI competencies, there will be similarly relevant priors. For example, individuals will have learned prior expectations for (1) their value in the eyes of others (self-esteem), (2) their ability to navigate the environment effectively (independence), (3) the probable mental states of others in specific situations and the types of actions that tend to make individuals feel better or worse (emotion management, social awareness, and empathy), and many others.

Competence within the perceptual and cognitive domains also requires estimating the reliability of particular sensory

inputs and expectations (Feldman and Friston, 2010). For example, in the context of a sunny day, visual input should be treated as reliable and have a strong influence on perception and learning within the brain. In contrast, input from vision in the dark of night is much less reliable, and the brain could arrive at many false percepts if it was treated as though it were trustworthy. Thus, in Bayesian models of the brain, it is assumed that the brain learns context-specific estimates of when to put greater trust in sensory input and when to put greater trust in prior expectations. These reliability estimates correspond to a set of internal model parameters called “precision estimates,” which guide attention, belief updating, and decision-making in a context-specific manner. In fact, the policy and transition precision parameters discussed in section 3.4 specifically represent two such precision estimates, reflecting the reliability of predictions about sensory input based on chosen actions and beliefs about the past/future, respectively (for discussion of mood biases as reflecting different types of precision estimates, see Clark et al., 2018).

More generally, however, precision estimates can be seen as conveying a person’s confidence in a wide range of variables. For example, if one assigned a very strong precision estimate to their current beliefs, they would have great difficulty learning from new experience and would be unlikely to engage in the type of reality testing competency assessed in the EQ-i, or if an individual assigned very low precision estimates to social information in sensory input (e.g., effectively ignoring the facial expressions, body postures, and voice tones of others), they would be expected to have low social awareness. The structure of these examples is widely generalizable to other EI traits. Regardless of the specific example, however, the key task for expanding this approach to trait EI research would be to identify the relevant prior expectation and precision estimate parameters and then design tasks to quantitatively measure individual differences in these parameters *via* individuals’ behavior.

Learned Action Values

The final example we will provide returns to the work on model-free decision algorithms discussed on section 3.4. In that section, we focused on the competition between these (habit-driven) algorithms and model-based (goal-directed) algorithms and did not discuss *what* habitual behaviors had been learned. However, competencies within the social/emotional domain also likely depend on the specific behavioral tendencies that an individual has learned through reinforcement in EI-relevant contexts. Within model-free algorithms, if a particular action (in a particular situation) has been repeatedly and reliably followed by positive outcomes, then the stored value of that action will be high for that situation; symmetrically, those actions typically followed by negative outcomes in personal experience with a specific situation will be assigned low values (Gershman, 2017). When again in that situation, model-free algorithms would select whatever action has the highest stored value, often corresponding to a strong subjective urge (or automatic tendency) to behave in a particular way

(and strong urges to avoid choosing low-value actions—without an individual necessarily understanding why).

The important point here is that different stored action values can promote more or less emotionally/socially competent behavioral tendencies. Less adaptive behavioral tendencies can arise, for example, if they were learned in one environment but then applied in a different environment. For example, if assertive behaviors were reliably punished during childhood, an individual would likely have automatic tendencies toward passive (nonassertive) behaviors in adult social environments—even if assertive behaviors would in fact be rewarded in the latter environment. Importantly, because such an individual would have a strong aversion to “trying out” assertive behaviors (i.e., because their stored action values are so low), they may never have an opportunity to learn that such behaviors would now be followed by desirable outcomes (i.e., this is an example of failing to adaptively solve the explore/exploit dilemma described in the “Cognitive Flexibility in Reality Testing” section). A similar analysis of other behavioral facets of trait EI could also be provided, such as facets pertaining to socially responsible behavior, behavior in interpersonal relationships, and empathic behavior (among others). The major point is that a particular set of model-free parameters that promote selection of habitual actions (technically called “state-action pair values” or “Q-values”) could in principle be used as objective indices of some trait EI competencies. This would require that tasks were designed to estimate an individual’s stored values for different actions in EI-relevant situations, which has not been attempted to date.

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CONCLUSION

In this paper, we have discussed the idea that specific individual difference parameters estimated in CCN studies could be understood as objective assessments of traits, and that many do not appear to correspond as directly to performance abilities. We have also provided specific examples of parameters that appear to correspond to EI-relevant traits to various degrees and illustrated how more general theoretical resources within CCN could guide the development of tasks capable of assessing trait EI facets more comprehensively. This offers the possibility of a complementary means of assessing trait EI competencies that does not rely on self-report and which could perhaps better dissociate them from other self-report measures. Finally, we have highlighted that, because each of the parameters discussed above have previously examined neuroscientific bases, this should help extend recent work attempting to examine the neural basis of individual differences in trait EI. We contend that this approach therefore represents a promising complementary assessment approach for future emotional intelligence research.

AUTHOR CONTRIBUTIONS

RS took the lead in the conceptualization and writing of the manuscript. AA and WK aided in developing ideas, providing feedback, editing, and revising the manuscript.

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The Relationship Between Trait Emotional Intelligence and Personality. Is Trait EI Really Anchored Within the Big Five, Big Two and Big One Frameworks?

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Pérez-González and Sánchez-Ruiz (2014) published a study in which they found that trait emotional intelligence can be considered a broad personality trait integrated into the higher levels of a multi-level personality hierarchy. They also came to the conclusion that this construct can be considered a proxy for the general factor of personality. The purpose of this study is to try to replicate their study. We follow the same methodology these authors used but with a new sample, and a different definition of trait emotional intelligence and therefore a different measurement tool. Our results show convergent validity between trait emotional intelligence and personality, but not discriminant validity, suggesting that trait emotional intelligence is not integrated in the higher level of the personality hierarchies, but it is another way to measure the same big five personality traits that traditionally compose the construct of personality. We also found that trait emotional intelligence highly correlated with the general personality factor, but additionally we found an extremely high negative correlation between those two constructs and neuroticism. This finding suggests that they may represent above all just the absence of neuroticism in a person.

Keywords: personality, five factor model, big 5, big 2, stability, plasticity, general factor of personality, trait emotional intelligence

INTRODUCTION

Personality is traditionally studied in terms of human traits, and the most popular classification of personality traits is the well known Big Five (B5) or Five Factor Model (Goldberg, 1981; Costa and McCrae, 1987, 1992). About 20 years ago, because of the use of statistical factor analysis, those B5 traits were grouped in two bigger personality factors (B2; Digman, 1997): one that Digman termed Alpha and that DeYoung et al. (2002) renamed as Stability encompasses the personality traits of agreeableness -A, conscientiousness -C, and neuroticism -N. The second factor that Digman called Beta and DeYoung et al. (2002) termed Plasticity encompasses extroversion -E and openness -O-. De Young and colleagues have been able to find support for the existence of these two-factors in different studies (DeYoung et al., 2002, 2007), and so has done Saucier (2010). Additionally, the model replicates reliably across cultures and languages (Saucier et al., 2014).

Further factor analyses revealed, in other studies, the existence of one general factor of personality (Rushton and Irwing, 2008; van der Linden et al., 2010). Rushton et al. (2008) proposed that this general personality factor (GFP) has evolved over centuries as a result of natural selection. According to this theory, it would be transferred via genetic inheritance, largely reflecting social effectiveness (Rushton, et al., 2008), and would represent an evolutionary adaptive trait with a survival advantage, especially in social situations, to any other personality trait or combination of traits (Figueredo and Rushton, 2009). Research shows that the GFP does in fact transfer genetically (van der Linden et al., 2017), and correlates to an array of positive social outcomes (see van der Linden et al., 2017 for a review). Some authors have argued that the GFP is nothing more than a statistical artifact caused by individuals' tendency to give socially desirable responses. However, van der Linden et al. (2016) showed that while some degree of bias can be expected, the GFP most likely is a real construct.

Another construct has been proposed in the last years as providing an advantage in social situations. It is called emotional intelligence (Mayer et al., 1991). Different authors such as Goleman (1995) and Brackett et al. (2006) directly or indirectly suggest that this construct would be adaptive because it provides abilities particularly useful in situations where an effective way of managing emotions and relationships is more important than the use of brute force in order to achieve goals. This proposition is supported by findings showing that the ability of living creatures to experience emotions allows the organism to respond more adequately to threats in the environment, thus providing an evolutionary advantage (Nesse, 1990; de Waal, 2011). Moreover, Fischman (1993) showed that evolution has favored individuals with the ability to better regulate their brain activity and therefore their thoughts and emotions. Furthermore, Kret et al. (2018) proposed that the ability to recognize emotions in others and adequately yet quickly responding to them is crucial for survival.

Trait Emotional Intelligence

From the very beginning, there has been strong controversy about the definition and nature of emotional intelligence. Lately, there seems to be some agreement among experts that there are two types of emotional intelligence: one termed ability emotional intelligence, which entails a particularly high ability to process emotional information and that is related to, but distinct from cognitive ability. The second, termed trait emotional intelligence (trait EI), is a construct first proposed by Petrides and Furnham (2001). It relates to personality, and represents a combination of personality traits, particularly effective in situations with emotional and social implications.

Over the years, different authors have provided ample evidence of the existence of trait EI, finding relationships with happiness (Petrides and Furnham, 2003; Ye et al., 2018), self-esteem (Ziasma et al., 2015), loneliness (Zou, 2014), and job satisfaction (Platsidou, 2010) among many other positive outcomes.

Moreover, because, trait EI is predicated to be a personality trait including a constellation of emotion-related dispositions and self-perceptions (Petrides et al., 2007b), it was necessary

to show that it correlates with other personality measures. Indeed, research findings have shown relationships between trait emotional intelligence and the B5, and especially between Neuroticism and Extroversion and trait EI (Saklofske et al., 2003; Vernon et al., 2008; Siegling et al., 2015). It also was important to understand which place trait EI occupied within established personality hierarchies to demonstrate its discriminant validity. Petrides et al. (2007b) were able to show that when factor analyzed in conjunction with other personality scales, trait EI appeared as a differentiated factor.

To consider trait EI a valid and important construct, nevertheless, it was also necessary to show that it had the ability to predict outcomes beyond those predicted by other personality constructs. Petrides et al. (2007b) again were able to show the incremental ability of trait EI to predict life satisfaction, rumination, and coping strategies.

In addition, from their own definitions, it made sense to think that the general factor of personality and the construct of trait EI would show a strong overlap. Both are composites of personality traits and both are supposed to be effective in social endeavors. In order to test this possibility further, Pérez-González and Sánchez-Ruiz (2014), in a study with 289 university students, investigated the relation between trait emotional intelligence and the B5 personality traits, the B2, and the Big 1 or General Factor of Personality. They found that, as expected and as found in previous studies (Petrides et al., 2007a, 2010), all five personality traits correlated with trait emotional intelligence. Moreover, using regression analysis, they were able to show that four of the B5 traits were significant predictors of trait EI (all except Agreeableness), and they jointly predicted 57.3% of trait EI variance. Because of those two results, trait EI demonstrated, according to the authors, convergent validity with the B5. Additionally, using exploratory factor analysis, they were able to show that trait EI emerged as a distinct oblique factor under the B5 factor space. That would mean, again according to these authors, that trait EI showed also discriminant validity with respect to the B5.

In terms of the B2, stability is hypothesized to contribute mainly to social and emotional adjustment. Plasticity, on the other hand, would be a facilitator of social learning (Pérez-González and Sánchez-Ruiz, 2014). Those two factors, plasticity and stability have been replicated in several studies (Rushton and Irwing, 2008; Şimşek, 2014; Liu and Campbell, 2017). Pérez-González and Sánchez-Ruiz suggested that trait EI would be more strongly related to Stability. In their study, they were able to confirm this hypothesis. Those results again indicated convergent validity and consistency with the hypothesis previously explained.

Finally, in regards to the general factor of personality (GFP), Pérez-González and Sánchez-Ruiz found a strong correlation between trait EI and the GFP. They also found that the ability of the B5 to predict trait EI was mostly due to those traits included in the GFP. In fact, the GFP correlated more strongly with trait EI than with any of the B5 traits. With all these results, Pérez-González and Sánchez-Ruiz concluded that trait emotional intelligence not only relates to the general factor of personality, but it is a broad personality trait integrated

into multi-level personality hierarchies. They believed that trait emotional intelligence could be considered as a proxy of the General Factor of Personality.

The purpose of this study is to replicate Pérez-Gonzalez and Sánchez Ruiz's study using a new measure of trait EI developed by Pérez-Escoda et al. (2010a), and obtain results that either support or do not support their conclusions. Additionally, the idea of the existence of a superior type of personality that would be more efficient than any other in social situations is a bold proposition and one that definitely needs more research support than it can show as of now. If we can confirm that trait EI can be considered a proxy for GFP, or in other words, that they are basically the same, we would provide support for this thesis. Trait EI has shown already that it is an advantage in social situations (Brackett et al., 2006). Showing that trait EI and the GFP are the same thing would mean that the GFP is also an advantage in social situations, and that would provide support for the thesis that the GFP is a real type of personality that has consolidated over time because it provides an evolutionary advantage.

MATERIALS AND METHODS

Participants

The sample consisted of 497 Spanish university students (86% female) ranging in age from 19 to 64 years old ($M = 29.39$, $SD = 9.28$), and with a level of studies ranging from elementary schooling to doctorates and a mode of undergraduate university studies.

Measures

B5

We measured the B5 factors using a personality questionnaire known as NEO-FFI (Costa and McCrae, 1992), which is a reduced version of the longer NEO Personality Inventory-Revised (NEO PI-R; Costa and McCrae, 1989). The NEO-FFI has demonstrated, according to its authors, high Cronbach reliability coefficients for all scales: Neuroticism (0.86), Extroversion (0.77), Openness (0.73) for, Agreeableness (0.68), and Conscientiousness (0.81). We report the internal consistencies obtained in the current study in parentheses in **Table 1**. The test consists of 60 items and is aimed at young adults and adults with a minimum level of instruction of sixth grade. It can be administered individually or in groups. It uses a Likert type scale with five response options that go from totally disagree to totally agree. We used the Spanish version of the NEO-FFI that has been translated and validated by TEA Ediciones (Cordero et al., 2008).

Trait Emotional Intelligence

We measured Trait emotional intelligence with the Emotional Development Questionnaire for Adults (CDE-A35; Pérez-Escoda and Alegre, in press). This scale is based on Bisquerra and Pérez Escoda (2007) trait EI definition as the set of knowledge, skills, abilities and attitudes necessary to understand, express and regulate emotional phenomena appropriately. It consists of 35 items, rated on a 10-point Likert scale, and it covers five distinct dimensions, namely Emotional Awareness, Emotional Regulation, Emotional Autonomy, Social Competence, and

Life and Well-being abilities. The scale also provides a total trait EI score. The CDE-A35 is particularly adapted to the Spanish language and culture, which made it the best choice for our sample.

Pérez-Escoda and Alegre validated this instrument with a sample of more than 3000 respondents. They were either graduate students or participants in diverse emotional competence workshops offered in different parts of Spain. The age of the participants ranged from 18 to 67 years with an average of 35.28 ($SD = 11.27$). In their study, they report good reliability for all the scales (Social skills = 0.66, Autonomy = 0.74, Life and well-being competencies = 0.82, Emotional awareness = 0.80, Emotional regulation = 0.78, and total trait EI = 0.92). They also report positive correlations with others measures of emotional intelligence or close constructs. For instance, the correlation with the constructive thinking coefficient or PGC measured with the Constructive Thinking Questionnaire (CTI; Cordero, 2001) was $r = 0.82$. The correlation with a social skills coefficient measured with the *Escala de habilidades sociales* (Social Skills Scale) (Gismero, 2000) was $r = 0.66$. Finally, the correlation with the emotional intelligence coefficient measured with the Spanish version of the Trait Meta-Mood Scale (Fernandez-Berrocal et al., 2004) was 0.39. Although this last correlation is not as high as the previous two, it is very similar to the correlation ($r = 0.43$) that Brackett and Mayer (2003) found between the SREIT (Schutte et al., 1998) and the EQ-I (Bar-On, 1997), two measures of trait emotional intelligence that are well established. Therefore, those results showed strong evidence of convergent validity. In addition, the measure showed predictive and incremental validity when the B5 personality traits, and the CDE-A35 coefficient were regressed on life satisfaction. Furthermore, a previous version of the same questionnaire also showed good reliability (Pérez-Escoda et al., 2010a), and validity (Pérez Escoda et al., 2010b). In the current study, the internal consistencies of the CDE-A35 scales were $\alpha = 0.63$ for Social Skills, 0.80 for Life and Well-being competencies, 0.79 for Emotional regulation, 0.78 for Emotional Awareness, 0.77 for Autonomy and 0.90 for trait EI (global score).

Demographic Information

A brief questionnaire with only three questions collected information of the participants' age, gender, and level of studies. The level of studies ranged from 1 = basic studies to 9 = Post-doctoral studies.

Procedure

Students signed a consent form indicating their voluntary participation in the study. We collected the data during class time. Testing sessions lasted about a half hour.

RESULTS

The Location of Trait EI in the B5 Factor Space

Moderate to high correlations were found between trait EI and the B5 (see **Table 1**); the highest correlation with Neuroticism ($r = -0.68$) and the lowest with Openness ($r = 0.26$). The

TABLE 1 | Inter-correlations among TEI, the B5, the B2, and the GFP.

	GPF	Stability	Plasticity	O	C	E	A	N	Total EI
GPF (0.88)	1								
Stability (0.87)	0.783**	1							
Plasticity (0.82)	0.423**	0.189**	1						
Openness (0.77)	0.092*	0.083	0.786**	1					
Conscientiousness (0.80)	0.675**	0.838**	0.093*	0.015	1				
Extraversion (0.82)	0.573**	0.215**	0.791**	0.244**	0.130**	1			
Agreeableness (0.69)	0.511**	0.752**	0.209**	0.135**	0.276**	0.194**	1		
Neuroticism (0.86)	−0.855**	−0.532**	−0.200**	0.017	−0.417**	−0.330**	−0.343**	1	
Total emotional intelligence (0.89)	0.730**	0.521**	0.461**	0.257**	0.396**	0.468**	0.389**	−0.678**	1

N = 497. GPF = General Personality Factor, O = Openness, C = Conscientiousness, E = Extraversion, A = Agreeableness, N = Neuroticism, Total EI = Emotional Intelligence total coefficient. **Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed).

TABLE 2 | Multiple regression of trait EI onto the B5 and trait EI onto the B2.

Section model		Unstandardized coefficients		Standardized coefficients	<i>t</i>
		B	Std. Error	Beta	
1	(Constant)	4.422	0.331		13.357
	Neuroticism	−0.065	0.004	−0.527**	−15.323
	Extraversion	0.032	0.005	0.210**	6.635
	Openness	0.030	0.005	0.198**	6.600
	Agreeableness	0.021	0.006	0.108**	3.453
	Conscientiousness	0.018	0.005	0.116**	3.627
	(Constant)	0.854	0.296		2.882
2	Stability	0.047	0.004	0.450**	12.749
	Plasticity	0.036	0.003	0.376**	10.645

N = 497, ***p* < 0.01.

mean inter-correlation between the global trait EI and the B5 was $r = 0.44$.

We carried out a multiple regression analysis with trait EI as the criterion variable and the B5 as predictors. We depict these results in **Table 2** (see section “Introduction”). All the B5 traits were significant predictors of trait EI, and they jointly predicted 59.1% of its variance. All VIF values were below 1.5 showing that there were no multicollinearity issues.

We ran a principal axis factoring exploratory factor analysis of the five NEO-PI-R scales and the five CDE-A35 dimensions using Oblimin (delta = 0) rotation. Based on the examination of the Eigenvalues greater than 1, and the scree plot, the results offered a three-factor solution (see **Table 3**). As opposed to the results that reported Pérez-González and Sánchez-Ruiz, in our study, Trait EI did not emerge as a distinct oblique factor under the B5 factor space. On the contrary, different EI dimensions appeared associated with different personality factors. Life and well-being skills, autonomy, and social skills loaded in the first factor with neuroticism. Emotional awareness loaded in the second factor with extroversion. Agreeableness, conscientiousness, and emotional regulation loaded together in the third factor. Results were very similar using Promax (kappa = 4) rotation. In both analyses, the results indicate that emotional intelligence is not a distinct and unique factor within the B5 factor space, but rather

that it represents a different way of measuring the same personality construct.

Trait EI and the B2

We first investigated the existence of higher-order factors in the B5 latent space. The five NEO-FFI scales were again subjected to principal component analysis (PCA) using Oblimin (delta = 0) rotation (see **Table 4**) in which the Eigenvalues and the analysis of scree plot showed a two factor solution. Those two factors were clearly (eigenvalues > 1), equivalent to the Alpha/Stability (C, A, and N loadings) and Beta/Plasticity super-factors (O and E loadings) mentioned before. These two super-factors (B2) explained 60.48% of the variance, with Alpha/Stability explaining a higher percentage than Beta/Plasticity. We computed the Alpha and the Beta coefficients by adding the raw scores of all the items integrating each of the dimensions. Both coefficients correlated positively ($r = 0.19$, $p < 0.01$).

As observed in **Table 1**, the correlation between trait EI and Alpha/Stability ($r = 0.52$) was higher than the correlation between trait EI and Beta/Plasticity ($r = 0.46$). The B2 explained a substantial 41% of the variance in Trait EI, with Alpha/Stability as the strongest predictor (**Table 2**, see section “Materials and Methods”).

When we correlated the five trait EI competencies with Stability and Plasticity we found that Emotional Regulation,

TABLE 3 | Combined factor analysis of trait EI and B5 dimensions.

	Components		
	1	2	3
Competencies for life and wellbeing	0.801		
Neuroticism	−0.768		
Autonomy	0.767		
Social skills	0.762		
Extroversion	0.653		
Openness		0.813	
Emotional awareness		0.679	
Emotional regulation			0.786
Agreeableness			0.734
Conscientiousness			0.710

Método de extracción: Análisis de componentes principales. Metodo de rotación: Normalización Oblimin con Kaiser.

TABLE 4 | EFA results showing factor loadings for the B2 and the GFP.

	B2		GFP	
	Stability	Plasticity	NEO-FFI	NEOFFI + TEI
Variance explained	−37.94	22.54	37.94	39.46
N	−0.822		0.775	0.778
C	0.749		0.657	0.513
A	0.636		0.666	0.511
O		0.852	0.259	0.285
E		0.687	0.595	0.576
Well-being and life skills				0.791
Emotional regulation				0.715
Autonomy				0.697
Social skills				0.679
Emotional awareness				0.562

Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization.

Life and Well-being competencies, and Autonomy related more strongly to Stability than to Plasticity, while Emotional Awareness and Social Skills correlated more strongly to Plasticity.

Trait EI and the Big One

To identify the general personality factor, we retain one unique unrotated general component (GFP). The correlation between trait EI and the GFP was $r = 0.73$, which was higher than the correlations between the GFP and the B5 from which it was extracted except for Neuroticism. It was also a little higher than the correlation obtained by Pérez-González and Sánchez-Ruiz between those two variables ($r = 0.69$).

Following Van der Linden et al. (2012), we also performed a hierarchical regression analysis including trait EI as criterion, the GFP as predictor entered in step 1, and the individual B5 scales (O, C, E, A, and N) as predictors entered in step 2. Multicollinearity analysis showed there was a problem with Neuroticism and the Big 1. Therefore, we removed neuroticism from the regression equation and conducted a new analysis. The GFP in step 1 explained a substantial 53.2% of the variance in

trait EI [$R^2_{adj}:53.2$, $F(1,495) = 563.77$, $p < 0.001$]. Concerning the total unique variance of the B5 scale scores in step 2, they explained an additional 5% of trait EI variance [$R^2_{adj}:58$, $F(5,495) = 138.26$, $p < 0.001$].

We conducted another single-factor PCA using Oblimin (delta = 0) rotation, whereby again the five NEO-FFI scales were combined together with the five CDE-A35 factors (see Table 4), but on this occasion we forced an unrotated one-factor solution. The loadings of the B5 on this factor ranged from 0.29 to 0.78, while those of trait EI ranged from 0.56 to 0.79. Similarly to Pérez-González results and others (see Rushton et al., 2009; Veselka et al., 2009a,b; McIntyre, 2010), the highest factor loadings on GFP corresponded to the five trait EI factors and N. However, in our case, E was also among the highest loadings, leaving C, A, and especially O as less important.

DISCUSSION

The goal of our study was to replicate the research carried out by Pérez-González and Sánchez-Ruiz (2014) on the relationship between trait emotional intelligence and the B5, the B2 and the B1 (or GFP) personality traits. In the aforementioned work, two types of evidence demonstrated the convergent validity of trait emotional intelligence. First, the five personality components correlated with trait EI, and second, each of the B5 personality traits predicted trait EI except for agreeableness, with a shared variance of 57%. In the current study, the B5 personality traits also correlated with trait EI, and they predicted it. In our case, even agreeableness contributed significantly in this prediction, and the B5 shared 63% of the variance with this variable. Therefore, we can say that our study confirms the convergent validity of the B5 in relation to trait EI.

Pérez-González and Sánchez-Ruiz (2014) based on a factorial analysis showed that the dimensions of trait EI emerged as an oblique and different factor from the five great factors of the personality. This result supported the thesis of discriminant validity between the B5 personality traits and trait EI. However, in our study, this separation of the dimensions of emotional intelligence in a factor other than the factors corresponding to the B5 did not occur. Quite the contrary, the factor analysis showed three factors, and all the emotional intelligence dimensions fell into different factors mixed with personality traits. These differences between the results seem to indicate that trait EI does not measure a different dimension of the personality, but measures the same personality construct determined by the B5. There may be two alternative explanations to this discrepancy. On the one hand, the difference between our results and those obtained by Pérez-González and Sánchez-Ruiz (2014) may be the consequence of our use of a different theoretical framework of trait emotional intelligence, and a different measuring instrument. Pérez-González and Sánchez-Ruiz (2014) based their study on the definition of emotional intelligence by Petrides and Furnham (2001), and used a measure of trait EI, the TEIQue, that offered four dimensions of emotional intelligence: well-being, emotionality, sociability and self-control. We based

our study on the Bisquerra and Pérez Escoda, 2007 theoretical framework, and we used a measure of trait EI that offers five dimensions: emotional awareness, emotional regulation, social competence, emotional autonomy and competence for life and well-being. These data seem to indicate that the five emotional dimensions measured by the CDE-A35 coincide more strongly with the five major personality traits than the four dimensions measured by the TEIQue.

On the other hand, Oltmanns and Widiger (2018) found that when a large number of specific and highly correlated scales measuring a narrowly defined variant of one of the B5 domains are included in a factor analysis, they may separate from that the five main domains, appearing to be a separate construct. However, this separated factor is an artifact of the analysis, and in fact, it may just simply be part of that domain of the B5. This is what Cattell and Tsujioka (1964) called a “bloated specific factor.” That would be the case on Pérez-González’s study where trait EI was measured with many, probably highly correlated, scales. On the other hand, in our study where only a few scales measured trait EI, this bloated factor did not appear. New research should clarify if this is a problem of the construct of trait emotional intelligence, if it is a problem reduced exclusively to the way it is defined by Bisquerra and Pérez Escoda (2007), or if it is due to flaw on the statistics analysis performed by Pérez-González.

Another aspect of the study by Pérez-González and Sánchez-Ruiz (2014) was the identification of the B2 personality traits called Stability and Plasticity. Our study also identified these two broad traits, and as in the study by Pérez-González and Sánchez-Ruiz (2014), Stability was composed of the traits of Agreeableness, Conscientiousness and Neuroticism, while Plasticity grouped the traits of Extroversion and Openness. In our study, these two major traits also correlated with trait EI, and Stability was again the trait that shared the most variance with trait EI.

Pérez-González and Sánchez-Ruiz (2014) argued that trait EI and Stability have a greater correlation because both represent an intelligence of intrapersonal type, which in the case of the TEIQue rests in facets such as intrapersonal emotion regulation, stress management, self-esteem, and self-motivation. In the case of trait EI measured by the CDE-A35, the intrapersonal and interpersonal facets are combined in some of its dimensions. For instance, Emotional Awareness includes awareness of one’s own emotions as well as awareness of the emotions of others, and Competencies for Life and Well-being include the ability to adopt appropriate and responsible behaviors for the solution of personal problems, as well as satisfaction with oneself and with life. With the exception of Social Skills, which includes only interpersonal skills, in each of the other dimensions, those of an intrapersonal type, acquire a greater preponderance. For instance, Emotional Regulation includes awareness of the relationship between emotion, cognition and behavior, as well as the ability to self-generate emotions, and Autonomy includes facets such as self-esteem, positive attitude in life, responsibility, as well as personal self-efficacy all of which are of an intrapersonal nature.

Finally, in relation to the General Factor of Personality, the exploratory factor analysis also offered a single factor obtained without rotation, similar to that found by Pérez-González and Sánchez-Ruiz (2014). This GFP correlated strongly with

trait EI confirming the findings of these authors. In fact, in our study, the correlation between these two variables was higher than that obtained by Pérez-González and Sánchez-Ruiz (2014). Additionally, similarly to their study, trait EI showed a correlation with the GFP higher than that shown by four of the B5 personality traits, a result that reinforces their thesis that trait EI can be considered a proxy of the GFP. In this sense, previous authors had proposed that trait EI would be the culmination of the GFP (Rushton and Irwing, 2011, p. 146), and the results mentioned would seem to confirm this hypothesis. However, the lack of discriminant validity between trait EI and the B5 introduces doubts about whether trait EI is a combination of personality traits at the highest level of the hierarchy of personality traits, or on the contrary, it is a new way of naming and grouping well known personality traits.

In addition, an unexpected result of our study is that the correlation between neuroticism and the GFP is so high (-0.86) that suggests that the GFP is basically the absence of neurotic tendencies. The high correlation between trait EI and neuroticism (-0.68) would seem to indicate that this phenomenon also applies to this construct. That is, based on our results, it could be interpreted that trait EI is indeed a proxy of the GFP, but that both more than a higher level of personality, represent an almost total absence of neurotic tendencies. These results resemble those obtained by other authors such as: Petrides and Furnham (2003); Freudenthaler et al. (2008), and van der Linden et al. (2017) who found very high correlations between trait EI and neuroticism ($r = -0.73$, of -0.76 and -0.58 , respectively). van der Linden et al. (2018) also found neuroticism to load heavily on the GFP (-0.83), while the other four traits loaded much lower. Oltmanns et al. (2018) offer an explanation for this results. In a study with 1,630 adults from a community sample, they found very high correlations between the general factors of psychopathology (p factor), personality, (GFP), and personality disorder (g-PD). They concluded that the GFP overlap with the other two variables indicates that the GFP is an inverted measure of general life impairment. Based on this interpretation, it does make sense that in our study neuroticism, which is also a measure of some type of life impairment, shows a high correlation with the GFP.

On the other hand, and in apparent contradiction with the previous comment, among the dimensions of trait EI, the Life and Well-being competencies showed the greatest factorial weight. This is a very similar result to that of Pérez-González and Sánchez-Ruiz (2014) in whose study the dimension with the greatest factorial weight in the GFP was the so-called well-being. It seems that the competence of people to develop the behaviors and thoughts that allow them to experience well-being in their lives is at the core of a higher level of personality and of emotional intelligence. In a way, it seems to reinforce Maslow’s (1943) thesis that places self-realization at the top of the hierarchy of human needs, bringing the most satisfaction and well-being to the person. Moreover, this double finding raises the possibility that at the higher level of self-realization of the person is the ability to stop experiencing anxiety and anguish, and to enjoy

the challenges and opportunities that every human being faces throughout of their life.

Pérez-González and Sánchez-Ruiz (2014) recommended in their article that future research explored the convergent and discriminant validity of emotional intelligence in relation to the personality traits proposed by different personality theories. This is a recommendation that we support. Nevertheless, we have done exactly the opposite in this study, that is, we have investigated whether an alternative model of trait emotional intelligence (in our case, the theoretical framework proposed by Bisquerra and Pérez Escoda, 2007) would present similar relationships with the same model of personality used by Pérez-González and Sánchez-Ruiz [and defined by Costa and McCrae (1992)]. It would be equally useful in the process of clarifying the relationships between emotional intelligence and personality to replicate this study using alternative definitions of both personality and emotional intelligence.

It should be noted that our study is not without limitations. In the first place, we obtained the information exclusively through questionnaires, all of them answered by the same respondents. This methodology tends to artificially increase the correlations between variables. However, in our case, the correlations are so high that they clearly outweigh the effect of this methodological limitation. In another aspect, the trait EI questionnaire used by Pérez-González and Sánchez-Ruiz (2014) measured 15 facets that were then grouped into four dimensions. This allowed them some analyses on the facets that were most related to the different groups of the most complete personality traits. In our case, the questionnaire measures only five dimensions of trait EI, but does not offer separate measures of the facets that make up each of these dimensions. Consequently, the analyses carried out in our study are more limited in their amplitude. In addition, the original study assessed the B5 with the NEO-PI-R and trait EI with the TEI-Que, while the present study assessed the B5 with the NEO-FFI (the short version of the NEO-PI-R that does not allow calculating facets) and trait EI with the CDE-A35. The use of different measurement tools was necessary because of time constraints, but it may have affected the results obtained.

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In short, our study aimed to replicate and confirm the results obtained by Pérez-González and Sánchez-Ruiz (2014) that placed trait EI as a proxy of the general factor of personality. Our results confirm the findings in their study about the convergent validity of the B5 in relation to trait EI. However, they do not support their finding about the discriminant validity between the B5 and trait EI. On the contrary, our results indicate that trait EI is just another way to measure the same personality construct that the B5 measure. They confirm Pérez-González and Sánchez-Ruiz's finding about the relation between trait EI and the B2, and show how much trait EI overlaps with stability. They also confirm their conclusion that trait EI can be considered a proxy of the GFP. Since trait EI is supposed to provide an advantage in our adaptation and survival, the GFP should be considered a combination of personality traits (or a type of personality) that also provide an adaptive advantage over other personality dimensions or combination of dimensions. However, our results point to the possibility that both the GFP and trait EI are mainly indicators of the absence of neuroticism in people and of their ability to enjoy life.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the University of Barcelona with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the University of Barcelona.

AUTHOR CONTRIBUTIONS

AA, NP-E, and EL-C have contributed equally to this manuscript. AA has developed the statistical analysis, the tables, and the conclusion. NP-E has developed the fieldwork, the collection of data, the processing of the data, and the review of the final version of the article. EL-C has developed the literature review, the search for references, the writing of the references, and the writing of the article.

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Relations Between Dimensions of Emotional Intelligence, Specific Aspects of Empathy, and Non-verbal Sensitivity

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In this work, on the one hand, we examined the relationship between emotional intelligence (EI) and empathy and, on the other, the relationship between EI and non-verbal sensitivity, through two independent studies. The first study analyzed the relationship between dimensions of EI and aspects of empathy, in a sample of 856 participants who completed two measures of EI, the trait meta-mood scale (TMMS) and the trait emotional intelligence questionnaire (TEIQue), and a measure of empathy, the interpersonal reactivity index (IRI). The results showed a similar pattern of significant positive relations in all the EI domains with empathic perspective-taking (PT), and significant negative relationships with empathic personal distress (PD), except for the EI domain of attention, which had a positive relationship. Stepwise multiple regression analyses showed that the dimension that best predicted empathic PT and empathic concern (EC) was the emotionality factor; whereas attention best predicted empathic fantasy; and the self-control factor best predicted PD, although negatively. Gender emerged as a predictor of three empathic aspects, fantasy, EC, and PD, with women obtaining higher scores than men in all of them. Age was the only predictor of fantasy, with a negative relationship. The second study involved 646 people who completed the same measures of EI as the participants of the first study and the mini-profile of non-verbal sensitivity (Mini-PONS). The results showed some significant relationships between EI dimensions and the channels and quadrants of the MiniPONS. Stepwise multiple regression analyses showed that very few EI dimensions predicted non-verbal sensitivity, with attention obtaining the best result. Both gender and age emerged as predictors, some in unique cases, of channels, quadrants, and of the total score of non-verbal sensitivity; age had a negative relationship, and women obtained higher scores than men.

Keywords: trait emotional intelligence, empathy, affective empathy, cognitive empathy, non-verbal sensitivity, age differences, gender differences

INTRODUCTION

Emotional intelligence (EI) is a multidimensional construct, “researchers refer to EI as a set of abilities or perceptions concerning the way individuals identify, make use of, deal with, and process emotions” (Andrei et al., 2016, p. 361).

The most widely recognized EI theoretical frameworks are the ability (Salovey and Mayer, 1990; Mayer and Salovey, 1997) and the trait models (Bar-On, 1997; Petrides and Furnham, 2001). The ability approaches which examine relatively discrete mental abilities that process emotional information (Mayer et al., 2008), and trait EI or trait emotional self-efficacy approaches where trait EI refers to a constellation of emotional self-perceptions located at the lower levels of personality hierarchies (Petrides et al., 2007a; see Zeidner et al., 2008, for a review of differences between the trait and ability EI frameworks). “Essentially, it concerns people’s perceptions of their emotional abilities, comprehensively encompassing the affective aspects of personality” (Andrei et al., 2016, p. 262).

Although EI has received different operationalizations, there is a broad consensus that it can be divided into two general streams: maximum performance tests, which assess actual levels of EI performance (ability EI), and self-report questionnaires, which reflect typical EI functioning (trait EI or emotional self-efficacy) (Pérez et al., 2005; Siegling et al., 2014; Fernández-Abascal and Martín-Díaz, 2015).

Andrei et al. (2016, p. 261) indicate that, “although distinct constructs, ability and trait EI are not mutually exclusive, and their bifurcation is now widely recognized within the scientific literature.”

“Although there is some divergence amongst EI researchers on the best model for EI, there is agreement that it covers the ways in which people differ in their emotional capabilities, both in the intrapersonal (mood regulation, stress management, and perceiving one’s own emotions) and interpersonal (social skills, perceiving others’ emotions) domains” (Austin et al., 2007, p. 685).

Empathy is a complex multidimensional concept (Davis, 1980). “There are probably nearly as many definitions of empathy as people working on the topic” (De Vignemont and Singer, 2006, p. 435), and a range of definitions used (e.g., see Batson, 2009, for a review of empathy definitions used). Empathy is broadly defined as the capacity to imagine, experience, and understand what another person is feeling (Gilet et al., 2013).

“The term empathy is used to refer to two related, yet different human abilities: mental perspective taking (cognitive empathy) and the vicarious sharing of emotion (affective empathy)” (Barlińska et al., 2018, p. 2).

In practice, empathy is defined by two major types, affective and cognitive, and is typically conceptualized as “a two-component model integrating both an affective and a cognitive dimension” (Braun et al., 2015, p. 736).

Empathy refers to a phenomenon that “requires both the ability to share the emotional experience of the other person (affective component) and an understanding of the other person’s experience (cognitive component)” (Decety and Jackson, 2004, p. 73).

“Affective empathy is the extent to which one feels what another person is feeling, and cognitive empathy is the extent to which one infers the thoughts, intentions, and feelings of another person” (Olderbak and Wilhelm, 2017, p. 1093).

Emotional intelligence and empathy are related but distinct constructs. There are similarities between some of their key concepts, “for example, Petrides and Furnham (2001) have identified the emotional management of others, emotion perception, relationship skills, social competence, and trait empathy as key components of EI” (Muncer and Ling, 2006, p. 1118). Austin et al. (2007) point out that empathy overlaps with interpersonal EI and covers the ability to be aware of and understand another person’s feelings.

From the perspective of Mayer and Salovey (1997), it is considered that emotionally intelligent people can not only better perceive, understand, and manage their own emotions, but are also more skilled at extrapolating these abilities of perception, understanding, and managing to the emotions of others.

Petrides et al. (2004) stated that most models of trait EI use aspects of affect-related functioning such as emotion awareness, empathy, and relationship skills to assess EI.

When examining the relationship between emotion perception and empathy Olderbak and Wilhelm (2017) point out that “there are three categories of theories positing a relation between emotion perception and empathy” (Olderbak and Wilhelm, 2017, p. 1094), and each one proposes a positive relation between the constructs (see Olderbak and Wilhelm, 2017, for a detailed description of the three categories of theories). “The first category proposes a within-subject process where emotion perception leads to affective and/or cognitive empathy... The second category includes theories that propose that emotion perception and empathy are lower-order factors of a single higher-order EI factor, implying a between-subject organization... The third category includes theories that propose emotion perception as a lower-order factor of EI and empathy, while related with emotion perception and its relevant higher-order constructs, is a construct distinct from EI” (Olderbak and Wilhelm, 2017, pp. 1094–1095).

The concept of non-verbal sensitivity is related to the concepts of EI and empathy. Riggio and Darioly (2016) point out that “Non-verbal sensitivity refers to the ability of individuals to read and decode non-verbal cues in others and, importantly, the ability to correctly interpret the meaning of those cues” (p. 589).

Non-verbal sensitivity toward others’ affective communication is a major part of EI. Bänziger et al. (2011a) indicate that “a central component of such competence is to correctly infer the complex affective states that individuals experience and communicate in specific social situations, which include fairly standardized communicative actions like requesting, commanding, scolding, pleading, etc.” (Bänziger et al., 2011a, p. 202).

In several models of EI, the accurate interpretation of non-verbal emotional information is considered to be a precondition for successfully understanding and managing others’ emotions, thus facilitating interpersonal communication and individual goal attainment (Schlegel et al., 2017).

Besides “recognizing emotion cues, both verbal and non-verbal, another important factor in empathic communication” (Blanch-Hartigan, 2011, p. 370). “It is assumed that non-verbal sensitivity is an important contributor to the concept of empathy, with the ability to read others’ emotions being critical for empathic understanding” (Riggio and Darioly, 2016, p. 589).

In the existing literature, many studies highlight the relationship among the constructs of EI, empathy, and non-verbal sensitivity to a greater or lesser extent but the investigations that have analyzed these relations have generally not differentiated between dimensions of the same construct. Also, in most cases, they have used a single score of either EI or empathy.

It is necessary therefore to analyze the relationship between the different dimensions of EI and the many aspects of non-verbal sensitivity and empathy, as well as the contribution of the EI dimensions to aspects of empathy and non-verbal sensitivity, leading to a better understanding of the interrelationships between these constructs.

The Present Research

The present study was designed to provide more information about the relationship between EI and empathy, on the one hand, and EI and non-verbal sensitivity, on the other hand. The main objective is to define the specific dimensions of EI that best predict aspects of empathy and various aspects of non-verbal sensitivity.

Regarding the scales designed to evaluate EI, as indicated by Martins et al. (2010) in their meta-analysis and by Baudry et al. (2018) in their review, two types of measures co-exist, which represent the “narrow” and the “comprehensive” models.

“The measure of narrow models is generally based on the trait meta-mood scale (TMMS; Salovey et al., 1995) and the emotional intelligence scale (EIS; Schutte et al., 1998). These scales assess the perception of individuals about their current level of emotional competences” (Baudry et al., 2018, p. 207).

“The comprehensive models are examined by scales based on emotional competences as well as emotion-related personality traits (e.g., general mood, optimism, and well-being) with the emotional quotient inventory (EQ-I; Bar-On, 2006) and the trait emotional intelligence questionnaire (TEIQue; Petrides, 2009a). These scales assess the perception of individuals about their emotion-related personality characteristics or personal disposition (Baudry et al., 2018, p. 207).

As indicated by Martins et al. (2010), the TMMS and the TEIQue are two of the most frequently used measures.

The TMMS is based on Salovey and Mayer’s (1990) EI model. This self-report measure evaluates a “reasonable operationalization of aspects of EI” (Salovey et al., 1995, p. 147). This instrument provides an index of what researchers have called a proxy for perceived EI (PEI) (Salovey et al., 2002; Extremera and Fernández-Berrocal, 2005; Paek, 2006; Fernández-Berrocal and Extremera, 2008).

The TEIQue provides an operationalization for Petrides’s model (Petrides and Furnham, 2001; Petrides et al., 2007a). The construct seems to encompass two kinds of variance, a portion that is scattered across the higher-order dimensions of established

personality taxonomies and a portion of variance that lies outside these dimensions (Petrides et al., 2007a). These two scales do not examine the same underlying dimensions of and mechanisms involved in EI (Baudry et al., 2018).

Several self-report measures have been developed to assess empathy (for a review, see Pedersen, 2009) but, currently, the interpersonal reactivity index (IRI), an individual difference measure of empathy based on such a multidimensional approach and developed by Davis (1980) is one of the most commonly used self-report questionnaires to assess empathic tendencies in adults (Gilet et al., 2013). “Rather than treating empathy as a simple unipolar construct, the rationale underlying the IRI is that empathy can best be considered as a set of constructs, related in that they all concern responsivity to others but are also clearly discriminable from each other” (Davis, 1983, p. 113). Davis (1980) instrument acquires special relevance and usefulness to assess empathy from a multidimensional perspective that includes both cognitive and emotional factors. The most outstanding feature of this instrument is that it measures both the cognitive aspect and the individual’s emotional reaction when adopting an empathetic attitude.

Some tests that collect static and video-taped visual stimuli have been developed to evaluate non-verbal emotional sensitivity, as well as prosodic tests. One of the most widely used and best known measures of the individual capacity to decode non-verbal behavior is the profile of non-verbal sensitivity (PONS) of Rosenthal et al. (1979), which was developed for assessing individual differences in the ability to recognize emotions and interpersonal attitudes, and to communicate intentions through various non-verbal expressive channels.

Bänziger et al. (2011a) developed a reduced version of the mini profile of non-verbal sensitivity (MiniPONS), which retains most of the non-verbal expressive channels (and their combination) of the original test in order to gather the broad variety of skills to decode emotional expression.

Taking into account that EI includes intrapersonal and interpersonal domains, and that the measures usually evaluate a number of subcomponents of EI, as well as combining them into an overall score, for our two studies, we selected the two most commonly used measures of EI that assess different EI domains and thus encompass the greatest possible number of EI domains. These measures are the TMMS and the TEIQue.

The measure of empathy selected for the present study was the IRI, and to evaluate non-verbal sensitivity in the second study, we selected mini profile of non-verbal sensitivity (MiniPONS).

This work has two main objectives. In the first study, the goal was to determine the dimensions of EI that predict different aspects of empathy; in the second study, to determine the EI dimensions that predict various aspects of non-verbal sensitivity.

In the first study, we hypothesized that only a few dimensions of EI would predict the evaluated aspects of empathy. However, in the second study we hypothesized that the few dimensions of EI that predict aspects of non-verbal sensitivity will be different from the predictive dimensions of the aspects of empathy evaluated in the first study.

STUDY 1

Materials and Methods

Participants and Procedure

Participants were 856 undergraduate students, with a mean age of 33.62 years ($SD = 10.46$), and age ranging between 18 and 67 years. There were 185 (21.6%) men in the sample, mean age 36.96 years ($SD = 11.17$), age range between 18 and 67 years, and 671 (78.4%) women, mean age 32.70 years ($SD = 10.07$), age range between 18 and 62 years.

These people were recruited in the National University of Distance Education (UNED), and volunteered to take part in this study. They were not rewarded for taking part in the study. Due to the characteristics of the National University of Distance Education (UNED), the participants are representative of the general population, they study and work, practice different professions, live in urban and rural environments, and have a very wide age range.

All subjects gave written informed consent to participate in the study. This study followed the Declaration of Helsinki and ethical guidelines. The study protocol was approved by the Bioethics Committee of the Faculty of Psychology of the National University of Distance Education.

Measures

Trait EI measures

Trait meta-mood scale (TMMS; Salovey et al., 1995). The TMMS was designed to assess the way people reflect on their moods, and thus, it was conceived as an index of perceived EI (Salovey et al., 2002). The TMMS “has been widely used as a measure for assessing stable individual differences in people’s beliefs to attend to, discriminate and regulate their moods, and emotions” (Extremera et al., 2011, p. 510).

The scale has three factors that provide three subscale scores: attention or attention to feelings, clarity or clarity of feelings, and repair or mood repair.

Attention or attention to feelings, evaluates the amount of attention paid to one’s emotional states, perceived ability to attend to moods and emotions. Clarity or clarity of feelings, refers to understanding one’s emotional states, perceived ability to understand and discriminate between different moods and emotions. Repair or Mood Repair, relating to the ability to regulate one’s emotional states, perceived ability to maintain positive, and repair negative moods and emotions (Salovey et al., 1995).

We used the validated Spanish shorter version of the TMMS (see Fernández-Berrocá et al., 2004), which includes 24 items from the original version, this version has shown acceptable internal consistency and satisfactory test–retest reliability (Fernández-Berrocá et al., 2004).

The final Spanish version consists of three subscales with 8 items for each subscale. Participants rate the extent to which they agree with each item on a 5-point Likert-type scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Trait emotional intelligence questionnaire (TEIQue; Petrides and Furnham, 2003; Petrides, 2009a,b). The TEIQue

comprehensively covers the sampling domain of trait EI (Petrides et al., 2011). We used the most recent version of this questionnaire, the TEIQue v 1.50 (Petrides, 2009b). This version consists of 153 items (rated on a 7-point Likert scale) and encompasses 13 facets, organized in four factors: well-being, self-control, emotionality, and sociability. Two additional facets (adaptability and self-motivation) contribute directly to the Global Trait EI score.

The well-being factor, pertaining to dispositional mood, refers to a generalized sense of well-being extending from past achievements to future expectations. The emotionality factor, reflects the ability to identify and express feelings and emotions, and to use these faculties to maintain close relationships with significant others. The sociability factor, interpersonal utilization and management of emotions, regarding the capacity to assert oneself as well as to influence others’ emotions and decisions. The self-control factor, concerning the ability to regulate one’s impulses and emotions, as well as to manage external pressures and stress (Petrides and Furnham, 2003; Petrides, 2009b).

The well-being factor includes the facets of self-esteem, trait happiness, and trait optimism. The emotionality factor includes the facets of emotion perception (self and others), emotion expression, trait empathy, and relationships. The sociability factor includes the facets of social awareness, emotion management (others), and assertiveness. The self-control factor includes the facets of emotion regulation, stress management, and impulsiveness (low).

In the 1.50 version of the TEIQue, participants rate their degree of agreement with each item on a 7-point Likert-type scale ranging from 1 (*Completely disagree*) to 7 (*Completely agree*).

The instrument has shown excellent psychometric properties in several studies (Mikolajczak et al., 2007; Freudenthaler et al., 2008; Jolic-Marjanovic and Altaras-Dimitrijevic, 2014). “The solid psychometric basis of the TEIQue instruments is reflected in the cross-cultural stability of its four-factor structure, which has been replicated in several languages” (see Andrei et al., 2016, p. 262).

Empathy measure

Interpersonal reactivity index (IRI, Davis, 1980, 1983). This index is based on a multidimensional approach. “The rationale underlying the IRI is that empathy can best be considered as a set of constructs, related in that they all concern responsiveness to others but are also clearly discriminable from each other” (Davis, 1983, p. 113). The IRI “acknowledges that empathy is composed of separate but related cognitive and affective components” (Young Kaelber and Schwartz, 2014, p. 279). The IRI contains 28 total items, with two cognitive and two emotional scales. Items are presented in randomized order using a 5-point Likert-type scale ranging from 0 (*Does not describe me*) to 4 (*Describes me very well*).

The two cognitive scales are perspective-taking (PT), which assesses the tendency to adopt the point of view of other people in everyday life, the ability to understand another person’s point of view; and fantasy (FS), which assesses the tendency to transpose oneself into the feelings and actions of fictitious characters in books, movies, and plays; that is, the person’s imaginative capacity

to place him- or herself in fictitious situations. The two emotional scales are empathic concern (EC), which assesses the tendency to experience feelings of warmth, compassion, and concern for other people; and personal distress (PD), which assesses typical emotional reactions, but rather than other-oriented feelings of concern, it taps one's own feelings of personal unease and discomfort in reaction to the emotions of others (Davis, 1983), measuring feelings of fear, apprehension, and discomfort at witnessing the negative experiences of others.

Each scale contains 7 items that are summed to create a total score for each scale which ranges from 0 to 28 points, with higher scores indicating greater empathy.

The IRI has good psychometric properties (Davis, 1980, 1983) and has been widely used in a variety of populations and validated in several languages including Chinese (Siu and Shek, 2005; Chiang et al., 2014), Dutch (De Corte et al., 2007), French (Gilet et al., 2013), German (Paulus, 2009), Italian (Sartori and Meneghini, 2007), Spanish (Pérez-Albéniz et al., 2003; Mestre et al., 2004), and Swedish (Cliffordson, 2002).

Statistical analysis

For all data analyses, we used the IBM SPSS Statistics for Windows, version 25.0 (IBM Corp. Released, 2017). For all continuous variables, correlations were reported as Pearson product moment correlations (two-tailed).

In order to analyze the differences between men and women, we used Student's paired-sample *t*-test for independent samples. When the variances were not significantly different (probability of $F > 0.05$), Student's *t*-test was used with pooled variances; and when they were significantly different, it was used with separate variances.

To explore the predictive value of the EI dimensions as the independent variables, stepwise multiple regression analyses were performed, with aspects of empathy as the dependent variable.

To integrate the results of the stepwise multiple regression analyses, we examined a model of relationships between variables. The program used was Amos (version 25.0).

RESULTS

Internal Consistencies and Descriptive Statistics

Cronbach alphas, means and standard deviations were calculated for each scale. **Table 1** presents the results for the total sample of participants and by gender. All the internal consistency values were within acceptable levels.

Correlations Between EI Dimensions and Empathic Interpersonal Reactivity Index (IRI)

To test the relationship between the EI dimensions and this aspect of empathy, Pearson product moment correlations were computed between the dimensions of the EI measures (TMMS, TEIQue) and the IRI. We also examined the relation between participants' age and the IRI.

As shown in **Table 2**, almost all the EI dimensions of the TMMS had a significant and positive correlation with the aspects of the IRI, except for the EI dimensions clarity and repair, which had significant but negative correlations with PD, and repair, which had no significant relationship with fantasy.

All the factors and the total EI score of the TEIQue had a significant and positive relationship with empathic PT and a significant and negative relationship with empathic PD. In contrast to these aspects, the relationships with the other two aspects of empathy, fantasy and EC, were not homogeneous. The well-being and self-control factors and global trait EI had significant negative relationships with fantasy, whereas the emotionality factor had a significant and positive relationship with fantasy. The sociability factor had no significant relationship with fantasy. The emotionality factor, the sociability factor, and global trait EI presented significant and positive relationships with EC, and the self-control factor had a significant and negative relationship with EC, whereas the well-being factor did not present a significant relationship with EC.

Age presented significant and negative relationships with fantasy and PD.

The relationships between the four aspects of empathy evaluated with the IRI were significant and positive, except for the relationship of PT with PD, which was negative.

Stepwise Multiple Regression With EI Dimensions as Predictor Variables and Each One of the Empathic Aspects of the IRI as Criterial Variables

Prior to the stepwise multiple regression analysis, the relationships between independent variables (TMMS, TEIQue) and dependent variables (IRI) were examined. EI dimensions variables significantly associated with empathic aspects variables were considered candidate predictors and entered into the stepwise multiple regression analysis. To avoid the collinearity problem with the TEIQue factors, we did not enter the general EI measure from this questionnaire in any analysis.

With the independent variable age, we followed the same procedure as with the EI dimensions, considering age an independent variable in the situations in which it had a significant relation with some aspect of empathy.

Gender was entered as an independent variable to determine whether it predicted empathy only in the cases in which significant differences between men and women were found, that is, all the empathy variables except for PT, where no significant mean differences were found, $t = -1858$ (854), $p = 0.064$, $d = -0.157$. Gender differences were observed in fantasy, $t(854) = -6.871$, $p = 0.000$, $d = -0.571$, EC, $t(854) = -8.598$, $p = 0.000$, $d = -0.691$, and PD, $t(854) = -4.480$, $p = 0.000$, $d = -0.364$, with a higher mean score in women than in men in these three aspects of empathy (see **Table 2**).

The results are presented in **Table 3**. In general, not all the dimensions of EI did have the same predictive power for empathy.

Regarding empathic PT, the prediction model contained seven predictors and was reached in seven steps, $F(7,848) = 55.898$,

TABLE 1 | Cronbach's alphas, means, and standard deviations of the variables examined.

Trait meta-mood scale (TMMS)							
Scale (number of items)	Total Sample <i>N</i> = 856			Male <i>N</i> = 185		Female <i>N</i> = 671	
	Cronbach alpha	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Attention (8)	0.887	27.55	6.59	25.14	6.56	28.22	6.44
Clarity (8)	0.899	29.01	6.77	28.40	6.92	29.18	6.73
Repair (8)	0.876	27.78	6.59	27.72	6.51	27.79	6.62
Trait emotional intelligence questionnaire (TEIQue)							
Scale (facet) (number of items)	Total Sample <i>N</i> = 856			Male <i>N</i> = 185		Female <i>N</i> = 671	
	Cronbach alpha	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Emotion expression (10)	0.907	4.70	1.37	4.41	1.31	4.78	1.38
Empathy (trait empathy) (9)	0.767	5.55	0.79	5.37	0.83	5.60	0.77
Self-motivation (10)	0.813	5.14	0.95	5.03	0.96	5.18	0.94
Emotion regulation (12)	0.839	4.42	0.96	4.68	0.98	4.34	0.94
Happiness (trait Happiness) (8)	0.885	5.52	1.13	5.50	1.19	5.53	1.11
Social awareness (11)	0.844	4.92	1.00	4.88	1.05	4.93	0.99
Impulsiveness (low) (9)	0.782	4.97	0.96	5.06	0.95	4.94	0.96
Emotion perception (self and others) (10)	0.815	5.11	0.94	4.91	0.95	5.17	0.93
Self-esteem (11)	0.855	4.86	1.02	4.96	0.99	4.84	1.03
Assertiveness (9)	0.742	4.72	0.92	4.77	0.92	4.70	0.92
Emotion management (others) (9)	0.803	4.90	0.98	4.94	0.99	4.89	0.97
Optimism (trait optimism) (8)	0.906	5.28	1.20	5.34	1.18	5.26	1.20
Relationship (9)	0.627	5.59	0.74	5.42	0.78	5.64	0.72
Adaptability (9)	0.782	4.72	0.94	4.79	0.98	4.71	0.92
Stress management (10)	0.839	4.55	1.10	4.88	1.12	4.45	1.07
Well-being factor (3 facets)	0.877	5.22	1.00	5.26	1.01	5.21	1.00
Emotionality factor (4 facets)	0.748	5.24	0.75	5.03	0.76	5.30	0.73
Sociability factor (3 facets)	0.772	4.85	0.80	4.86	0.84	4.84	0.79
Self-control factor (3 facets)	0.840	4.64	0.88	4.87	0.89	4.58	0.86
Global trait EI (15 facets)	0.910	5.00	0.67	5.00	0.73	5.00	0.65
Interpersonal reactivity index (IRI)							
Scale (number of items)	Total Sample <i>N</i> = 856			Male <i>N</i> = 185		Female <i>N</i> = 671	
	Cronbach alpha	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Perspective-taking (7)	0.805	18.54	5.10	17.92	4.95	18.71	5.13
Fantasy (7)	0.830	18.21	6.02	15.59	5.88	18.94	5.86
Empathic concern (7)	0.684	21.80	4.12	19.58	4.32	22.41	3.85
Personal distress (7)	0.753	10.17	5.07	8.71	5.32	10.58	4.93

$p < 0.001$, accounting for 31.6% of the variance of PT ($R^2 = 0.316$). The significant predictors of this model were the emotionality factor ($R^2 = 0.199$), repair ($R^2 = 0.049$), the well-being factor ($R^2 = 0.03$), the self-control factor ($R^2 = 0.013$), attention ($R^2 = 0.01$), clarity ($R^2 = 0.009$), and the sociability factor ($R^2 = 0.005$). As can be seen, the EI dimension that best predicts empathic PT is the emotionality factor, which is made up of the following EI facets: Emotion Perception (self and others), emotion expression, trait empathy, and relationships.

In empathic fantasy, the prediction model contained six predictors and was reached in six steps, $F(6,849) = 41.890$,

$p < 0.001$, accounting for 22.8% of the variance of the fantasy ($R^2 = 0.228$). The significant predictors of this model were attention ($R^2 = 0.126$), the self-control factor ($R^2 = 0.043$; with a negative relation, see **Table 2**), age ($R^2 = 0.026$; with a negative relation, see **Table 2**), the emotionality factor ($R^2 = 0.018$), gender ($R^2 = 0.01$; with the women obtaining higher scores than the men in this empathic aspect, see **Table 1**), and clarity ($R^2 = 0.004$). The EI dimension that best predicted empathic fantasy was attention.

The prediction model of EC contained six predictors and was reached in six steps, $F(6,849) = 49.879$, $p < 0.001$, accounting for 26.1% of the variance ($R^2 = 0.261$). The significant predictors of

TABLE 2 | Pearson correlations between the emotional intelligence dimensions and the Interpersonal Reactivity Index.

Interpersonal reactivity index (IRI)				
	Perspective-taking	Fantasy	Empathic concern	Personal distress
Trait meta-mood scale (TMMS)				
Attention	0.180*** ($p = 0.000$)	0.356*** ($p = 0.000$)	0.285*** ($p = 0.000$)	0.194*** ($p = 0.000$)
Clarity	0.293*** ($p = 0.000$)	0.081* ($p = 0.018$)	0.120*** ($p = 0.000$)	-0.316*** ($p = 0.000$)
Repair	0.386*** ($p = 0.000$)	0.011 ($p = 0.759$)	0.118*** ($p = 0.001$)	-0.379*** ($p = 0.000$)
Trait emotional intelligence questionnaire (TEIQue)				
Well-being factor	0.227*** ($p = 0.000$)	-0.120*** ($p = 0.000$)	0.044 ($p = 0.200$)	-0.443*** ($p = 0.000$)
Emotionality factor	0.446*** ($p = 0.000$)	0.069* ($p = 0.044$)	0.323*** ($p = 0.000$)	-0.343*** ($p = 0.000$)
Sociability factor	0.206*** ($p = 0.000$)	0.042 ($p = 0.215$)	0.166*** ($p = 0.000$)	-0.452*** ($p = 0.000$)
Self-control factor	0.322*** ($p = 0.000$)	-0.289*** ($p = 0.000$)	-0.130*** ($p = 0.000$)	-0.569*** ($p = 0.000$)
Global trait EI	0.391*** ($p = 0.000$)	-0.106** ($p = 0.002$)	0.133*** ($p = 0.000$)	-0.571*** ($p = 0.000$)
Age	0.024 ($p = 0.478$)	-0.259*** ($p = 0.000$)	0.038 ($p = 0.261$)	-0.199*** ($p = 0.000$)
Interpersonal reactivity index (IRI)				
Perspective-taking		0.174*** ($p = 0.000$)	0.351*** ($p = 0.000$)	-0.168*** ($p = 0.000$)
Fantasy			0.378*** ($p = 0.000$)	0.249*** ($p = 0.000$)
Empathic concern				0.100** ($p = 0.003$)

Total Sample $N = 856$. *** $p \leq 0.001$ (two tailed); ** $p \leq 0.01$ (two tailed); * $p \leq 0.05$ (two tailed).

this model were the emotionality factor ($R^2 = 0.104$), the self-control factor ($R^2 = 0.096$; with a negative relation, see **Table 2**), gender ($R^2 = 0.029$; with women obtaining higher scores than men, see **Table 1**), attention ($R^2 = 0.01$), clarity ($R^2 = 0.011$), and repair ($R^2 = 0.01$). The emotionality factor was the EI dimension that best predicted EC, as was found with empathic PT.

Finally, in empathic PD, the prediction model contained five predictors and was reached in five steps, $F(5,850) = 125.122$, $p < 0.001$, accounting for 42.4% of the variance ($R^2 = 0.424$). The significant predictors of this model were the self-control factor ($R^2 = 0.324$; with a negative relation, see **Table 2**), the Sociability Factor ($R^2 = 0.078$; with a negative relation, see **Table 2**), Attention ($R^2 = 0.012$), repair ($R^2 = 0.005$; with a negative relation, see **Table 2**), and gender ($R^2 = 0.005$; with women obtaining higher scores than men, see **Table 1**). The EI dimension that best predicted empathic PD was the self-control factor, which is made up of the following EI facets: emotion regulation, stress management, and impulsiveness (low). However, the relationship between PD and the Self-Control Factor was negative, as shown in **Table 2**. The relationship of the EI dimensions with empathic PD were all significant and negative, except for the EI dimension of attention, which was positive (see **Table 2**).

In particular, the EI dimensions that more strongly predicted aspects of empathy were the emotionality factor, which predicted PT and EC; the Self-Control Factor, which predicted PD; and attention, which predicted fantasy.

Based on the results obtained in the exploratory analyses carried out with correlations and regressions, we examined a model of relationships between the variables, using path analysis. The model included the predictors that were significant in each stepwise regression as independent or exogenous variables, and the aspects of empathy as dependent or endogenous variables.

To estimate the parameters, the maximum likelihood (ML) procedure was used. To determine possible univariate normality, the distribution of each variable with the skewness and kurtosis indexes (Kline, 2005) was examined, finding that all the variables presented a normal distribution. The bivariate correlations between the independent variables were also examined and, as no correlation exceeded the score of 0.85, there was no multicollinearity (Kline, 2005). There were no significant relationships between any of the independent variables.

The first model presented an acceptable fit, data fit, $\chi^2(18, N = 856) = 218.79$, $p < 0.0000$, $\chi^2/df = 12.15$, CFI = 0.950, GFI = 0.961, RMSEA = 0.114. Although the value of χ^2 did not indicate a good fit, we cannot consider this index because it is not a reliable indicator of the fit of a model with large samples ($N > 200$), as indicated by Hair et al. (2010).

We respecified the first model, eliminating from the analysis the non-significant relationships between the independent variables, and the second model presented a better fit, data fit $\chi^2(24, N = 856) = 225.63$, $p < 0.000$, $\chi^2/df = 9.40$, CFI = 0.950, GFI = 0.960, RMSEA = 0.099.

Figure 1 presents the model, indicating standardized solutions and the most relevant relations. All the relations are presented in the tables included in that figure. The results show that the percentages of variance of each of the aspects of empathy explained by the independent variables are similar to those obtained in the regression analyses.

STUDY 2

Materials and Methods

Participants and Procedure

The participants in this second study were similar to those of the first study in their origin and characteristics, and were recruited in the same way, following the same procedure as in the first study. The sample comprised 646 undergraduate students with a mean age of 33.91 years ($SD = 9.51$), and age range from 18 to 63 years, who volunteered to take part in this study. There were 147 (22.8%) men in the sample, mean age 35.82 years ($SD = 9.88$), age range from 19 to 60 years; and 499 (77.2%) women, mean age 33.34 years ($SD = 9.34$), age range from 18 to 63 years.

All subjects gave written informed consent to participate in the study. This study followed the Declaration of Helsinki and ethical guidelines. The study protocol was approved by the Bioethics Committee of the Faculty of Psychology of the National University of Distance Education.

TABLE 3 | Stepwise multiple regression analysis.

Dependent variables: Components of the interpersonal reactivity index (IRI)										
Independent variables: Dimensions of the trait meta-mood scale (TMMS) and trait emotional intelligence questionnaire (TEIQue)										
Model	R	R²	R² adjusted	R² change	F(df)	p	β	β standardized	t	p
Dependent variable: Perspective-taking										
Model 1: Emotionality factor	0.446	0.199	0.198	0.199	212.156 (1,854)***	0.000	3.030	0.446	14.566***	0.000
Model 2: Emotionality factor							2.347	0.346	10.596***	0.000
Repair	0.498	0.248	0.246	0.049	140.604 (2,853)***	0.000	0.188	0.243	7.451***	0.000
Model 3: Emotionality Factor							2.988	0.440	12.310***	0.000
Repair							0.274	0.354	9.549***	0.000
Well-being factor	0.527	0.278	0.275	0.030	109.142 (3,852)***	0.000	-1.241	-0.244	-5.917***	0.000
Model 4: Emotionality factor							2.811	0.414	11.479***	0.000
Repair							0.253	0.327	8.740***	0.000
Well-being factor							-1.479	-0.291	-6.830***	0.000
Self-control factor	0.539	0.291	0.287	0.013	87.155 (4,851)***	0.000	0.823	0.142	3.948***	0.000
Model 5: Emotionality factor							2.466	0.363	9.423***	0.000
Repair							0.234	0.302	7.993***	0.000
Well-being factor							-1.334	-0.263	-6.094***	0.000
Self-control factor							1.098	0.189	4.968***	0.000
Attention	0.549	0.301	0.297	0.010	73.213 (5,850)***	0.000	0.090	0.116	3.559***	0.000
Model 6: Emotionality factor							2.986	0.440	9.884***	0.000
Repair							0.250	0.323	8.480***	0.000
Well-being factor							-1.385	-0.273	-6.351***	0.000
Self-control factor							1.205	0.208	5.429***	0.000
Attention							0.104	0.134	4.082***	0.000
Clarity	0.557	0.310	0.305	0.009	63.670 (6,849)***	0.000	-0.102	-0.136	-3.384***	0.001
Model 7: Emotionality factor							3.260	0.480	10.215***	0.000
Repair							0.251	0.325	8.553***	0.000
Well-being factor							-1.237	-0.244	-5.505***	0.000
Self-control factor							1.178	0.203	5.319***	0.000
Attention							0.104	0.135	4.125***	0.000
Clarity							-0.098	-0.130	-3.258***	0.001
Sociability factor	0.562	0.316	0.310	0.005	55.898 (7,848)***	0.000	-0.617	-0.097	-2.589**	0.010
Dependent variable: Fantasy										
Model 1: Attention	0.356	0.126	0.125	0.126	123.667 (1,854)***	0.000	0.325	0.356	11.121***	0.000
Model 2: Attention							0.277	0.303	9.403***	0.000
Self-control factor	0.412	0.169	0.168	0.043	87.026 (2,853)***	0.000	-0.1463	-0.214	-6.644***	0.000
Model 3: Attention							0.261	0.286	8.969***	0.000
Self-control factor							-1.191	-0.174	-5.344***	0.000
Age	0.442	0.196	0.193	0.026	69.119 (3,852)***	0.000	-0.097	-0.169	-5.275***	0.000
Model 4: Attention							0.211	0.231	6.833***	0.000
Self-control factor							-1.774	-0.259	-6.913***	0.000
Age							-0.101	-0.176	-5.551***	0.000
Emotionality factor	0.463	0.214	0.210	0.018	57.908 (4,851)***	0.000	1.302	0.162	4.441***	0.000
Model 5: Attention							0.204	0.223	6.611***	0.000
Self-control factor							-1.637	-0.239	-6.338***	0.000
Age							-0.093	-0.161	-5.080***	0.000
Emotionality factor							1.102	0.138	3.706***	0.000
Gender	0.473	0.224	0.219	0.010	49.089 (5,850)***	0.000	1.548	0.106	3.327***	0.001
Model 6: Attention							0.190	0.208	6.049***	0.000
Self-control factor							-1.736	-0.254	-6.634***	0.000
Age							-0.095	-0.165	-5.193***	0.000
Emotionality factor							0.683	0.085	1.932	0.054

(Continued)

TABLE 3 | Continued

Dependent variables: Components of the interpersonal reactivity index (IRI)										
Independent variables: Dimensions of the trait meta-mood scale (TMMS) and trait emotional intelligence questionnaire (TEIQue)										
Model	R	R ²	R ² adjusted	R ² change	F(df)	p	β	β standardized	t	p
Gender							1.603	0.110	3.449***	0.001
Clarity	0.478	0.228	0.223	0.004	41.890 (6,849)***	0.000	0.082	0.092	2.190*	0.029
Dependent variable: Empathic concern										
Model 1: Emotionality factor	0.323	0.104	0.103	0.104	99.468 (1,854)***	0.000	1.773	0.323	9.973***	0.000
Model 2: Emotionality factor							2.636	0.480	13.988***	0.000
Self-control factor	0.448	0.200	0.198	0.096	106.872 (2,853)***	0.000	-1.629	-0.348	-10.122***	0.000
Model 3: Emotionality factor							2.380	0.434	12.489***	0.000
Self-control factor							-1.417	-0.302	-8.721***	0.000
Gender	0.479	0.229	0.227	0.029	84.505 (3,852)***	0.000	1.771	0.177	5.657***	0.000
Model 4: Emotionality factor							2.155	0.393	10.718***	0.000
Self-control factor							-1.207	-0.258	-6.970***	0.000
Gender							1.679	0.168	5.374***	0.000
Attention	0.489	0.239	0.236	0.010	66.908 (4,851)***	0.000	0.069	0.111	3.333***	0.001
Model 5: Emotionality factor							2.622	0.478	11.004***	0.000
Self-control factor							-1.094	-0.234	-6.257***	0.000
Gender							1.611	0.161	5.180***	0.000
Attention							0.084	0.135	3.998***	0.000
Clarity	0.501	0.251	0.246	0.011	56.851 (5,850)***	0.000	-0.090	-0.148	-3.590***	0.002
Model 6: Emotionality factor							2.550	0.465	10.725***	0.000
Self-control factor							-1.305	-0.278	-7.069***	0.000
Gender							1.592	0.159	5.150***	0.000
Attention							0.078	0.125	3.724***	0.000
Clarity							-0.103	-0.169	-4.067***	0.000
Repair	0.511	0.261	0.255	0.010	49.879 (6,849)***	0.000	0.075	0.119	3.392***	0.001
Dependent variable: Personal distress										
Model 1: Self-control factor	0.569	0.324	0.323	0.324	409.195 (1,854)***	0.000	-3.283	-0.569	-20.229***	0.000
Model 2: Self-control factor							-2.717	-0.471	-16.775***	0.000
Sociability factor	0.634	0.402	0.400	0.078	286.153 (2,853)***	0.000	-1.859	-0.295	-10.517***	0.000
Model 3: Self-control factor							-2.511	-0.435	-14.951***	0.000
Sociability factor							-1.999	-0.318	-11.213***	0.000
Attention	0.643	0.413	0.411	0.012	200.222 (3,852)***	0.000	0.089	0.115	4.168***	0.000
Model 4: Self-control factor							-2.294	-0.398	-12.446***	0.000
Sociability factor							-1.881	-0.299	-10.299***	0.000
Attention							0.098	0.127	4.566***	0.000
Repair	0.647	0.419	0.416	0.005	153.323 (4,851)***	0.000	-0.067	-0.087	-2.796**	0.005
Model 5: Self-control factor							-2.243	-0.389	-12.153***	0.000
Sociability factor							-1.878	-0.298	-10.323***	0.000
Attention							0.089	0.115	4.110***	0.000
Repair							-0.070	-0.091	-2.935**	0.003
Gender	0.651	0.424	0.421	0.005	125.122 (5,850)***	0.000	0.906	0.073	2.753**	0.006

Total sample N = 856. *** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$.

Measures

Trait EI measures

To assess EI, we applied the same scale and questionnaire as used in the first study, TMMS and TEIQue.

Non-verbal sensitivity measure

Mini profile of non-verbal sensitivity (MiniPONS; Bänziger et al., 2011a,b). The MiniPONS is a short, multichannel version of the established profile of non-verbal sensitivity

(PONS; Rosenthal et al., 1979). This test measures people's ability to recognize the communication of feelings, attitudes, and intentions from non-verbal expressions in faces, voice, gestures, and body postures. The MiniPONS contains 64 video items from the original test, depicting a young woman in 20 different interpersonal situations varying widely with regard to their emotional quality. The recordings are shown in three different forms: videos with sound (16 Face-Voice video), videos without sound (16 face videos and 16 body videos), and audio stimuli

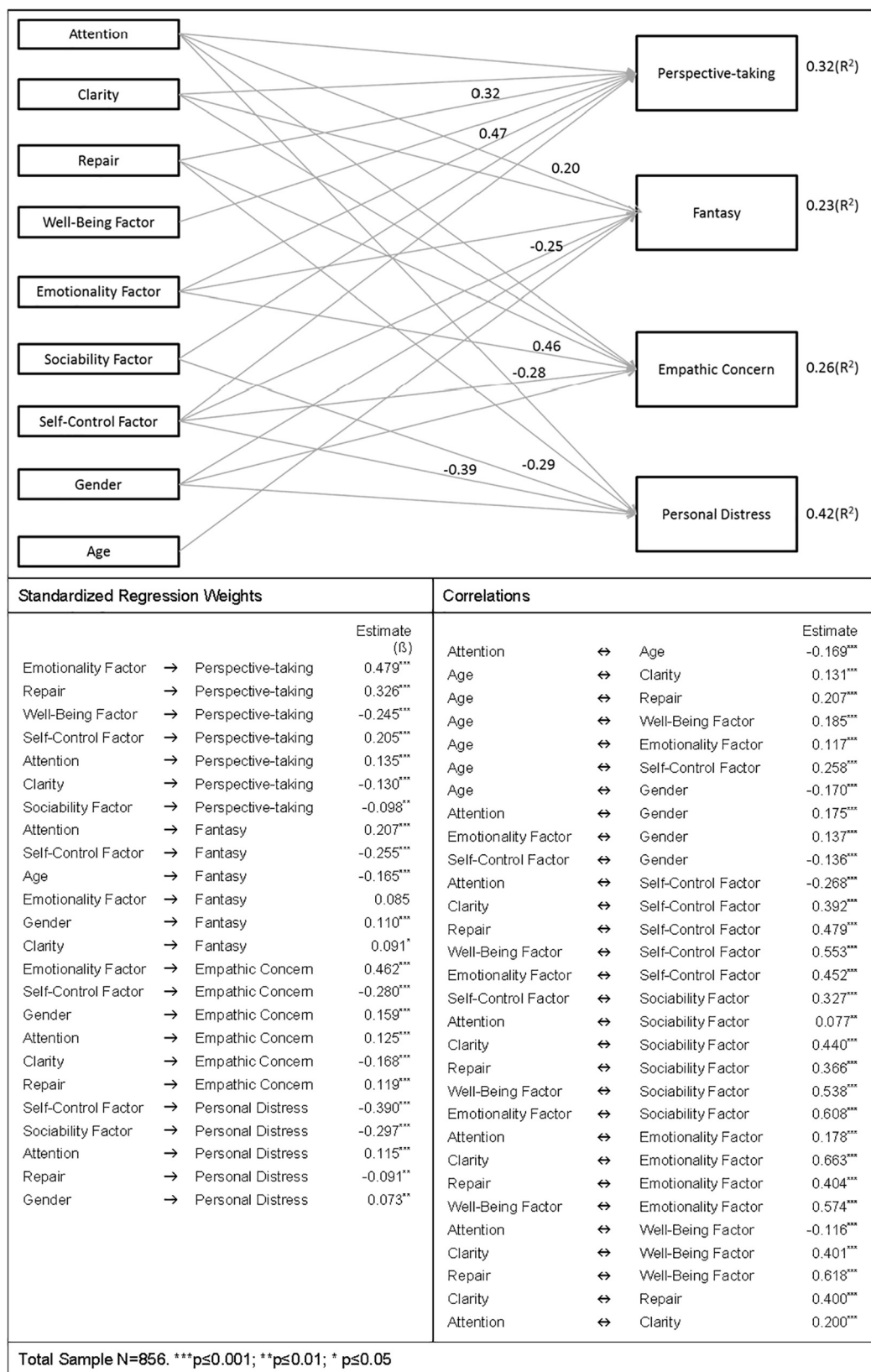


FIGURE 1 | Model indicating standardized solutions and the most relevant relations.

(16 audio clips). In each audio recording, the woman produces an utterance that has been filtered to mask the verbal content.

After each presentation, two alternative situations are shown on the screen, describing what the young woman felt or wanted to communicate. The participants' task is to decide which of the two alternatives best corresponds to her respective expression. "The scenarios include both positive and negative emotion and both dominant and submissive demeanor" (Roter et al., 2008, p. 400). Each scene lasts for 2 s, and the entire administration of the test requires approximately 15 min.

The scores obtained from the videos of the MiniPONS belong to the following channels:

Channel RS voice modality audio (randomized splicing) (8 videos).
 Channel CF voice modality audio (content filtered) (8 videos).
 Channel body modality video (16 videos).
 Channel face modality video (16 videos).
 Channel face+RS modality both audio and video (8 videos).
 Channel face+CF modality both audio and video (8 videos).
 Total MiniPONS (64 videos).

The scores can also be obtained that are relevant to the following quadrant design, combining valence and dominance: Negative dominant (16 videos), negative submissive (16 videos), positive dominant (16 videos), and positive submissive (16 videos).

In our work, we used the scores concerning the following channels:

Channel RS voice modality audio (randomized splicing) (8 videos) + Channel CF voice modality audio (content filtered) (8 videos), obtaining a single score with the sum of the two channels (16 videos).
 Channel body modality video (16 videos).
 Channel face modality video (16 videos).
 Channel body modality video (16 videos) + Channel face modality video (16 videos), adding the scores obtained on both channels and obtaining a new score (32 videos).
 Channel Face+RS modality both, audio and video (8 videos) + Channel face+CF modality both, audio and video (8 videos), obtaining a single score with the sum of the two channels (16 videos).
 Total MiniPONS (64 videos).

Negative dominant (16 videos), negative submissive (16 videos), positive dominant (16 videos), and positive submissive (16 videos).

We obtained some scores that were not contemplated in the original MiniPONS, by performing more combinations of valence and dominance, as did Martínez-Sánchez et al. (2013), denominating them as follows:

Dominant, obtained from the sum of the scores of negative dominant and positive dominant.

Submissive, obtained by adding negative submissive and positive submissive.

Positive valence, obtained by adding positive and dominant positive submissive.

Negative valence, obtained by adding negative dominant and negative submissive.

In this paper, we used the Spanish adaptation of the MiniPONS carried out by Martínez-Sánchez et al. (2013). The psychometric properties of the MiniPONS have been documented by Bänziger et al. (2011a). In Spanish population, these properties can be seen in the study of Martínez-Sánchez et al. (2013).

Statistical analysis

We perform the same statistical analyses as in the first study.

RESULTS

Internal Consistencies and Descriptive Statistics

Cronbach alphas, means, and standard deviations were calculated for each EI scale. **Table 4** presents the results for the total sample of participants, and by gender. All the internal consistency values of the EI measures were within acceptable levels. The Kuder–Richardson formula 20 (KR–20), means, and standard deviations were calculated for each channel and quadrant of the MiniPONS. As can be seen in **Table 4**, the values of internal consistency of the MiniPONS did not present a very acceptable level. The highest value was that of the total test (0.420), in the same line but somewhat lower than that obtained for the total test (0.566) by the authors (Bänziger et al., 2011a), and than that (0.563) of the adaptation (Martínez-Sánchez et al., 2013).

Janusik (2017) collect the opinions of Hall (2001) which indicates that "due to low interitem correlations, the shorter forms of the PONS (Face and Body, Vocal Expression, and MiniPONS) tend to generate poor reliability estimates, and argued that the standard psychometric model might not be applicable to non-verbal sensitivity tests" Janusik (2017, p. 524).

Correlations Between the EI Dimensions and the Channel Scores of the MiniPONS

Pearson product moment correlations were computed between the dimensions of the EI measures (TMMS, TEIQue) and the channel scores of the MiniPONS. We also examined the relation between participants' age and the channel scores of the MiniPONS.

As shown in **Table 5**, not all the EI dimensions were significantly related to the channels and quadrants of the MiniPONS. Regarding the EI dimensions of the TMMS, the repair dimension did not present any significant relationship; Clarity only presented a significant and positive relationship with the score of the CF+RS channel; whereas attention presented significant and positive relations with the scores of CF+RS, body, body+face, negative submissive, positive

TABLE 4 | Cronbach's alphas, means, standard deviations of the variables examined.

Trait meta-mood scale (TMMS)							
Scale (number of items)	Total sample <i>N</i> = 646			Male <i>N</i> = 147		Female <i>N</i> = 499	
	Cronbach alpha	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Scale (number of items)	Cronbach alpha	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Attention (8)	0.893	27.20	6.20	25.42	6.21	27.72	6.10
Clarity (8)	0.879	28.20	6.53	29.37	7.05	27.86	6.33
Repair (8)	0.875	28.09	6.21	29.00	6.13	27.82	6.21
Trait emotional intelligence questionnaire (TEIQue)							
Scale (facet) (number of items)	Total Sample <i>N</i> = 646			Male <i>N</i> = 147		Female <i>N</i> = 499	
	Cronbach alpha	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Emotion expression (10)	0.901	4.78	1.30	4.55	1.29	4.85	1.30
Empathy (trait empathy) (9)	0.748	5.53	0.76	5.31	0.78	5.59	0.74
Self-motivation (10)	0.816	5.18	0.92	5.03	0.89	5.22	0.92
Emotion regulation (12)	0.842	4.39	0.94	4.76	0.93	4.28	0.91
Happiness (trait happiness) (8)	0.879	5.55	1.08	5.49	1.14	5.57	1.06
Social awareness (11)	0.833	4.91	0.95	4.96	0.98	4.90	0.94
Impulsiveness (low) (9)	0.776	5.04	0.93	5.13	0.95	5.02	0.93
Emotion perception (self and others) (10)	0.803	5.14	0.88	4.99	0.88	5.18	0.88
Self-esteem (11)	0.840	4.94	0.94	5.08	0.81	4.90	0.98
Assertiveness (9)	0.777	4.73	0.94	4.92	1.03	4.68	0.91
Emotion management (others) (9)	0.783	4.83	0.92	4.98	0.90	4.79	0.93
Optimism (trait optimism) (8)	0.903	5.30	1.16	5.36	1.17	5.29	1.15
Relationship (9)	0.636	5.62	0.72	5.42	0.82	5.68	0.67
Adaptability (9)	0.794	4.69	0.95	4.85	0.95	4.64	0.94
Stress management (10)	0.837	4.58	1.06	4.94	1.11	4.47	1.02
Well-being factor (3 facets)	0.860	5.26	0.94	5.31	0.93	5.25	0.94
Emotionality factor (4 facets)	0.740	5.27	0.70	5.07	0.74	5.32	0.69
Sociability factor (3 facets)	0.755	4.83	0.77	4.95	0.82	4.79	0.75
Self-control factor (3 facets)	0.829	4.67	0.84	4.95	0.86	4.59	0.82
Global trait EI (15 facets)	0.907	5.01	0.64	5.05	0.68	5.00	0.63
Mini profile of non-verbal sensitivity (MiniPONS)							
Channel (modality) (number of items)	Total sample <i>N</i> = 646			Male <i>N</i> = 147		Female <i>N</i> = 499	
	KR-20	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
CF + RS (audio) (16)	0.327	12.10	1.96	12.05	1.98	12.11	1.96
Body (video) (16)	0.139	12.44	1.66	12.16	1.52	12.52	1.70
Face (video) (16)	0.082	12.64	1.45	12.32	1.45	12.73	1.43
Body + Face (video) (32)	0.210	25.07	2.34	24.48	2.21	25.25	2.35
Face & CF + Face & RS (both audio & video) (16)	0.189	13.26	1.58	12.99	1.57	13.34	1.57
Total MiniPONS (64)	0.420	50.43	3.94	49.52	4.07	50.70	3.86
Quadrant (number of items)	Total sample <i>N</i> = 646			Male <i>N</i> = 147		Female <i>N</i> = 499	
	KR-20	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Negative dominant (16)	0.026	12.28	1.56	11.89	1.68	12.39	1.51
Negative submissive (16)	0.261	12.49	1.75	12.27	1.75	12.56	1.74
Positive dominant (16)	0.264	12.78	1.71	12.61	1.70	12.83	1.72
Positive submissive (16)	0.101	12.88	1.55	12.75	1.49	12.92	1.56
Dominant (32)	0.228	24.98	2.47	24.39	2.49	25.15	2.45
Submissive (32)	0.278	25.45	2.44	25.13	2.59	25.55	2.38
Positive valence (32)	0.326	25.43	2.58	25.14	2.56	25.52	2.58
Negative valence (32)	0.208	25.00	2.42	24.38	2.48	25.18	2.37

CF = content-filtered speech; RS = randomized-spliced speech; Dominant = negative dominant + positive dominant; Submissive = negative submissive + positive submissive; Positive valence = positive dominant + positive submissive; Negative valence = negative dominant + negative submissive.

TABLE 5 | Pearson correlations between the emotional intelligence dimensions and the mini profile of non-verbal sensitivity (MiniPONS).

Mini profile of non-verbal sensitivity (MiniPONS)														
	CF + RS	Body	Face	Body + Face	Face & CF + Face & RS	Total MiniPONS	Negative dominant	Negative submissive	Positive dominant	Positive submissive	Dominant	Submissive	Positive valence	Negative valence
Trait meta-mood scale (TMMS)														
Attention	0.119** (p = 0.002)	0.107** (p = 0.006)	0.060 (p = 0.129)	0.114** (p = 0.004)	0.013 (p = 0.735)	0.132*** (p = 0.001)	0.062 (p = 0.116)	0.099* (p = 0.012)	0.092* (p = 0.019)	0.060 (p = 0.128)	0.125*** (p = 0.001)	0.087* (p = 0.027)	0.100* (p = 0.011)	0.109** (p = 0.006)
Clarity	0.078* (p = 0.049)	-0.018 (p = 0.650)	-0.011 (p = 0.788)	-0.019 (p = 0.624)	-0.020 (p = 0.614)	0.019 (p = 0.626)	0.041 (p = 0.294)	0.028 (p = 0.473)	-0.013 (p = 0.739)	-0.010 (p = 0.794)	0.038 (p = 0.338)	-0.007 (p = 0.852)	0.025 (p = 0.522)	0.004 (p = 0.912)
Repair	-0.014 (p = 0.730)	-0.038 (p = 0.340)	0.028 (p = 0.482)	-0.010 (p = 0.807)	-0.027 (p = 0.486)	-0.024 (p = 0.550)	0.018 (p = 0.648)	-0.002 (p = 0.962)	-0.031 (p = 0.426)	-0.041 (p = 0.297)	0.009 (p = 0.818)	-0.047 (p = 0.230)	0.003 (p = 0.931)	-0.042 (p = 0.287)
Trait emotional intelligence questionnaire (TEIQue)														
Well-being factor	-0.112** (p = 0.004)	-0.058 (p = 0.144)	-0.005 (p = 0.908)	-0.044 (p = 0.266)	-0.013 (p = 0.736)	-0.087* (p = 0.027)	0.040 (p = 0.308)	-0.077* (p = 0.049)	-0.106** (p = 0.007)	-0.057 (p = 0.147)	-0.067 (p = 0.090)	-0.073 (p = 0.064)	-0.079* (p = 0.045)	-0.058 (p = 0.143)
Emotionality factor	-0.023 (p = 0.560)	0.004 (p = 0.929)	0.021 (p = 0.595)	0.016 (p = 0.694)	0.049 (p = 0.217)	0.017 (p = 0.661)	0.085* (p = 0.032)	0.026 (p = 0.516)	-0.057 (p = 0.148)	-0.007 (p = 0.857)	-0.001 (p = 0.990)	0.028 (p = 0.471)	-0.031 (p = 0.424)	0.062 (p = 0.117)
Sociability factor	-0.097* (p = 0.014)	-0.039 (p = 0.322)	-0.012 (p = 0.770)	-0.035 (p = 0.375)	0.041 (p = 0.301)	-0.053 (p = 0.182)	0.021 (p = 0.602)	-0.045 (p = 0.248)	-0.090* (p = 0.023)	-0.004 (p = 0.924)	-0.053 (p = 0.182)	-0.031 (p = 0.425)	-0.058 (p = 0.139)	-0.023 (p = 0.554)
Self-control factor	-0.109** (p = 0.005)	-0.035 (p = 0.368)	-0.031 (p = 0.436)	-0.044 (p = 0.261)	-0.033 (p = 0.398)	-0.094* (p = 0.016)	-0.044 (p = 0.265)	-0.064 (p = 0.103)	-0.058 (p = 0.143)	-0.059 (p = 0.135)	-0.099* (p = 0.011)	-0.051 (p = 0.193)	-0.042 (p = 0.286)	-0.109** (p = 0.006)
Global trait EI	-0.107** (p = 0.006)	-0.041 (p = 0.303)	-0.008 (p = 0.841)	-0.034 (p = 0.391)	0.005 (p = 0.899)	-0.072 (p = 0.069)	0.039 (p = 0.323)	-0.051 (p = 0.194)	-0.107** (p = 0.006)	-0.045 (p = 0.253)	-0.070 (p = 0.076)	-0.045 (p = 0.256)	-0.072 (p = 0.067)	-0.040 (p = 0.311)
Age	-0.101** (p = 0.010)	-0.147*** (p = 0.000)	-0.098* (p = 0.013)	-0.166*** (p = 0.000)	-0.101** (p = 0.010)	-0.190*** (p = 0.000)	0.018 (p = 0.641)	-0.119** (p = 0.003)	-0.207*** (p = 0.000)	-0.137*** (p = 0.000)	-0.139*** (p = 0.000)	-0.164*** (p = 0.000)	-0.180*** (p = 0.000)	-0.117** (p = 0.003)
Short multichannel version of the profile of non-verbal sensitivity (MiniPONS)														
Channel (modality)														
CF + RS (audio)	0.111** (p = 0.005)	0.139*** (p = 0.000)	0.122** (p = 0.002)	0.165*** (p = 0.000)	0.148*** (p = 0.000)	0.656*** (p = 0.000)	0.286*** (p = 0.000)	0.384*** (p = 0.000)	0.485*** (p = 0.000)	0.408*** (p = 0.000)	0.515*** (p = 0.000)	0.536*** (p = 0.000)	0.581*** (p = 0.000)	0.449*** (p = 0.000)
Body (video)				0.788*** (p = 0.000)	0.105** (p = 0.008)	0.565*** (p = 0.000)	0.223*** (p = 0.000)	0.313*** (p = 0.000)	0.400*** (p = 0.000)	0.415*** (p = 0.000)	0.408*** (p = 0.000)	0.498*** (p = 0.000)	0.464*** (p = 0.000)	0.425*** (p = 0.000)
Face (video)				0.707*** (p = 0.000)	0.149*** (p = 0.000)	0.549*** (p = 0.000)	0.377*** (p = 0.000)	0.402*** (p = 0.000)	0.349*** (p = 0.000)	0.174*** (p = 0.000)	0.510*** (p = 0.000)	0.369*** (p = 0.000)	0.402*** (p = 0.000)	0.465*** (p = 0.000)
Body + Face (video)					0.167*** (p = 0.000)	0.743*** (p = 0.000)	0.393*** (p = 0.000)	0.472*** (p = 0.000)	0.501*** (p = 0.000)	0.404*** (p = 0.000)	0.607*** (p = 0.000)	0.583*** (p = 0.000)	0.580*** (p = 0.000)	0.592*** (p = 0.000)
Face & CF + Face & RS (both audio & video)						0.575*** (p = 0.000)	0.276*** (p = 0.000)	0.445*** (p = 0.000)	0.362*** (p = 0.000)	0.278*** (p = 0.000)	0.465*** (p = 0.000)	0.456*** (p = 0.000)	0.420*** (p = 0.000)	0.488*** (p = 0.000)
Total MiniPONS							0.487*** (p = 0.000)	0.651*** (p = 0.000)	0.686*** (p = 0.000)	0.555*** (p = 0.000)	0.805*** (p = 0.000)	0.797*** (p = 0.000)	0.803*** (p = 0.000)	0.771*** (p = 0.000)
Quadrant Negative dominant								0.068 (p = 0.084)	0.096* (p = 0.015)	0.045 (p = 0.251)	0.677*** (p = 0.000)	0.098* (p = 0.012)	0.348*** (p = 0.000)	0.421*** (p = 0.000)
(Continued)														

(Continued)

TABLE 5 | Continued

	CF + RS	Body	Face	Body + Face	Face & CF + Face & RS	Total MiniPONS	Negative dominant	Negative submissive	Positive dominant	Positive submissive	Dominant	Submissive	Positive valence	Negative valence
Negative submissive							0.297*** ($p = 0.000$)			0.125*** ($p = 0.001$)	0.489*** ($p = 0.000$)	0.554*** ($p = 0.000$)	0.290*** ($p = 0.000$)	0.750*** ($p = 0.000$)
Positive dominant										0.202*** ($p = 0.000$)	0.597*** ($p = 0.000$)	0.501*** ($p = 0.000$)	0.808*** ($p = 0.000$)	0.254*** ($p = 0.000$)
Positive submissive											0.148*** ($p = 0.000$)	0.746*** ($p = 0.000$)	0.467*** ($p = 0.000$)	0.406*** ($p = 0.000$)
Dominant												0.283*** ($p = 0.000$)	0.667*** ($p = 0.000$)	0.598*** ($p = 0.000$)
Submissive													0.618*** ($p = 0.000$)	0.638*** ($p = 0.000$)
Positive valence														0.240*** ($p = 0.000$)

CF = content-filtered speech; RS = randomized-spliced speech; Dominant = negative dominant + positive dominant; Submissive = negative submissive + positive submissive; Positive valence = positive dominant + positive submissive; Negative valence = negative dominant + negative submissive; Total sample N = 646. *** $p \leq 0.001$ (two tailed); ** $p \leq 0.01$ (two tailed); * $p \leq 0.05$ (two tailed).

dominant, dominant, submissive, positive valence, negative valence, and total MiniPONS.

Of the EI factors of the TeiQUE, the following relationships were significant: the well-being factor presented a significant and negative relationship with CF+RS, negative submissive, positive dominant, positive valence, and the total MiniPONS. The emotionality factor only presented a significant and positive relationship with negative dominant. The sociability factor presented significant and negative relationships with CF+RS and positive dominant. The self-control factor presented significant and negative relations with CF+RS, dominant, negative valence, and the total MiniPONS.

Age presented significant and negative relationship with all the channels and quadrants except for the negative dominant.

Stepwise Multiple Regression With EI Dimensions as Predictor Variables and the Channel Scores of the MiniPONS as Criterial Variables

Prior to the stepwise multiple regression analyses, the relationships between independent variables (TMMS, TEIQue) and the dependent variables (MiniPONS) were examined. EI dimensions variables significantly associated with channel scores variables were considered candidate predictors and were entered into the stepwise multiple regression analysis.

Age was considered as an independent variable in the situations in which it had a significant relation with some scores of the MiniPONS.

Gender was entered as an independent variable to determine whether it predicted non-verbal sensitivity only in cases where significant differences between men and women were found, that is, in the following channels: Body $t(644) = -2.268$, $p = 0.024$, $d = -0.223$; Face $t(644) = -3.044$, $p = 0.002$, $d = -0.283$; Body+Face $t(644) = -3.517$, $p = 0.000$, $d = -0.337$; Face & CF+Face & RS $t(644) = -2.379$, $p = 0.018$, $d = -0.222$; and total MiniPONS $t(644) = -3.215$, $p = 0.001$, $d = -0.297$. In all of them, women's scores were higher than men's (see Table 4). We also found significant differences between men and women in the scores of the quadrants negative dominant $t(644) = -3.446$, $p = 0.001$, $d = -0.313$; dominant $t(644) = -3.312$, $p = 0.001$, $d = -0.307$; and negative valence $t(644) = -3.534$, $p = 0.000$, $d = -0.329$. In all of them, women's scores were higher than men's.

The results are presented in Table 6. In general, very few EI dimensions predicted Non-verbal Sensitivity, and the same prediction results did not appear in all the channels and scores of the MiniPONS quadrants.

In the CF+RS channel, the prediction model contained four predictors and was reached in four steps, $F(4,641) = 6.365$, $p < 0.001$, accounting for 3.8% of the variance of the CF+RS channel ($R^2 = 0.038$). The significant predictors of this model were attention ($R^2 = 0.014$), the Sociability Factor ($R^2 = 0.009$; with a negative relation, see Table 5), clarity ($R^2 = 0.009$), and age ($R^2 = 0.006$; with a negative relation, see Table 5). attention was the EI dimension that best predicted the CF+RS channel.

TABLE 6 | Stepwise multiple regression analysis.

Dependent variables: Components of the mini profile of non-verbal sensitivity (MiniPONS)										
Independent variables: Dimensions of the trait meta-mood scale (TMMS) and trait emotional intelligence questionnaire (TEIQue)										
Model	R	R²	R² adjusted	R² change	F(df)	p	β	β standardized	t	p
Dependent variable: CF + RS (audio)										
Model 1: Attention	0.119	0.014	0.013	0.014	9.285 (1,644)**	0.002	0.038	0.119	3.047**	0.002
Model 2: Attention							0.037	0.116	2.977**	0.003
Sociability factor	0.151	0.023	0.020	0.009	7.501 (2,643)***	0.001	−0.236	−0.093	−2.377*	0.018
Model 3: Attention							0.029	0.093	2.317*	0.021
Sociability factor							−0.337	−0.132	−3.151**	0.002
Clarity	0.179	0.032	0.028	0.009	7.095 (3,642)***	0.000	0.032	0.107	2.483*	0.013
Model 4: Attention							0.024	0.074	1.817	0.070
Sociability factor							−0.325	−0.127	−3.036**	0.002
Clarity							0.034	0.114	2.660**	0.008
Age	0.195	0.038	0.032	0.006	6.365 (4,641)***	0.000	−0.017	−0.081	−2.018*	0.044
Dependent variable: Negative dominant										
Model 1: Gender	0.135	0.018	0.017	0.018	11.877 (1,644)***	0.001	0.502	0.135	3.446***	0.001
Dependent variable: Negative submissive										
Model 1: Age	0.119	0.014	0.013	0.014	9.205 (1,644)**	0.003	−0.022	−0.119	−3.034**	0.003
Dependent variable: Positive dominant										
Model 1: Age	0.207	0.043	0.041	0.043	28.848 (1,644)***	0.000	−0.037	−0.207	−5.371***	0.000
Dependent variable: Dominant										
Model 1: Age	0.139	0.019	0.018	0.019	12.777 (1,644)***	0.000	−0.036	−0.139	−3.574***	0.000
Model 2: Age							−0.033	−0.127	−3.252***	0.001
Gender	0.181	0.033	0.030	0.013	10.852 (2,643)***	0.000	0.683	0.116	2.962**	0.003
Model 3: Age							−0.029	−0.110	−2.778**	0.006
Gender							0.615	0.104	2.649**	0.0008
Attention	0.199	0.040	0.035	0.007	8.806 (3,642)***	0.000	0.034	0.086	2.143*	0.032
Dependent variable: Positive valence										
Model 1: Age	0.180	0.032	0.031	0.032	21.570 (1,644)***	0.000	−0.049	−0.180	−4.644***	0.000
Dependent variable: Negative valence										
Model 1: Gender	0.138	0.019	0.017	0.019	12.486 (1,644)***	0.000	0.795	0.138	3.534***	0.000
Model 2: Gender							0.731	0.127	3.242***	0.001
Age	0.172	0.029	0.026	0.010	9.756 (2,643)***	0.000	−0.026	−0.103	−2.629**	0.009
Dependent variable: Total MiniPONS										
Model 1: Age	0.190	0.036	0.034	0.036	24.010 (1,644)***	0.000	−0.078	−0.190	−4.900***	0.000
Model 2: Age							−0.074	−0.178	−4.596***	0.000
Gender	0.217	0.047	0.044	0.011	15.894 (2,643)***	0.000	0.998	0.106	2.745**	0.006
Model 3: Age							−0.067	−0.162	−4.106***	0.000
Gender							0.892	0.095	2.437*	0.015
Attention	0.232	0.054	0.049	0.007	12.140 (3,642)***	0.000	0.053	0.084	2.112*	0.035

CF = content-filtered speech; RS = randomized-spliced speech; Dominant = negative dominant + positive dominant; Submissive = negative submissive + positive submissive; Positive valence = positive dominant + positive submissive; Negative valence = negative dominant + negative submissive; Total sample N = 646. *** $p \leq 0.001$ (two tailed); ** $p \leq 0.01$ (two tailed); * $p \leq 0.05$ (two tailed).

In the total MiniPONS, the prediction model contained three predictors and was reached in three steps, $F(3,642) = 12.140$, $p < 0.001$, accounting for 5.4% of the variance of the total MiniPONS ($R^2 = 0.054$). The significant predictors of this model were age ($R^2 = 0.036$; with a negative relation, see **Table 5**), gender ($R^2 = 0.011$; with women obtaining higher scores than men, see **Table 4**), and attention ($R^2 = 0.007$).

In the negative dominant quadrant, the prediction model contained one predictor and was reached in one step,

$F(1,644) = 11.877$, $p = 0.001$, accounting for 1.8% of the variance of the negative dominant quadrant ($R^2 = 0.018$). The significant predictors of this model were gender ($R^2 = 0.018$; with women obtaining higher scores than men).

In the negative submissive quadrant, the prediction model contained one predictor and was reached in one step, $F(1,644) = 9.205$, $p = 0.003$, accounting for 1.4% of the variance of the negative submissive quadrant ($R^2 = 0.014$). The significant predictor of this model was age ($R^2 = 0.014$; with a negative relation, see **Table 5**).

Similarly to the previous quadrant, in the positive dominant quadrant, the prediction model contained one predictor and was reached in one step, $F(1,644) = 28.848$, $p < 0.001$, accounting for 4.3% of the variance of the positive dominant quadrant ($R^2 = 0.043$). The significant predictor of this model was age ($R^2 = 0.043$; with a negative relation, see **Table 5**).

In the dominant quadrant, the prediction model contained three predictors and was reached in three steps, $F(3,642) = 8.806$, $p < 0.001$, accounting for 4.0% of the variance of the dominant quadrant ($R^2 = 0.040$). The significant predictors of this model were age ($R^2 = 0.019$; with a negative relation, see **Table 5**), gender ($R^2 = 0.013$; with women obtaining higher scores than men, see **Table 4**), and attention ($R^2 = 0.007$). In this quadrant and the total MiniPONS, the same predictors emerged.

In the positive valence quadrant, the prediction model contained one predictor and was reached in one step, $F(1,644) = 21.570$, $p < 0.001$, accounting for 3.2% of the variance of the positive valence quadrant ($R^2 = 0.032$). The significant predictors of this model was Age ($R^2 = 0.032$; with a negative relation, see **Table 5**).

Finally, in the negative valence quadrant, the prediction model contained two predictors and was reached in two steps, $F(2,643) = 9.756$, $p < 0.001$, accounting for 2.9% of the variance of the negative valence quadrant ($R^2 = 0.029$). The significant predictors of this model were gender ($R^2 = 0.019$; with women obtaining higher scores than men, see **Table 4**), and age ($R^2 = 0.010$; with a negative relation, see **Table 5**).

Results showed that the only EI dimensions that predicted non-verbal sensitivity were attention, clarity, and the sociability factor [which includes the facets of social awareness, emotion management (others), and Assertiveness]. Of these three EI dimensions, the one that best predicted non-verbal sensitivity was attention. However, the prediction was generally not very strong.

CONCLUSION

The purpose of this study was to examine the relationship between EI and empathy, on the one hand, and, on the other, the relationship between EI and non-verbal sensitivity, through two independent studies.

The investigations carried out to date have usually applied a single EI measure to verify the relation between EI and empathy. One of our goals was to obtain results with the highest possible number of EI dimensions to determine those that best predict empathy, so we applied the two measures that are most commonly used, assessing different domains.

The descriptive statistics and the internal consistency of the EI measurements, in both studies, are in line with those obtained by us in a study on EI and health, where we apply the same scales of EI in a similar population (Fernández-Abascal and Martín-Díaz, 2015).

With respect to the proposed objectives, in the first study, the results show a similar pattern of significant positive relationships of all the analyzed EI domains with empathic PT, and significant negative relationships with empathic

PD, except for the EI domain attention, which presents a positive relationship with empathic PD. The negative relationships established between all the domains of EI, with the exception of the domain of attention, and the empathy factor PD are in the line of our expectations because PD is a negative social factor that reflects a person's feelings of anxiety and discomfort when observing other people's negative experiences.

With the other two aspects of empathy, fantasy and EC, their relations with the EI domains were not homogeneous, and in some domains, no significant relationships were established.

Regarding the results of the specific EI dimensions that best predict aspects of empathy, the data showed that not all EI dimensions have the same predictive power for empathy.

For the two cognitive empathy scales, PT and fantasy, the results showed that the EI dimension that best predicts empathic PT is the Emotionality Factor, which reflects self efficacy in perceiving and expressing emotions and subsequently using them to create and maintain relationships with others, and it includes the facets of emotion perception (self and others), emotion expression, Trait empathy, and relationships. In addition to other facets, the facet of empathy is contemplated within this factor, and this circumstance cannot be ignored, the construct of EI includes components of empathy.

The EI dimension that best predicts empathic fantasy is attention, which reflects the degree to which people tend to observe and think about their feelings and moods.

For the two emotional empathy scales, EC and PD, the EI dimension that best predicts EC is the emotionality factor, as with empathic PT. The self-control factor [reflecting self-efficacy in emotion/impulse regulation, and including the facets of emotion regulation, Stress Management, and (low) Impulsiveness] is the EI dimension that best predicts empathic PD, but the relationship between them is negative, as can be seen in the analysis of the correlations.

Alterman et al. (2003) pointed out that the most robust components of empathy seem to be represented in the scales of PT and EC and, in our study, the emotionality factor is the common predictor of both component.

Gender emerges as a predictor in three of the four analyzed aspects of empathy, fantasy, EC, and PD, and in all of them, women score higher than men. We had previously found significant gender differences in these three aspects of empathy, and PT was the only aspect where no differences were found.

Age is only a predictor of empathic fantasy, and the relationship is negative. However, age also presented significant negative relationships with PD: as age increases, the score in both these aspects decreases.

We cannot compare these results with those obtained in other studies, as we have not found any research that uses so many EI domains as predictors. However, some results can be partially compared with those obtained by Extremera and Fernández-Berrocal (2004) because, in their research, they used two of the measures employed in our first study, the TMMS and the IRI. In their analysis of the relationships between the two tests, they found correlations pointing in the same direction as those of our study, although they

found no positive relationships between the clarity and repair dimensions and EC, as we did in our work. These authors also studied the contribution of EI assessed with TMMS as a predictor of empathy assessed with IRI, finding fewer predictive EI dimensions than ours, and moreover, they found no EI dimension predicting empathic fantasy. However, in our study, the attention and clarity dimensions were entered in the prediction model, and clarity was the dimension that best predicted fantasy.

The differences observed in men's and women's scores in empathy, with women obtaining higher scores than men, agree with some of those obtained in studies of adaptation of the test to other languages; for example, Pérez-Albéniz et al. (2003) found differences in the same aspects as we found in our study; Gilet et al. (2013) found differences in the aspects of fantasy and EC, and De Corte et al. (2007) found differences in all the aspects. It seems that, in general, women score higher on measures of empathy than men (e.g., Wright and Skagerberg, 2012; Clarke et al., 2016).

The results concerning age, with younger people scoring higher, are similar to those obtained, for example, by Gilet et al. (2013) in the same empathic aspects as in our study, fantasy and PD. Davis (1983) emphasized that "PD is an egocentric precursor of more mature empathy and that it decreases with age and emotional maturity" (Young Kaelber and Schwartz, 2014, p. 279).

Regarding the second study, which examined the relationship between EI and non-verbal sensitivity, like the first study, the most usual solution has been to apply a single measure of EI to verify this relationship. However, because one of our goals was to obtain results with the highest number of EI dimensions in order to determine those that best predict non-verbal sensitivity, we also applied the two measures that we had administered in the first study.

The results do not show many relations between the two constructs; notably, attention is the EI dimension that presents more significant relationships – all of them positive – with CF+RS, body, body+face, negative submissive, positive dominant, dominant, submissive, positive valence, negative valence, and Total MiniPONS. Another relevant result is the significant negative relationships between three EI factors, well-being, sociability, and self-control, with some channels and quadrants of MiniPONS. The emotionality factor only presents a significant and positive relationship with the quadrant Negative dominant.

Very few EI dimensions predict non-verbal sensitivity, and there were no predictive results in some of the channels and quadrants of the MiniPONS and, furthermore, they had little predictive value.

The highest number of EI dimensions that are predictors emerge in channel CF+RS: attention, the sociability factor (with a negative relationship), clarity, and age (with a negative relationship), but the dimension that best predicts is attention.

In the total MiniPONS the strongest predictor is age (with a negative relation): as participants' get older, the results in non-verbal sensitivity are worse. This predictor is followed by gender: women score higher than men, and within the EI dimensions,

only the dimension of attention emerges as a predictor, with a rather low value.

In the dominant quadrant, the same predictors emerge as for the total MiniPONS score.

Age emerges as the only predictor (with a negative relationship), in the negative submissive, positive dominant, and positive valence quadrants: as people age, they obtain worse results in these quadrants of non-verbal sensitivity.

Gender emerges as the only predictor in the negative dominant quadrant, with women obtaining higher scores than men.

Finally, age (with a negative relationship) and gender predict the negative valence, both of them in the same line as the results obtained in the previous channels and quadrants: as people age, they obtain worse results, and compared to men, women obtain better results.

In the analysis of the relationships between age and the channels and quadrants, age showed significant and negative relations with all of them except for negative dominant.

We found significant differences between men and women in body, face; body+face; face & CF+face & RS, and the total MiniPONS channels and in the negative dominant, dominant, and negative valence quadrants. In all of them, women obtained higher scores than men.

There are almost no studies concerning the connection between EI and non-verbal sensitivity, but we can partially compare some of the results obtained in this work, for example, with the work of Martínez-Sánchez et al. (2013), who obtained a result similar to the one of our study with the domain of attention, finding positive, and significant relationships of attention with multiple channels and quadrants of the MiniPONS, including the total test score.

The differences observed in the scores between men and women are consistent with the results obtained in other studies, showing that women obtain higher scores than men in the PONS, and the MiniPONS (Hall, 1978, 1984, Martínez-Sánchez et al., 2013; Gulabovska and Leeson, 2014). Knapp and Hall (2002) pointed out that, compared to men, women not only decode more efficiently, but they also encode non-verbal emotional cues more efficiently.

The negative correlations obtained between age and the level of non-verbal sensitivity are in line with the results found in other studies reporting that the ability to recognize facial expressions decreases with age (Mill et al., 2009), and the capacity to recognize emotional prosody also appears to be negatively affected by age (Orbelo et al., 2005; Ruffman et al., 2008).

Riggio and Darioly (2016) pointed out that, despite the obviousness of the connection between non-verbal sensitivity and EI, this connection is not well-known among researchers, apart from those who are investigating non-verbal communication. Among the reasons, they note are the time it takes to apply measures of non-verbal sensitivity, the lack of strong validity, and the concern that the readily available and better investigated measures have a fairly limited approach. These authors also state that, given the popularity of the construct of EI, the merging of these two worlds would make sense.

The results of the two studies help us to better understand the relationship between the constructs of EI and empathy, on the one hand, and EI and non-verbal sensitivity, on the other, especially with regard to the contribution of the EI dimensions as predictors of empathy and non-verbal sensitivity.

Several limitations of these two studies should be mentioned. In both of them, we applied self-report measures, so it is likely that social desirability influenced the response to the tests. On another hand, due to the cross-sectional design of the studies, the assumption of causality should be considered with caution. A longitudinal follow-up study would be valuable to address this limitation, so further research is needed using prospective designs to confirm our findings. Another limitation is the cultural homogeneity of the participants in the studies, which advises caution in the generalization of the results.

Despite these limitations, this study provides evidence of some EI dimensions that could explain some specific aspects of empathy and non-verbal sensitivity. These findings may help in future research to continue defining the specific domains of EI that contribute to non-verbal sensitivity and empathy.

The most relevant results of the two studies are those obtained in the first one, which delimits the

specific domains of EI that predict each of the aspects of empathy considered in the study, such as the emotionality factor, the self-control factor, and attention. This information may prove useful to design intervention programs focused on improving empathic capacities, thereby influencing the training of specific domains of EI that better predict empathy, such as those that have emerged in this work.

ETHICS STATEMENT

This study followed the Declaration of Helsinki and ethical guidelines.

AUTHOR CONTRIBUTIONS

The two authors listed have made a substantial, direct and intellectual contribution to the work, contribution to the work, conceptualization, data collection, write-up, data analysis, and approved it for publication.

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Predicting the Pursuit of Post-Secondary Education: Role of Trait Emotional Intelligence in a Longitudinal Study

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Trait Emotional Intelligence (EI) is a constellation of emotional self-perceptions and dispositions related to perceiving, understanding, using, and managing emotions of self and others. Although higher trait EI has been implicated in post-secondary success among university students. There is lack of evidence for whether it predicts the pursuit of post-secondary education (PSE) in emerging adulthood. This was the first study to investigate the role of trait EI in PSE pursuit using a large, nationally-representative sample of Canadian young adults who participated in the National Longitudinal Survey for Children and Youth (NLSCY). Participants in this dataset reported on their PSE status at three biennial waves (age 20–21, 22–23, and 24–25), and completed a four-factor self-report scale for trait EI (Emotional Quotient Inventory: Mini) at ages 20–21 and 24–25. Higher trait EI subscale scores were significantly associated with greater likelihood of PSE participation both concurrently, and at 2- and 4-year follow-ups. Overall, these associations were larger for men than women. The finding that these links persisted over a multi-year period is particularly promising, as it represents an important validation step toward further investment in socioemotional competencies as part of youth development interventions.

Keywords: trait emotional intelligence, longitudinal, post-secondary pursuit, emerging adulthood, nationally-representative data

INTRODUCTION

The period of emerging adulthood is an important developmental stage where one's decisions can have substantial personal, social and economic implications for the individual (Arnett, 2000; Lüdtke et al., 2011). One such decision involves the pursuit of post-secondary education (PSE), which is essential for better vocational outcomes in the modern economy (Toutkoushian and Paulsen, 2016; Statistics Canada, 2017; Uppal, 2017). Canadians with a university degree have an employment rate of over 70%, compared to those without one (under 60%, decreasing with lower education levels; Statistics Canada, 2017). PSE completion is also linked to higher income levels in both males and females (Uppal, 2017). However, many young adults who enter PSE leave without completing the program. The attrition rate for high-school graduates transitioning to PSE is ~50% in the United States and Canada (Shaiens et al., 2008; Ross et al., 2012). Moreover, there is a

sizeable segment of high school graduates who do not pursue higher education (Finnie, 2012). Understanding the factors that predict PSE pursuit and attainment can inform both policy and programming for enhancing employability of young adults and building a highly skilled workforce of tomorrow.

Models of PSE attainment have traditionally emphasized cognitive metrics—IQ scores, achievement tests, school grades—as key predictors of outcomes. However, cognitive skills alone are no longer considered sufficient for explaining PSE success, with a growing wave of evidence pointing to the unique contributions of non-cognitive factors, such as personality traits, emotional, and interpersonal competencies, and aspects of self-concept (Pascarella and Terenzini, 2005; Richardson et al., 2012; Rowan-Kenyon et al., 2017; Boerchi et al., 2018). Non-cognitive factors are of particular interest from a practical standpoint, because they are more malleable and therefore potentially more amenable to intervention (Richardson et al., 2012; Boerchi et al., 2018).

One of such non-cognitive factors implicated in post-secondary success is trait emotional intelligence, or trait EI (Perera and DiGiacomo, 2013; Parker et al., 2018). Trait EI is defined as a constellation of emotional self-perceptions and dispositions related to perceiving, understanding, using, and managing emotions of self and others (Petrides et al., 2018). Conceptualized as a set of lower-order personality facets, trait EI is assessed via self-report questionnaires and shares moderate degree of overlap with the higher-order Big Five personality traits (Petrides et al., 2007). However, trait EI is not redundant with other constructs, and it has been consistently found to explain incremental variance in various life outcomes beyond measures of cognitive intelligence, mood, and basic personality (Petrides et al., 2007; Wood et al., 2009; Andrei et al., 2016). Trait EI is also distinct from the construct of ability EI (Petrides and Furnham, 2001). Ability EI reflects emotion-related knowledge and the ability to apply that knowledge when instructed to do so; whereas trait EI entails emotional self-efficacy and behavioral dispositions which reflect how a person utilizes their EI abilities in every-day settings (Austin et al., 2008; Mikolajczak, 2009; Keefer, 2015). Given this distinction between aptitude (ability EI) and typical behavior (trait EI), it is not surprising that trait EI has emerged as the stronger and more reliable predictor of various life outcomes than ability EI (Keefer et al., 2018).

A considerable body of research has linked higher trait EI to positive educational outcomes at both secondary and post-secondary levels, including higher grades, fewer school absences, and greater likelihood of degree completion (Humphrey et al., 2007; Perera and DiGiacomo, 2013; Petrides et al., 2018). However, much of this research is cross-sectional, with only a small number of studies utilizing longitudinal designs (e.g., Parker et al., 2004; Keefer et al., 2012). Moreover, extant evidence linking trait EI to long-term PSE outcomes is limited to students who were already enrolled in college or university. To date, there have been no studies examining whether trait EI predicts the likelihood of a young person entering PSE in the first place—an empirical question that requires longitudinal follow-ups of a large representative cohort of youth. The present study capitalized on 4 years of available longitudinal data from the National Longitudinal Survey for Children and Youth (NLSCY;

Statistics Canada, 2010a) to investigate the long-term utility of trait EI in predicting PSE pursuit from age 20–21 to 24–25 in a large, nationally-representative sample of young Canadians. To provide more context, the following section reviews existing longitudinal evidence on trait EI in PSE contexts.

TRAIT EI IN POST-SECONDARY CONTEXTS

The first series of studies to evaluate the prospective utility of trait EI in predicting post-secondary outcomes of emerging adults transitioning to PSE was the Trent Academic Success and Wellness Project (TASWP; Parker et al., 2018). This research was conducted at a medium-sized Canadian university (Trent University), recruiting four successive cohorts of undergraduate students (total $N = 3,500$) at the beginning of their first year. Participants were administered an array of psychological self-report instruments, including a measure of trait EI called the Emotional Quotient Inventory-Short form (EQ-i:S; Bar-On, 2002), which assesses four trait EI domains: Interpersonal, Intrapersonal, Stress Management, and Adaptability. Participants also consented to releasing their high-school grades and subsequent university records for the project.

In the first TASWP study (Parker et al., 2004) participants' EQ-i:S scores were matched with their academic record at the end of their first year of university. In order to measure academic success, the participants were processed as two groups: academically successful (those with grade-point-averages [GPAs] $> 79\%$) and academically unsuccessful (GPA $< 60\%$ for that academic year). Results revealed that, despite having comparable age, course load, and high-school grades, successful students scored significantly higher than the unsuccessful group on total trait EI, as well as on the Intrapersonal, Stress Management, and Adaptability scales assessed by the EQ-i:S. Discriminant Function Analysis classified students into the successful and unsuccessful groups based on their EQ-i:S scores and revealed an overall 86% correct classification rate. This was the earliest compelling evidence showing that trait EI is a relevant factor in PSE settings, as it incrementally predicted academic success independent of a students' previous academic record (Parker et al., 2004).

In a subsequent TASWP study, trait EI was also found to predict student retention into the second year of university (Parker et al., 2006). Again, despite having comparable age, course load, and high-school grades, students who persisted beyond the first year of university had significantly higher trait EI-related competencies (Interpersonal, Intrapersonal, Stress Management, and Adaptability) at the start of the academic year, compared to those who withdrew. This effect was moderated by gender: males who withdrew had significantly lower Interpersonal and total trait EI scores than both males and females who persisted, while females who withdrew had significantly lower total trait EI scores than males who persisted (Parker et al., 2006). Importantly, these initial TASWP findings have been since independently replicated in university samples from Europe and the United States (Parker et al., 2005a; Qualter et al., 2009; Saklofske et al., 2012; Sanchez-Ruiz et al., 2013).

A 6-year follow-up of the TASWP cohorts indicated that first-year trait EI profiles also significantly predicted degree completion status (graduated vs. withdrew): students who left without completing their degree had both significantly lower total trait EI levels and low scores across all four trait EI domains assessed (Keefer et al., 2012). More recently, Parker et al. (2016) reported similar results for a subsample of academically gifted TASWP participants who had a high-school GPA of 90% or better: gifted students who entered university with lower trait EI scores were significantly less likely to graduate within 6 years, compared to their gifted peers with high trait EI. Taken together, this evidence suggests that trait EI is predictive of long-term PSE attainment regardless of students' cognitive intelligence or exceptional academic ability (Parker et al., 2018).

There are several possible mechanisms by which trait EI predicts post-secondary success. One of the more proximal variables is its function as a resilience factor for post-secondary students. Attending a college or university can be a very stressful transition, presenting an array of personal and interpersonal challenges for students (Pascarella and Terenzini, 2005), especially when having to move away from their home town (Witkow et al., 2015). This demographic, comprised mostly of young adults, leave the proximity of pre-existing relationships (like family and friends) and have to form new ones, as well as adapt to a more challenging academic load (Fussell et al., 2007). Compounding this stress is the rising financial costs of attending colleges and universities (Finnie, 2012; Statistics Canada, 2016). This often requires students to take up part-time work, which poses an additional challenge in attempting to balance academic, social, and work life (see Moulin et al., 2013). Consistent with its resilience function, trait EI has been linked with fewer physical fatigue symptoms (Brown and Schutte, 2006; Thompson et al., 2007), lower levels of social anxiety and loneliness (Summerfeldt et al., 2006), and use of more adaptive coping strategies in students (Saklofske et al., 2007). These variables in turn mediate the relationship between trait EI and academic adjustment and performance (Perera and DiGiacomo, 2015).

Three of the main contributing factors in the relationship between trait EI and PSE success are general interpersonal skills, motivation/optimism, and decision-making (Perera and DiGiacomo, 2015). Indeed, all theories of trait EI consider the ability to empathize with others' feelings as one of its core components (Bar-On, 1997; Petrides and Furnham, 2000). This is an important skill for students in an environment requiring collaboration with others (Wang et al., 2009). Students deficient in this competency can feel alienated from campus life—which has been implicated in student attrition (see Wilcox et al., 2005). Higher trait EI is also linked with a more confident and positive outlook on future outcomes (Petrides and Furnham, 2001; Bar-On, 2002). This is an ideal state of mind to persist and attain one's academic goals (Nes and Segerstrom, 2006; Carver and Connor-Smith, 2010), and stay engaged in learning activities (Linnenbrink, 2007). The capacity to effectively collaborate, utilize emotions resourcefully in problem-solving, and stay determined while adaptively coping with socioemotional and academic challenges is a

psychological profile typically linked with post-secondary success (Credé and Niehorster, 2012).

THE PRESENT STUDY

As is evident from the studies reviewed above, extant research on the role of trait EI in PSE attainment has been limited to an overly restricted participant pool—one in which everyone has already made it into a PSE program. Whether trait EI predicts the likelihood of pursuing PSE in the first place is an important question that is yet to be addressed empirically. While it is true that external factors, such as socioeconomic status can influence PSE pursuit, population-based evidence suggests that 43% of Canadians report no barriers in the decision to pursue PSE (irrespective of whether they pursue it or not), compared to 25% citing financial barriers (Finnie, 2012). Therefore, PSE pursuit depends on individual and sociocultural factors more so than on economic barriers alone (Abada and Tenkorang, 2009; Finnie, 2012). Given the importance of PSE in the marketplace, and the demonstrated long-term links between trait EI and PSE success, it is worth investigating if trait EI in emerging adulthood is also associated with the pursuit of higher education. Obtaining empirical evidence for this link is an important validation step toward further investment in trait EI interventions.

The main goal of the current study was to examine the predictive utility of trait EI for PSE pursuit over a 4-year period of emerging adulthood (age 20–21 to 24–25). To accomplish this, we analyzed three biennial waves of nationally-representative data from the Canadian National Longitudinal Survey of Children and Youth (NLSCY; Statistics Canada, 2010a).

The inclusion of multi-year trait EI data is a unique feature of the NLSCY, relative to other comparable databases, such as the Canadian Youth in Transition Survey or the American National Longitudinal Survey of Youth. It is therefore the only current source of longitudinal, population-level data on trait EI. Specifically, the study dataset includes measures of trait EI for 20–21-year-olds and 24–25-year-olds (among its emerging adult demographic). Education data for that sample was available concurrently, and prospectively at age 22–23 and 24–25. We expected trait EI to positively predict PSE participation in emerging adulthood. In line with previous research on trait EI in PSE contexts (e.g., Parker et al., 2004, 2011), gender was included as a potential moderator in these analyses.

METHODS

Data Source

This study utilized a stratified, nationally representative, multi-wave dataset from Statistics Canada called the National Longitudinal Survey of Children and Youth (NLSCY). The survey was administered to children aged 0–11 years old at the start (in 1994), with follow-ups conducted every 2 years from then until 2008, producing a total of 8 cycles. The survey assessed a variety of constructs from demographic information to physical and mental health, educational and vocational outcomes, and socioemotional competencies from early childhood into young adulthood (Statistics Canada, 2010a).

The original Cycle 1 cohort included almost 23,000 children selected to represent the population of all Canadian children aged 0–11 years. Exclusionary criteria included children living in Northwestern territories, or having parents that are either institutionalized, living in First Nations Reserves and Crown Lands, and/or children whose parents were full-time members of the Canadian Armed Forces (representing 2% of the population). Budget restrictions and the need to reduce response burden on households with more than 2 children reduced the sample size to 16,000 in Cycle 2. Close to 10,000 of that sample participated in the final cycle of the survey (Cycle 8).

As this research is based on anonymized secondary data files provided by Statistics Canada, an ethics approval was not required for this particular investigation. We refer readers to the Statistics Act (<http://laws-lois.justice.gc.ca/eng/acts/S-19/PITIndex.html>) for ethical guidelines that the Government of Canada abided by during data collection.

Study Sample

For this study we only used data from Cycle 6 (2004), Cycle 7 (2006), and Cycle 8 (2008) of the multi-wave study, as these were the only cycles containing our target age group (early adulthood) along with the relevant variables (trait EI and PSE pursuit). We specifically used a subsample of ~1,400 Canadian youth (50% males) aged 20–21 who had completed the same measure of trait EI (EQ-i: Mini) at Cycle 6, and again at Cycle 8 when they were 24–25 years old. The EQ-i: Mini data was not available at any other Cycle for this cohort. PSE information for this cohort was available at Cycles 6, 7, and 8. Participants were surveyed via face-to-face or telephone interview conducted by a trained Statistics Canada interviewer using computer-assisted interviewing (Statistics Canada, 2010b). The NLSCY data User Guide contains more information on the sampling design and data collection procedure (Statistics Canada, 2010a).

Measures

Trait EI

Trait EI was assessed using a shortened, 20-item version of the EQ-i: Short (Bar-On, 2002) called the EQ-i: Mini. For the present sample, this measure was only administered to participants at Cycle 6 (age 20–21) and Cycle 8 (age 24–25). The EQ-i: Mini consists of self-referential statements rated by participants on a 5-point Likert scale (from 1 = “Very seldom true or not true” to 5 = “Very often true or true”). Higher scores imply higher levels of trait EI. Of the 20 items, 16 tap into dimensions of interest (Interpersonal, Intrapersonal, Stress Management and Adaptability) while the other 4 are screeners for participants’ General Mood. As General Mood is not part of the trait EI construct, it was not considered in the present study. For a full list of items see **Appendix A in Supplementary Material**.

This measure demonstrated good reliability coefficients: for each dimension of the EQ-i: Mini, average item reliabilities (R^2) and mean inter-item correlations (MICs) across both cycles were moderate: Interpersonal ($R^2 = 0.34$; MIC = 0.34), Intrapersonal ($R^2 = 0.28$; MIC = 0.33), Stress Management ($R^2 = 0.35$, MIC = 0.33), and Adaptability ($R^2 = 0.35$; MIC = 0.31). The EQ-i: Mini

also had good Cronbach’s alpha coefficients for the total scores at each time-point (0.76 at Cycle 6 and 0.77 at Cycle 8).

PSE Participation

A variable in the NLSCY dataset coded participants’ self-reported educational status at each Cycle by the following categories: 01 = School leaver; 02 = In high school; 03 = Completed high school but not in post-secondary; 04 = In post-secondary; 05 = Completed post-secondary; 06–99 = Current education status unknown.

For the present study, this variable was re-coded to form a dichotomous variable with the following groups: No PSE (categories 01, 02, and 03) and Some PSE (categories 04 and 05), respective to that specific time-point. Cases with unknown education status (06–99) were excluded from the analyses.

To examine change in PSE status across time-points, the education variables were re-coded as a three-level variable: No PSE at all (at either time-point), New PSE (for those who had no PSE at a previous time-point but acquired some PSE by a second time-point), and Previous PSE (for those who had some PSE at a previous time-point).

Statistical Analyses

Trait EI and PSE Pursuit

A series of between-groups (for concurrent) and within-subjects (for prospective) Multivariate Analyses of Variance (MANOVAs) were conducted with the PSE groups (No PSE and Some PSE for PSE status; No PSE, New PSE, and Previous PSE for change in PSE status) as the grouping independent variable and the EQ-i: Mini subscales (Interpersonal, Intrapersonal, Stress Management, and Adaptability) as dependent variables. Gender was also included as a second grouping variable in the analyses to assess for potential moderating effects. These MANOVAs were conducted using the latest version of SPSS software.

Significance Criteria

Following the NLSCY guidelines (Statistics Canada, 2010a), all analyses were conducted on weighted data, calculated from longitudinal sampling weights (pre-generated by Statistics Canada), which are adjusted for longitudinal survey-wide non-response and post-stratified to known frequencies by age, sex, and province to reflect the original survey population (Statistics Canada, 2010a). This allows for making population-based inferences from the results. However, the weighting procedure inflates the effective sample sizes (to the hundreds of thousands) to a point where orthodox statistical significance testing ($p < 0.05$) is not applicable¹. Therefore, we interpreted the results based on standardized effect size measures, such as the Eta statistic (η ; the square root of Partial Eta-Squared values in SPSS) for mean differences, and Cramer’s V for cross-tabulations of frequencies. These values provide information on the magnitude of the effect, and are independent of the sample size (Ferguson, 2009; Gignac and Szodorai, 2016). There is no

¹Due to privacy restrictions from Statistics Canada on the release of weighted and unweighted sample sizes, the weighted subgroup sample sizes are not reported in the results. The unweighted total sample size is approximately $N = 1,400$.

TABLE 1 | Concurrent and Prospective Associations between EQ-i: Mini Subscale Scores and PSE Status.

Effects	Interpersonal at age 20–21	Intrapersonal at age 20–21	Stress Mngt. at age 20–21	Adaptability at age 20–21
PSE STATUS AT AGE 20–21				
<i>Eta</i> PSE	0.11*	0.12*	0.15*	0.14*
<i>Eta</i> PSE × Gender	0.07	0.03	0.00	0.07
<i>M</i> (SD) Some PSE	4.30 (0.49) ^a	3.77 (0.72) ^a	3.94 (0.69) ^a	4.03 (0.57) ^a
<i>M</i> (SD) No PSE	4.08 (0.72) ^b	3.55 (0.84) ^b	3.67 (0.82) ^b	3.82 (0.70) ^b
PSE STATUS AT AGE 22–23				
<i>Eta</i> PSE	0.14*	0.05	0.15*	0.05
<i>Eta</i> PSE × Gender	0.15*	0.09 [†]	0.06	0.13*
<i>M</i> (SD) Some PSE Men	4.13 (0.61) ^a	3.74 (0.74) ^a	3.96 (0.67) ^a	3.99 (0.56) ^a
<i>M</i> (SD) No PSE Men	3.69 (0.53) ^b	3.44 (0.78) ^b	3.53 (0.87) ^b	3.69 (0.61) ^b
<i>M</i> (SD) Some PSE Women	4.46 (0.52) ^c	3.76 (0.72) ^a	3.94 (0.68) ^a	4.01 (0.58) ^a
<i>M</i> (SD) No PSE Women	4.44 (0.41) ^c	3.85 (0.91) ^a	3.76 (0.81) ^c	4.13 (0.74) ^a
PSE STATUS AT AGE 24–25				
<i>Eta</i> PSE	0.22*	0.09 [†]	0.11*	0.13*
<i>Eta</i> PSE × Gender	0.16*	0.10*	0.11*	0.00
<i>M</i> (SD) Some PSE Men	4.15 (0.54) ^a	3.76 (0.73) ^a	4.00 (0.69) ^a	4.04 (0.54) ^a
<i>M</i> (SD) No PSE Men	3.60 (0.52) ^b	3.33 (0.80) ^b	3.54 (0.79) ^b	3.71 (0.60) ^b
<i>M</i> (SD) Some PSE Women	4.45 (0.42) ^c	3.76 (0.74) ^a	3.91 (0.70) ^a	4.00 (0.60) ^a
<i>M</i> (SD) No PSE Women	4.35 (0.54) ^c	3.78 (0.89) ^a	3.91 (0.73) ^a	3.88 (0.77) ^b
	Interpersonal at age 4–25	Intrapersonal at age 24–25	Stress Mngt. at age 24–25	Adaptability at age 24–25
PSE STATUS AT AGE 24–25				
<i>Eta</i> PSE	0.17*	0.09 [†]	0.11*	0.15*
<i>Eta</i> PSE × Gender	0.06	0.09 [†]	0.04	0.12*
<i>M</i> (SD) Some PSE Men	4.22 (0.57) ^a	3.79 (0.67) ^a	3.95 (0.71) ^a	4.19 (0.54) ^a
<i>M</i> (SD) No PSE Men	3.86 (0.52) ^b	3.42 (0.67) ^b	3.63 (0.75) ^b	3.72 (0.59) ^b
<i>M</i> (SD) Some PSE Women	4.52 (0.44) ^c	3.85 (0.69) ^a	3.97 (0.69) ^a	4.19 (0.61) ^a
<i>M</i> (SD) No PSE Women	4.35 (0.63) ^a	3.84 (0.74) ^a	3.83 (0.77) ^c	4.14 (0.76) ^a

Mean scores on the EQ-i: Mini subscales range from 1 to 5. Subscale means with different superscripts are significantly different from each other. PSE, Post-secondary education; Non-trivial effect; [†] Marginal effect.

“objective” indicator for the extent of difference required to be deemed “non-trivial.” Therefore, we followed the guideline that effect size benchmarks for “practically significant” effects should be determined based on evidence from the specific research context (Hill et al., 2008; Keefer et al., 2013). Our interpretations relied on empirically derived benchmarks used in previous studies on socioemotional competencies (Durlak et al., 2011; Keefer et al., 2013). Specifically, effect sizes of ≥ 0.10 (non-squared) units were considered to be non-trivial, or practically significant.

RESULTS

Concurrent Associations With PSE Status at Age 20–21

Of the total study sample who had valid EQ-i: Mini data at Cycle 6, 66% reported at least some PSE experience at Cycle 6, 22%

reported no PSE experience at Cycle 6, and the remaining 12% had unknown or missing Cycle 6 education status. Respondents who had unknown/missing vs. valid Cycle 6 education data were compared on their Cycle 6 EQ-i: Mini subscale scores and proportions of men and women. Missingness of Cycle 6 education data was not significantly associated with gender (Cramer's $V = 0.06$) or Cycle 6 EQ-i: Mini scores (Wilk's lambda = 0.99, $Eta = 0.08$). Only the respondents with valid Cycle 6 education data were used in subsequent analyses of variance.

A 2×2 factorial MANOVA was conducted on Cycle 6 (age 20–21) EQ-i: Mini subscale scores, using Cycle 6 PSE Status (some PSE vs. no PSE) and gender (men vs. women) as the grouping factors. There was a significant multivariate effect of PSE Status (Wilk's lambda = 0.97, $Eta = 0.18$), but the moderating effect of gender was non-significant (Wilk's lambda = 0.99, $Eta = 0.08$). *Eta* values and contrasts of group means from follow-up univariate ANOVAs are presented in **Table 1**. Individuals who had at least some PSE experience

by age 20–21 had significantly higher concurrent scores on all four EQ-i: Mini subscales than individuals who had no PSE experience.

Prospective 2-Year Associations With PSE Status at Age 22–23

Of the total study sample who had valid EQ-i: Mini data at Cycle 6, 22% did not return for Cycle 7 (age 22–23). Of the returning Cycle 7 sample, 73% reported at least some PSE experience at Cycle 7, 14% reported no PSE experience at Cycle 7, and the remaining 13% had unknown or missing Cycle 7 education status. Respondents who had unknown/missing vs. valid Cycle 7 education data were compared on their Cycle 6 EQ-i: Mini subscale scores, proportions of men and women, and Cycle 6 PSE Status (some vs. none). Missingness of Cycle 7 education data was not significantly associated with gender (Cramer's $V = 0.09$) or Cycle 6 EQ-i: Mini scores (Wilk's lambda = 1.0, Eta = 0.06). However, missingness was significantly associated with Cycle 6 PSE Status (Cramer's $V = 0.18$); respondents who reported no PSE at Cycle 6 were three times more likely (18%) to have missing Cycle 7 PSE data than respondents who reported some PSE at Cycle 6 (6%). Only the respondents with valid Cycle 7 education data were used in subsequent analyses of variance.

A 2×2 MANOVA was conducted on Cycle 6 (age 20–21) EQ-i: Mini subscale scores, using Cycle 7 (age 22–23) PSE Status (Some PSE vs. No PSE) and gender (men vs. women) as the grouping factors. There was a significant multivariate effect of PSE Status (Wilk's lambda = 0.96, Eta = 0.20), as well as a significant moderation effect of gender (Wilk's lambda = 0.96, Eta = 0.19). Eta values and contrasts of group means from follow-up univariate ANOVAs are presented in **Table 1**. Individuals (both men and women) who had at least some PSE experience at age 22–23 had significantly higher Stress Management scores at age 20–21 than individuals who had no PSE experience at age 22–23. In addition, men who had at least some PSE experience at age 22–23 had significantly higher Interpersonal, Intrapersonal, and Adaptability scores at age 20–21 than men who had no PSE experience at age 22–23; for women, these effects were non-significant.

Predicting Change in PSE Status From Age 20–21 to 22–23

Of the respondents who had reported Cycle 7 education data, 76% reported at least some PSE experience previously in Cycle 6, 8% reported no PSE experience in either Cycle 6 or Cycle 7, and 8% reported no PSE experience at Cycle 6 but had newly acquired some PSE experience by Cycle 7.

A 3×2 factorial MANOVA was conducted on Cycle 6 (age 20–21) EQ-i: Mini subscale scores, using Cycle 7 (age 22–23) PSE Status Change (Previous PSE vs. New PSE vs. No PSE) and gender (men vs. women) as the grouping factors. There was a significant multivariate effect of PSE Status Change (Wilk's lambda = 0.94, Eta = 0.17), as well as a significant moderation effect of gender (Wilk's lambda = 0.96, Eta = 0.14). Eta values and contrasts of group means from follow-up univariate ANOVAs

are presented in **Table 2**. Among those men who had no PSE experience at age 20–21, higher Interpersonal and Intrapersonal scores at age 20–21 differentiated the individuals who acquired new PSE experience by age 22–23 from individuals who did not. For women, none of the EQ-i: Mini subscales at age 20–21 predicted new acquisition of PSE experience by age 22–23.

Prospective 4-Year Associations With PSE Status at Age 24–25

Of the total study sample who had valid EQ-i: Mini data at Cycle 6, 29% did not return for Cycle 8. Of the returning Cycle 8 sample, 77% reported at least some PSE experience at Cycle 8, 12% reported no PSE experience at Cycle 8, and the remaining 11% had unknown or missing Cycle 8 education status. Respondents who had unknown/missing vs. valid Cycle 8 education data were compared on their Cycle 6 EQ-i: Mini subscale scores, proportions of men and women, and Cycle 7 PSE Status (some vs. none). Missingness was not significantly associated with gender (Cramer's $V = 0.09$) or Cycle 6 EQ-i: Mini scores (Wilk's lambda = 1.0, Eta = 0.05). However, missingness was significantly associated with Cycle 7 PSE Status (Cramer's $V = 0.11$); respondents who reported no PSE at Cycle 7 were three times more likely (11%) to have missing Cycle 8 PSE data than respondents who reported some PSE at Cycle 7 (4%). Only the respondents with valid Cycle 8 education data were used in subsequent analyses of variance.

A 2×2 factorial MANOVA was conducted on Cycle 6 (age 20–21) EQ-i: Mini subscale scores, using Cycle 8 (age 24–25) PSE Status (some vs. none) and gender (men vs. women) as the grouping factors. There was a significant multivariate effect of PSE Status (Wilk's lambda = 0.95, Eta = 0.24), as well as a significant moderation effect of gender (Wilk's lambda = 0.96, Eta = 0.20). Eta values and contrasts of group means from follow-up univariate ANOVAs are presented in **Table 1**. Individuals (both men and women) who had at least some PSE experience at age 24–25 had significantly higher Adaptability scores at age 20–21 than individuals who had no PSE experience at age 24–25. In addition, men who had at least some PSE experience at age 24–25 had significantly higher Interpersonal, Intrapersonal, and Stress Management scores at age 20–21 than men who had no PSE experience at age 24–25; these effects were non-significant for women.

Predicting Change in PSE Status From Age 22–23 to 24–25

Of the respondents who had reported Cycle 8 education data, 86% reported at least some PSE experience previously in Cycle 7, 11% reported no PSE experience in either Cycle 7 or Cycle 8, and 3% reported no PSE experience at Cycle 7 but had newly acquired some PSE experience by Cycle 8. Given the very small percentage of individuals in the last category (corresponding unweighted $n < 30$), the following results should be treated as preliminary.

A 3×2 factorial MANOVA was conducted on Cycle 6 EQ-i: Mini subscale scores, using Cycle 8 PSE Status Change (Previous vs. New vs. None) and gender (men vs. women) as the grouping factors. This omnibus test revealed a significant multivariate

TABLE 2 | Prospective Associations between EQ-i: Mini Subscale Scores and PSE Status Change.

Effects	Interpersonal at age 20–21	Intrapersonal at age 20–21	Stress Mngt. at age 20–21	Adaptability at age 20–21
PSE STATUS CHANGE FROM AGE 20–21 TO 22–23				
Eta PSE Change	0.16*	0.06	0.18*	0.09 [†]
Eta PSE Change × Gender	0.15*	0.09 [†]	0.08	0.12*
MEN				
M (SD) Previous PSE	4.16 (0.51) ^a	3.74 (0.74) ^a	3.99 (0.65) ^a	4.03 (0.54) ^a
M (SD) New PSE	3.94 (1.13) ^b	3.89 (0.68) ^a	3.59 (0.76) ^b	3.82 (0.69) ^b
M (SD) No PSE	3.69 (0.53) ^c	3.44 (0.78) ^b	3.53 (0.88) ^b	3.70 (0.62) ^b
WOMEN				
M (SD) Previous PSE	4.44 (0.40) ^d	3.76 (0.72) ^a	3.96 (0.66) ^a	4.02 (0.57) ^a
M (SD) New PSE	4.36 (0.56) ^d	3.74 (0.79) ^a	3.77 (0.91) ^c	3.91 (0.69) ^a
M (SD) No PSE	4.44 (0.55) ^d	3.83 (0.98) ^a	3.78 (0.77) ^c	4.11 (0.77) ^a
PSE STATUS CHANGE FROM AGE 22–23 TO 24–25				
Eta PSE Change	0.21*	0.08	0.09 [†]	0.12*
Eta PSE Change × Gender	0.20*	0.15*	0.10*	0.15*
MEN				
M (SD) Previous PSE	4.18 (0.53) ^a	3.73 (0.72) ^a	4.03 (0.65) ^a	4.04 (0.52) ^a
M (SD) New PSE	3.92 (0.58) ^b	3.20 (1.30) ^b	4.11 (0.78) ^a	3.39 (0.70) ^b
M (SD) No PSE	3.52 (0.54) ^c	3.27 (0.78) ^b	3.61 (0.82) ^b	3.66 (0.65) ^c
WOMEN				
M (SD) Previous PSE	4.45 (0.42) ^d	3.75 (0.74) ^a	3.94 (0.68) ^a	3.99 (0.70) ^a
M (SD) New PSE	4.55 (0.46) ^d	4.28 (0.71) ^c	3.63 (0.66) ^b	4.23 (0.63) ^d
M (SD) No PSE	4.42 (0.57) ^d	3.83 (0.99) ^a	3.94 (0.74) ^a	3.96 (0.79) ^a

Mean scores on the EQ-i: Mini subscales range from 1 to 5. Subscale means with different superscripts are significantly different from each other. PSE, post-secondary education;

*Non-trivial effect; [†]Marginal effect.

effect of PSE Status Change (Wilk's lambda = 0.95, Eta = 0.15), as well as a significant moderation effect of gender (Wilk's lambda = 0.92, Eta = 0.20). Eta values and contrasts of group means from follow-up univariate ANOVAs are presented in **Table 2**. The results differed for men and women. Among those men who had no PSE experience at age 22–23, higher Intrapersonal and Stress Management scores, but lower Adaptability scores at age 20–21 differentiated the men who acquired new PSE experience by age 24–25 from the men who did not. Among those women who had no PSE experience at age 22–23, higher Intrapersonal and Adaptability scores, but lower Stress Management scores at age 20–21 differentiated the women who acquired new PSE experience by age 24–25 from the women who did not.

Concurrent Associations With PSE Status at Age 24–25

A 2 × 2 MANOVA was conducted on Cycle 8 (age 24–25) EQ-i: Mini subscale scores, using Cycle 8 (age 24–25) PSE Status (Some PSE vs. No PSE) and gender (men vs. women) as the grouping factors. This omnibus test revealed a significant multivariate effect of PSE Status (Wilk's lambda = 0.95, Eta = 0.22), as well as a significant moderation effect of gender (Wilk's lambda = 0.98, Eta = 0.13). Eta values and contrasts of group means from follow-up univariate ANOVAs are presented in **Table 1**. Individuals (both men and women) who had at least some PSE experience at age 24–25 had significantly higher concurrent Interpersonal and Stress Management scores than individuals who had no PSE experience at age 24–25. In addition, men who had at least some

PSE experience at age 24–25 had significantly higher concurrent Adaptability and Intrapersonal scores than men who had no PSE experience at age 24–25; these effects were non-significant for women.

DISCUSSION

This study was the first to examine the concurrent and longitudinal associations of trait EI with PSE participation using a unique, nationally representative sample of Canadian young adults. Higher trait EI scores (as measured by the EQ-i: Mini) at age 20–21 predicted greater PSE participation both concurrently, as well as prospectively at age 22–23 and 24–25. All four trait EI dimensions were positively associated with PSE participation for both genders concurrently at age 20–21. Longitudinally, all four trait EI dimensions (at age 20–21) were positively associated with PSE participation in men at each time point. Meanwhile, women's PSE pursuit at age 22–23 and 24–25 was only associated with their age 20–21 Stress Management and Adaptability scores. Concurrent PSE status at age 24–25 was positively associated with all four trait EI dimensions for men and with the Interpersonal and Stress Management scores for women. Most importantly, trait EI at age 20–21 significantly predicted acquisition of new PSE over-time. Among men with no PSE at age 20–21, those with higher Interpersonal scores were more likely to enter PSE either 2 or 4 years later. Acquiring new PSE was also predicted by higher Intrapersonal and Stress Management scores for men, and higher Intrapersonal and Adaptability scores for women.

With these findings it is possible to conclude that higher trait EI has non-trivial prospective utility for predicting PSE pursuit during the period of emerging adulthood. These findings also add to the existing body of research linking higher trait EI with success in PSE settings. Students who enter university with higher trait EI levels are more likely to persist beyond first year (Parker et al., 2006), attain higher grades (Parker et al., 2004, 2005a), suffer from less anxiety and use better coping strategies (Summerfeldt et al., 2006; Austin et al., 2010; Saklofske et al., 2012), and are more likely to graduate (Keefer et al., 2012; Parker et al., 2016). Trait EI therefore serves not only as a resilience factor for students already in PSE, but also as an antecedent to pursuing this important life goal in the first place.

There are several possible mechanisms through which trait EI might contribute to greater rates of PSE participation. Individuals with higher trait EI levels may be more likely to pursue PSE because they are more likely to meet admission eligibility criteria due to their better high school performance (Petrides et al., 2004; Perera and DiGiacomo, 2013). In addition, trait EI has been studied in relation to career decision-making process, signifying the importance of these socioemotional competencies in being able to handle the overwhelming nuances of important life decisions (Brown et al., 2003; Avsec, 2012; Di Fabio and Kenny, 2012). A similar mechanism could be influencing the decision to pursue higher education. In today's unpredictable economic times, career decisions require a firmer grasp of nuance, as well as a reasonable level of emotional awareness and stability (Krieshok et al., 2009). Higher levels of trait EI entail factors, such as considering all possibilities before making a decision, and being aware of one's own emotional states (Bar-On, 1997, 2002). These traits have demonstrated to be effective mediators for combatting indecisiveness, lack of information on future opportunities, and productive use of information to make a career decision (Di Fabio and Palazzeschi, 2008, 2009; Di Fabio et al., 2012; Di Fabio and Saklofske, 2014). Trait EI is also positively associated with more adaptive decision-making styles (Di Fabio and Palazzeschi, 2008; Di Fabio and Blustein, 2010). Indeed, attaining a college or university degree is undoubtedly important for better vocational prospects (Toutkoushian and Paulsen, 2016; Statistics Canada, 2017; Uppal, 2017) and would therefore be a crucial factor in career decisions. It is therefore very plausible to hypothesize that if trait EI is implicated in the general process of career decision-making, it may also be associated with the decision to pursue PSE via a similar mechanism. Future research on trait EI and PSE pursuit should consider including decision-making variables as mediating factors.

Magnitude of Effects

It is important to note that although most of the reported effect sizes were relatively small, close to the 0.10 benchmark (Gignac and Szodorai, 2016), this is still non-trivial when viewed in light of population-based research and the practical significance of the outcome variable. For example, Mikolajczak et al. (2015) studied the effects of trait EI on physical health variables (e.g., doctor visits, days spent in hospital, reimbursed drugs) in a nationally-representative European sample. Similar to the present study, they also found small but meaningful effects

(<0.20) when assessing the relationship between high trait EI levels and better physical health outcomes. In arguing for the practical significance of their findings, they bring up the fiscal reality that the “population with below-average socioemotional competencies cost nearly 2 billion more to the Belgian social security, than the population with above-average [trait EI]” (Mikolajczak et al., 2015; p. 12). From the standpoint of public policy, this is considered a worthwhile return on investment (Mikolajczak and Van Bellegem, 2017).

Another economic impact study showed that the implementation of socioemotional programs in schools estimates an economic return of \$11 per dollar invested in these programs (Belfield et al., 2015). This is further supported by Durlak et al.'s (2011) meta-analysis indicating that while the implementation of socioemotional learning programs had relatively small mean effect on academic performance ($r = 0.13$), it translated to an overall 11 percentile point gain in grades. Therefore, the present study's relatively small magnitudes of effects for trait EI dimensions on PSE pursuit are hence not at all trivial and, when viewed from a population-based lens, can carry significant economic implications.

In discussing the issue of effect sizes, Keefer et al. (2018) further argued that a broad life outcome, such as PSE attainment is necessarily the product of numerous individual and contextual factors; thus, any single factor can only be expected to account for a small portion of criterion variance by itself. This argument is particularly relevant in the present study, where the effects of trait EI on PSE pursuit were further moderated by gender and trait EI domain.

Gender and Domain Differences

Some trait EI domains are more gendered than others. Specifically, women tend to score higher than men on the Interpersonal dimension, whereas men tend to score higher than women on Adaptability (Keefer, 2015). Gender differences in the Intrapersonal and Stress Management domains tend to be smaller or inconsistent. Siegling et al. (2012) investigated the nuances of gender differences in trait EI domains in relation to the gender-linked personality traits of communion and agency. Communion refers to compassion, nurturance, or placing a strong salience on interpersonal relationships. Agency involves assertiveness, competitiveness, and self-autonomy. Typically, agentic traits are associated with males while communal traits are associated with females (Bakan, 1966). Siegling et al. (2012) found that gender differences in the Interpersonal vs. Adaptability domains of trait EI were linked to communion vs. agency orientations, respectively.

In our results, the relatively gender-neutral EI traits (i.e., Intrapersonal and Stress Management) were linked to long-term PSE pursuit in both men and women. However, the two gender-typed domains (i.e., Interpersonal and Adaptability) had unique patterns of predictive utility for the counter-stereotypical gender. Controlling for previous PSE status, the Adaptability scores (male-typed traits) predicted long-term gains in PSE status for women, while the Interpersonal scores (female-typed traits) predicted long-term gains in PSE status for men. This differential pattern of relationships provides support for the idea

that an androgynous trait EI profile, characterized by high levels of both male-typed and female-typed traits, may be maximally advantageous for both men and women (Keefer, 2015).

Overall, the associations of trait EI with PSE pursuit were stronger and more robust for men than for women. The weaker effects for women may be partially explained by the restricted range of the PSE variable: in the present study the proportion of women pursuing PSE was significantly higher than men (e.g., at age 20–21 the group with “Some PSE” had 81% women). However, similar gender moderation effects have been reported for other criterion variables, showing that trait EI matters more for men than women. For example, Karakuş (2013) investigated trait EI and negative feelings in a sample of primary school teachers. It was found that trait EI directly predicted stress and indirectly (mediated via stress) predicted anxiety levels in male teachers, but this effect was not significant for women. This is consistent with gender differences in the effects of trait EI on stress found by Petrides and Furnham (2006) in a similar workplace study. It is reasoned that men and women are exposed to different forms of stress; specifically, women face other responsibilities, such as family responsibilities and the “glass ceiling effect” of progressing in the organizational hierarchy (Cotter et al., 2001; as cited in Petrides and Furnham, 2006). Future studies should examine the mediating role of such gendered responsibilities in the relationship between trait EI and PSE pursuit in young adults. Additionally, interventions aimed at enhancing trait EI should consider the different types of stressors experienced by men and women.

Methodological Considerations

A notable methodological strength of the present study was the use of three biennial waves of longitudinal data from a large nationally representative sample of young adults, afforded by the NLSCY database. These design features were not only unique relative to all previous studies of trait EI and PSE outcomes, but also essential in allowing us to investigate the link between trait EI and PSE pursuit in the first place. That said, the correlational nature of the NLSCY data does not permit making causal inferences based on the observed relationships. From the directionality standpoint, higher trait EI may predict future pursuit of PSE, but the PSE experience itself has also been found to predict subsequent gains in trait EI above and beyond the effect of maturation with age (Parker et al., 2005b). In the present study, the mean levels of trait EI (for both men and women) showed a moderate increase from age 20–21 to 24–25. However, this change in trait EI was not significantly moderated by participants’ PSE status, suggesting that the observed increase in trait EI was likely due to maturation with age rather than the reciprocal effect of PSE. Still, we cannot rule out the effects of potential third variables unaccounted for in this study.

It should also be noted that the descriptive statistics reported in this study are a decade old (2004–2008), which may not reflect current population statistics and so should be interpreted with reference to its appropriate time period. Nevertheless, the high rates of PSE participation observed in the current sample (e.g., over 60% at age 20–21, increasing to over 70% by age 24–25) is consistent with more recent reports, where Canada has the

highest proportion of post-secondary graduates (53%) among all OECD countries (OECD, 2016).

As in all multi-year longitudinal studies, participant attrition and non-response pose a potential limitation to the generalizability of our results. Our missing data analyses showed that participants who had missing cycle-to-cycle data had significantly lower levels of education compared to participants who had complete data for all analyses. This is not surprising, given that indices of lower socioeconomic status are among the most commonly reported predictors of longitudinal survey non-response (Keefer et al., 2013). To account for this potential source of bias, our analyses of change in PSE explicitly controlled for the previous-cycle PSE status. Importantly, no other demographic or trait EI variables were associated with longitudinal or cross-sectional missingness in the current sample. Furthermore, all our analyses were weighted by the NLSCY longitudinal survey weights designed to preserve the original population demographics. These measures would mitigate the biasing impact of longitudinal attrition on our findings. If any, however, the bias would favor null results, resulting in attenuated associations between trait EI and PSE pursuit.

Lastly, the trait EI measure used in the NLSCY (EQ-i: Mini) is a highly abridged version of the EQ-i:S assessment used in previous PSE research (Parker et al., 2011). Although truncating the EQ-i: Mini had permitted the inclusion of trait EI variables in the large NLSCY database, this also likely limited its domain coverage, so its full equivalence to the EQ-i:S cannot be assumed. Indeed, the EQ-i: Mini showed some divergence from the EQ-i:S in the pattern of gender differences across its subscales. At both ages 20–21 and 24–25, women scored significantly higher than men on the Interpersonal subscale of the EQ-i: Mini, which is consistent with gender differences observed for the EQ-i:S (Parker et al., 2011). However, the EQ-i: Mini showed no gender differences on the Adaptability subscale, on which men typically score higher than women based on the EQ-i:S (Parker et al., 2011). It will be important to accrue independent validity evidence for the EQ-i: Mini in future studies, to fully capitalize on these and other findings generated from the NLSCY database.

CONCLUSIONS AND IMPLICATIONS

Previous studies on the role of trait EI in PSE attainment have found that individuals who enter PSE with higher levels of trait EI are more likely to earn higher grades, persevere with their studies, and successfully complete their program (Parker et al., 2018). The present study expands on this picture, showing that the role of trait EI in PSE outcomes is evident even earlier in the educational pathway, predicting whether individuals will enter PSE at all during the period of emerging adulthood. This association was especially robust for men, whose PSE participation rates were significantly lower than those of women. The finding that trait EI continued to predict further gains in PSE participation 2 and 4 years later is particularly promising, as it represents an important validation step toward further investment in trait EI interventions, starting with school children. Indeed, integrating socioemotional learning

systematically and early in the education cycle, starting with the K-12 curriculum, has been advocated as the best approach for building human capital (Durlak et al., 2011). The economic returns on investing in young people's socioemotional learning throughout K-12 schooling are estimated to be more than 10-fold (Belfield et al., 2015). We would further argue that socioemotional programming should also be part and parcel of student services offered by PSE institutions (Parker et al., 2018). Evidence from controlled intervention studies with school children, undergraduates, and adults supports the efficacy of such efforts in boosting socioemotional traits and improving academic, employment, and other life outcomes (Durlak et al., 2011; Kotsou et al., 2011; Nelis et al., 2011; Dacre Pool and Qualter, 2012; Schutte et al., 2013).

AUTHOR CONTRIBUTIONS

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- SS: data analysis. RH: editing and research idea. JP: editing and research idea.
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- ## SUPPLEMENTARY MATERIAL
- The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01182/full#supplementary-material>
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The Measurement of Emotional Intelligence: A Critical Review of the Literature and Recommendations for Researchers and Practitioners

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Emotional Intelligence (EI) emerged in the 1990s as an ability based construct analogous to general Intelligence. However, over the past 3 decades two further, conceptually distinct forms of EI have emerged (often termed “trait EI” and “mixed model EI”) along with a large number of psychometric tools designed to measure these forms. Currently more than 30 different widely-used measures of EI have been developed. Although there is some clarity within the EI field regarding the types of EI and their respective measures, those external to the field are faced with a seemingly complex EI literature, overlapping terminology, and multiple published measures. In this paper we seek to provide guidance to researchers and practitioners seeking to utilize EI in their work. We first provide an overview of the different conceptualizations of EI. We then provide a set of recommendations for practitioners and researchers regarding the most appropriate measures of EI for a range of different purposes. We provide guidance both on how to select and use different measures of EI. We conclude with a comprehensive review of the major measures of EI in terms of factor structure, reliability, and validity.

Keywords: emotional intelligence, measures, questionnaires, trait, ability, mixed, recommendations

OVERVIEW AND PURPOSE

The purpose of this article is to review major, widely-used measures of Emotional Intelligence (EI) and make recommendations regarding their appropriate use. This article is written primarily for academics and practitioners who are not currently experts on EI but who are considering utilizing EI in their research and/or practice. For ease of reading therefore, we begin this article with an introduction to the different types of EI, followed by a brief summary of different measures of EI and their respective facets. We then provide a detailed set of recommendations for researchers and practitioners. Recommendations focus primarily on choosing between EI constructs (ability EI, trait EI, mixed models) as well as choosing between specific tests. We take into account such factors as test length, number of facets measured and whether tests are freely available. Consequently we also provide recommendations both for users willing to purchase tests and those preferring to utilize freely available measures.

In our detailed literature review, we focus on a set of widely used measures and summarize evidence for their validity, reliability, and conceptual basis. Our review includes studies that focus

purely on psychometric properties of EI measures as well as studies conducted within applied settings, particularly health care settings. We include comprehensive tables summarizing key empirical studies on each measure, in terms of their research design and main findings. Our review includes measures that are academic and/or commercial as well as those that are freely available or require payment. To assist users with accessing measures, we include web links to complete EI questionnaires for freely available measures and to websites and/or example items for copyrighted measures. For readers interested in reviews relating primarily to EI constructs, theory and outcomes rather than specifically *measures* of EI, we recommend a number of recent high quality publications (e.g., Kun and Demetrovics, 2010; Gutiérrez-Cobo et al., 2016). Additionally, for readers interested in a review of measures without the extensive recommendations we provide here, we recommend the chapter by Siegling et al. (2015).

EARLY RESEARCH ON EMOTIONAL INTELLIGENCE

EI emerged as a major psychological construct in the early 1990s, where it was conceptualized as a set of abilities largely analogous to general intelligence. Early influential work on EI was conducted by Salovey and Mayer (1990), who defined EI as the “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). They argued that individuals high in EI had certain emotional abilities and skills related to appraising and regulating emotions in the self and others. Accordingly, it was argued that individuals high in EI could accurately perceive certain emotions in themselves and others (e.g., anger, sadness) and also regulate emotions in themselves and others in order to achieve a range of adaptive outcomes or emotional states (e.g., motivation, creative thinking).

However, despite having a clear definition and conceptual basis, early research on EI was characterized by the development of multiple measures (e.g., Bar-On, 1997a,b; Schutte et al., 1998; Mayer et al., 1999) with varying degrees of similarity (see Van Rooy et al., 2005). One cause of this proliferation was the commercial opportunities such tests offered to developers and the difficulties faced by researchers seeking to obtain copyrighted measures (see section Mixed EI for a summary of commercial measures). A further cause of this proliferation was the difficulty researchers faced in developing measures with good psychometric properties. A comprehensive discussion of this issue is beyond the scope of this article (see Petrides, 2011 for more details) however one clear challenge faced by early EI test developers was constructing emotion-focused questions that could be scored with objective criteria. In comparison to measures of cognitive ability that have objectively right/wrong answers (e.g., mathematical problems), items designed to measure emotional abilities often rely on expert judgment to define correct answers which is problematic for multiple reasons (Roberts et al., 2001; Maul, 2012).

A further characteristic of many early measures was their failure to discriminate between measures of typical and maximal performance. In particular, some test developers moved away from pure ability based questions and utilized self-report questions (i.e., questions asking participants to rate behavioral tendencies and/or abilities rather than objectively assessing their abilities; e.g., Schutte et al., 1998). Other measures utilized broader definitions of EI that included social effectiveness in addition to typical EI facets (see Ashkanasy and Daus, 2005) (e.g., Boyatzis et al., 2000; Boyatzis and Goleman, 2007). Over time it became clear that these different measures were tapping into related, yet distinct underlying constructs. Currently, there are two popular methods of classifying EI measures. First is the distinction between trait and ability EI proposed initially by Petrides and Furnham (2000) and further clarified by Pérez et al. (2005). Second is in terms of the three EI “streams” as proposed by Ashkanasy and Daus (2005). Fortunately there is overlap between these two methods of classification as we discuss below.

METHODS OF CLASSIFYING EI

The distinction between *ability EI* and *trait EI* first proposed by Petrides and Furnham (2000) was based purely on whether the measure was a test of maximal performance (ability EI) or a self-report questionnaire (trait EI) (Petrides and Furnham, 2000; Pérez et al., 2005). According to this method of classification, Ability EI tests measure constructs related to an individual’s *theoretical* understanding of emotions and emotional functioning, whereas trait EI questionnaires measure typical behaviors in emotion-relevant situations (e.g., when an individual is confronted with stress or an upset friend) as well as self-rated abilities. Importantly, the key aspect of this method of classification is that EI type is best defined by method of measurement: all EI measures that are based on self-report items are termed “trait EI” whereas all measures that are based on maximal performance items are termed “ability EI”.

The second popular method of classifying EI measures refers to the three EI “streams” (Ashkanasy and Daus, 2005). According to this method of classification, stream 1 includes ability measures based on Mayer and Salovey’s model; stream 2 includes self-report measures based on Mayer and Salovey’s model and stream 3 includes “expanded models of emotional intelligence that encompass components not included in Salovey and Mayer’s definition” (p. 443). Ashkanasy and Daus (2005) noted that stream 3 had also been referred to as “mixed” models in that they comprise a mixture of personality and behavioral items. The term “mixed EI” is now frequently used in the literature to refer to EI measures that measure a combination of traits, social skills and competencies and overlaps with other personality measures (O’Boyle et al., 2011).

Prior to moving on, we note that Petrides and Furnham’s (2000) trait vs. ability distinction is sufficient to categorize the vast majority of EI tests. Utilizing this system, both stream 2 (self-report) and stream 3 (self-report mixed) are simply classified as “trait” measures. Indeed as argued by Pérez et al. (2005), this method of classification is probably sufficient given that self-report measures of EI tend to correlate strongly regardless of whether they are stream 2 or stream 3 measures.

However, given that the terms “stream 3” and “mixed” are so extensively used in the EI literature, we will also use them here. We are not proposing that these terms are ideal or even useful when classifying EI, but rather we wish to adopt language that is most representative of the existing literature on EI. In the following section therefore, we refer to ability EI (stream 1), trait EI (stream 2), and mixed EI (stream 3). As outlined later, decisions regarding which measure of EI to use should be based on what form of EI is relevant to a particular research project or professional application.

ABILITY EI

For the purposes of this review, we refer to “ability” based measures as tests that utilize questions/items comparable to those found in IQ tests (see Austin, 2010). These include all tests containing ability-type items and not only those based directly on Mayer and Salovey’s model. In contrast to trait based measures, ability measures do not require that participants self-report on various statements, but rather require that participants solve emotion-related problems that have answers that are deemed to be correct or incorrect (e.g., what emotion might someone feel prior to a job interview? (a) sadness, (b) excitement, (c) nervousness, (d) all of the above). Ability based measures give a good indication of individuals’ ability to understand emotions and how they work. However since they are tests of maximal ability, they do not tend to predict typical behavior as well as trait based measures (see O’Connor et al., 2017). Nevertheless, ability-based measures are valid, albeit weak, predictors of a range of outcomes including work related attitudes such as job satisfaction (Miao et al., 2017) and job performance (O’Boyle et al., 2011).

TRAIT EI

In this review, we define trait based measures as those that utilize self-report items to measure overall EI and its sub dimensions. We utilize this term for measures that are self-report, and have not explicitly been termed as “mixed” or “stream 3” by others. Individuals high in various measures of trait EI have been found to have high levels of self-efficacy regarding emotion-related behaviors and tend to be competent at managing and regulating emotions in themselves and others. Also, since trait EI measures tend to measure typical behavior rather than maximal performance, they tend to provide a good prediction of actual behaviors in a range of situations (Petrides and Furnham, 2000). Recent meta-analyses have linked trait EI to a range of work attitudes such as job satisfaction and organization commitment (Miao et al., 2017), and Job Performance (O’Boyle et al., 2011).

MIXED EI

As noted earlier, although the majority of EI measures can be categorized using the terms “ability EI” and “trait EI”, we adopt the term “mixed EI” in this review when this term

has been explicitly used in our source articles. The term mixed EI is predominately used to refer to questionnaires that measure a combination of traits, social skills and competencies that overlap with other personality measures. Generally these measures are self-report, however a number also utilize 360 degree forms of assessment (self-report combined with multiple peer reports from supervisors, colleagues and subordinates) (e.g., Bar-On, 1997a,b). This is particularly true for commercial measures designed to predict and improve performance in the workplace. A common aspect in many of these measures is the focus on emotional “competencies” which can theoretically be developed in individuals to enhance their professional success (See Goleman, 1995). Research on mixed measures have found them to be valid predictors of multiple emotion-related outcomes including job satisfaction, organizational commitment (Miao et al., 2017), and job performance (O’Boyle et al., 2011). Effect sizes of these relationships tend to be moderate and on par with trait-based measures.

We note that although different forms of EI have emerged (trait, ability, mixed) there are nevertheless a number of conceptual similarities in the majority of measures. In particular, the majority of EI measures are regarded as *hierarchical* meaning that they produce a total “EI score” for test takers along with scores on multiple facets/subscales. Additionally, the facets in ability, trait and mixed measures of EI have numerous conceptual overlaps. This is largely due to the early influential work of Mayer and Salovey. In particular, the majority of measures include facets relating to (1) perceiving emotions (in self and others), (2) regulating emotions in self, (3) regulating emotions in others, and (4) strategically utilizing emotions. Where relevant therefore, this article will compare how well different measures of EI assess the various facets common to multiple EI measures.

EMOTIONAL INTELLIGENCE SCALES

The following emotional intelligence scales were selected to be reviewed in this article because they are all widely researched general measures of EI that also measure several of the major facets common to EI measures (perceiving emotions, regulating emotions, utilizing emotions).

1. Mayer-Salovey-Caruso Emotional Intelligence Tests (MSCEIT) (Mayer et al., 2002a,b).
2. Self-report Emotional Intelligence Test (SREIT) (Schutte et al., 1998)
3. Trait Emotional Intelligence Questionnaire (TEIQue) (Petrides and Furnham, 2001)
4. Bar-On Emotional Quotient Inventory (EQ-i) (Bar-On, 1997a,b)
5. i) The Situational Test of Emotional Management (STEM) (MacCann and Roberts, 2008)
ii) The Situational Test of Emotional Understanding (STEU) (MacCann and Roberts, 2008)
6. Emotional and Social competence Inventory (ESCI) (Boyatzis and Goleman, 2007)

The complete literature review of these measures is included in the Literature Review section of this article. The following section provides a set of recommendations regarding which of these measures is appropriate to use across various research and applied scenarios.

RECOMMENDATIONS REGARDING THE APPROPRIATE USE OF MEASURES

Deciding Between Measuring Trait EI, Ability EI and Mixed EI

A key decision researchers/practitioners need to make prior to incorporating EI measures into their work is whether they should utilize a trait, ability or mixed measure of EI. In general, we suggest that when researchers/practitioners are interested in emotional abilities and competencies then they should utilize measures of ability EI. In particular ability EI is important in situations where a good theoretical understanding of emotions is required. For example a manager high in ability EI is more likely to make good decisions regarding team composition. Indeed numerous studies on ability EI and decision making in professionals indicates that those high in EI tend to be competent decision makers, problem solvers and negotiators due primarily to their enhanced abilities at perceiving and understanding emotions (see Mayer et al., 2008). More generally, ability EI research also has demonstrated associations between ability EI and social competence in children (Schultz et al., 2004) and adults (Brackett et al., 2006).

We suggest that researchers/practitioners should select trait measures of EI when they are interested in measuring behavioral tendencies and/or emotional self-efficacy. This should be when ongoing, typical behavior is likely to lead to positive outcomes, rather than intermittent, maximal performance. For example, research on task-induced stress (i.e., temporary states of negative affect evoked by short term, challenging tasks) has shown trait EI to have incremental validity over other predictors (O'Connor et al., 2017). More generally, research tends to show that trait EI is a good predictor of effective coping styles in response to life stressors (e.g., Austin et al., 2010). Overall, trait EI is associated with a broad set of emotion and social related outcomes adults and children (Mavroveli and Sánchez-Ruiz, 2011; Petrides et al., 2016). Therefore in situations characterized by ongoing stressors such as educational contexts and employment, we suggest that trait measures be used.

When both abilities and traits are important, researchers/practitioners might choose to use *both* ability and trait measures. Indeed some research demonstrates that both forms of EI are important stress buffers and that they exert their protective effects at different stages of the coping process: ability EI aids in the selection of coping strategies whereas trait EI predicts the implementation of such strategies once selected (Davis and Humphrey, 2014).

Finally, when researchers/practitioners are interested in a broader set of emotion-related and social-related dispositions and competencies we recommend a mixed measure. Mixed

measures are particularly appropriate in the context of the workplace. This seems to be the case for two reasons: first, the tendency to frame EI as a set of competencies that can be trained (e.g., Goleman, 1995; Boyatzis and Goleman, 2007) is likely to equip workers with a positive growth mindset regarding their EI. Second, the emphasis on 360 degree forms of assessment in mixed measures provides individuals with information not only on their self-perceptions, but on how others perceive them which is also particularly useful in training situations.

Advantages and Disadvantages of Trait and Ability EI

There are numerous advantages and disadvantages of the different forms of EI that test users should factor into their decision. One disadvantage of self-report measures is that people are not always good judges of their emotion-related abilities and tendencies (Brackett et al., 2006; Sheldon et al., 2014; Boyatzis, 2018). A further disadvantage of self-report, trait based measures is their susceptibility to faking. Participants can easily come across as high in EI by answering questions in a strategic, socially desirable way. However, this is usually only an issue when test-takers believe that someone of importance (e.g., a supervisor or potential employer) will have access to their results. When it is for self-development or research, individuals are less likely to fake their answers to trait EI measures (see Tett et al., 2012). We also note that the theoretical bases of trait and mixed measures have also been questioned. Some have argued for example that self-report measures of EI measure nothing fundamentally different from the Big Five (e.g., Davies et al., 1998). We will not address this issue here as it has been extensively discussed elsewhere (e.g., Bucich and MacCann, 2019) however we emphasize that regardless of the statistical distinctiveness of self-report measures of EI, there is little question regarding their utility and predictive validity (O'Boyle et al., 2011; Miao et al., 2017).

One advantage of ability based measures is that they cannot be faked. Test-takers are told to give the answer they believe is correct, and consequently should try to obtain a score as high as possible. A further advantage is that they are often more engaging tests. Rather than simply rating agreement with statements as in trait based measures, test-takers attempt to solve emotion-related problems, solve puzzles, and rate emotions in pictures.

Overall however, there are a number of fundamental problems with ability based measures. First, many personality and intelligence theorists question the very existence of ability EI, and suggest it is nothing more than intelligence. This claim is supported by high correlations between ability EI and IQ, although some have provided evidence to the contrary (e.g., MacCann et al., 2014). Additionally, the common measures of ability EI tend to have relatively poor psychometric properties in terms of reliability and validity. Ability EI measures do not tend to strongly predict outcomes that they theoretically should predict (e.g., O'Boyle et al., 2011; Miao et al., 2017). Maul (2012) also outlines a comprehensive set of problems with the most widely used ability measure, the MSCEIT, related to consensus-based scoring, reliability, and underrepresentation of the EI construct. Also see Petrides (2011) for a comprehensive critique of ability measures.

General Recommendation for Non-experts Choosing Between Ability and Trait EI

While the distinction between trait, ability and mixed EI is important, we acknowledge that many readers will simply be looking for an overall measure of emotional functioning that can predict personal and professional effectiveness. Therefore, when potential users have no overt preference for trait or ability measures but need to decide, *we strongly recommend researchers/practitioners begin with a trait-based measure of EI*. Compared to ability based measures, trait based measures tend to have very good psychometric properties, do not have questionable theoretical bases and correlate moderately and meaningfully with a broad set of outcome variables. In general, we believe that trait based measures are more appropriate for most purposes than ability based measures. That being said, several adequate measures of ability EI exist and these have been reviewed in the Literature Review section. If there is a strong preference to use ability measures of EI then several good options exist as outlined later.

Choosing a Specific Measure of Trait EI

Based on our literature review we suggest that a very good, comprehensive measure of trait EI is the Trait Emotional Intelligence Questionnaire, or TEIQue (Petrides and Furnham, 2001). If users are not restricted by time or costs (commercial users need to pay, researchers do not) then the TEIQue is a very good option. The TEIQue is a widely used questionnaire that measures 4 factors and 15 facets of trait EI. It has been cited in more than 2,000 academic studies. It is regarded as a “trait” measure of EI because it is based entirely on self-report responses, and facet scores represent typical behavior rather than maximal performance. There is extensive evidence in support of its reliability and validity (Andrei et al., 2016). The four factors of the TEIQue map on to the broad EI facets present in multiple measures of EI as follows: emotionality = perceiving emotions, self-control = regulating emotions in self, sociability = regulating emotions in others, well-being = strategically utilizing emotions.

One disadvantage of the TEIQue however is that it is not freely available for commercial use. The website states that commercial or quasi-commercial use without permission is prohibited. The test can nevertheless be commercially used for a relatively small fee. The relevant webpage can be found here (<http://psychometriclab.com/>). A second disadvantage is that the test can be fairly easily faked due to its use of a self-report response scale. However, this is generally only an issue when individuals have a reason for faking (e.g., their score will be seen by someone else and might impact their prospects of being selected for a job) (see Tett et al., 2012). Consequently, we do not recommend the TEIQue to be used for personnel selection, but it is relevant for other professional purposes such as in EI training and executive coaching.

There are very few free measures of trait EI that have been adequately investigated. One exception is the widely used, freely available measure termed the Self-Report Emotional Intelligence Test (SREIT, Schutte et al., 1998). The SREIT has been cited more than 3,000 times. The full paper which includes all test items can be accessed here (https://www.researchgate.net/publication/247166550_Development_and_Validation_of_a_Measure_of_Emotional_Intelligence).

Although it was designed to measure overall EI, subsequent research indicates that it performs better as a multidimensional scale measuring 4 distinct factors including: optimism/mood regulation, appraisal of emotions, social skills and utilization of emotions. These four scales again map closely to the broad facets present in many EI instruments as follows: optimism/mood regulation = regulating emotions in self, appraisal of emotions = perceiving emotions in self, social skills = regulating emotions in others, and utilization of emotions = strategically utilizing emotions. Please note that although one study has comprehensively critiqued the SREIT (Petrides and Furnham, 2000), it actually works well as a multidimensional measure. This was acknowledged by the authors of the critique and has been subsequently confirmed (e.g., by O'Connor and Athota, 2013).

Long vs. Short Measures of Trait EI

The TEIQue is available in long form (153 items, 15 facets, 4 factors) and short form (30 items, 4 factors/subscales). A complete description of all factors and facets can be found here (<http://www.psychometriclab.com/adminsdata/files/TEIQue%20interpretations.pdf>). We recommend using the short form when users are interested in measuring only the 4 broad EI factors measured by this questionnaire (self-control, well-being, sociability, emotionality). Additionally, there is much more research on the short form of the questionnaire (e.g., Cooper and Petrides, 2010) (see **Table 5**), and the scoring instructions for the short form are freely available for researchers. If the short form is used, it is recommended that all factors/subscales are utilized because they predict outcomes in different ways (e.g., O'Connor and Brown, 2016). The SREIT is available only as a short, 33 item measure. All subscales are regarded as equally important and should be included if possible. Again it is noted that this test is freely available and the article publishing the items specifically states “Note: the authors permit free use of the scale for research and clinical purposes.”

When users require a comprehensive measure of trait EI, the long form of the TEIQue is also a good option (see **Table 5**). Although not as widely researched as the short version, the long version nevertheless has strong empirical support for reliability and validity. The long form is likely to be particularly useful for coaching and training purposes, because the use of 15 narrow facets allows for more focused training and intervention than measures with fewer broad facets/factors.

Choosing Between Measures of Ability EI

The most researched and supported measure of ability EI is the Mayer, Salovey, Caruso Emotional Intelligence Test (MSCEIT) (see **Tables 2, 3**). It has been cited in more than 1,500 academic studies. It uses a 4 branch approach to ability EI and measures ability dimensions of perceiving emotions, facilitating thought, understanding emotions and managing emotions. These scales broadly map onto the broad constructs present in many measures of EI as follows: facilitating thought = strategically utilizing emotions, perceiving emotions = perceiving emotions in self and others, understanding emotions = understanding emotions, and managing emotions = regulating emotions in self and others.

TABLE 1 | Summary of recommended emotional intelligence assessment measures for each broad EI construct.

Broad EI construct	Best overall	Best free
Perceiving emotions in self and others	Self-Perception (EQ-i)	Appraisal of emotions (SREIT)
Regulating emotions in self	Self-control (TEIQue-SF)	Optimism/mood regulation (SREIT)
Regulating emotions in others	Sociability (TEIQue-SF)	Social skills (SREIT)
Strategically utilizing emotions	Relationship management (ESCI) or emotionality (TEIQue-SF)	Utilization of emotions (SREIT)

However, this is a highly commercialized test and relatively expensive to use. The test is also relatively long (141 items) and time consuming to complete (30–45 min).

A second, potentially more practical option includes two related tests of ability EI designed by MacCann and Roberts (2008) (see **Tables 2, 7**). These tests are called the Situational Test of Emotion Management (STEM) and the Situational Test of Emotional Understanding (the STEU). These tests are becoming increasingly used in academic articles; the original paper has now been cited more than 250 times. The two aspects of ability EI measured in these tests map neatly onto two of the broad EI constructs present in multiple measures of EI. Specifically, the STEM can be regarded as a measure of emotional regulation in oneself and the STEU can be regarded as a measure of emotional understanding. As indicated in **Table 7**, there is strong psychometric support for these tests (although the alpha for STEU is sometimes borderline/low). A further advantage of STEU is that it contains several items regarding workplace behavior, making it highly applicable for use in professional contexts.

If researchers/practitioners decide to use the STEM and STEU, additional measures might be required to measure the remaining broad EI constructs present in other tests. Although these measures could all come from relevant scales of tests reviewed in this article (see **Table 1**), there is a further option. Users should consider the Diagnostic Analysis of Non-verbal Accuracy scale (DANVA) which is a widely used, validated measure of perceiving emotion in others (see Nowicki and Duke, 1994 for an introduction to the DANVA). Alternatively, for those open to using a combination of ability and trait measures, users might wish to use Schutte et al.'s (1998) SREIT to assess remaining facets of EI (see **Table 4**). This is because it is free and captures aspects of EI not measured by STEM/STEU. These include appraisal of emotions (for perceiving emotions) and utilization of emotions (for strategically utilizing emotions), respectively.

Therefore, if there is a strong preference to utilize ability based measures, the STEM, STEU, and DANVA represent some very good options worth considering. The advantage of using these over the MSCEIT is the lower cost of these measures and the reduced test time. Although the STEM, STEU, and DANVA do not seem to be freely available for commercial use, they are nevertheless appropriate for commercial use and likely to be cheaper than alternative options at this point in time.

Deciding Between Using a Single Measure or Multiple Measures

When seeking to measure EI, researchers/practitioners could choose to use (1) a single EI tool that measures overall EI along

with common EI facets (i.e., perceiving emotions in self and others, regulating emotions in self and others and strategically utilizing emotions) or (2) some combination of existing scales from EI tool/s to cumulatively measure the four constructs.

The first option represents the most pragmatic and generally optimal solution because all information about the relevant facets and related measures would usually be located in a single document (e.g., test manual, journal article) or website. Additionally, if a paid test is used it would only require a single payment to a single author/institution. Furthermore, single EI tools are generally based on theoretical models of EI that have implications for training and development. For example EI facets in Goleman's (1995) model (as measured using the ESCI, Boyatzis and Goleman, 2007) are regarded as characteristics that can be trained. Therefore, if a single EI tool is selected, the theory underlying the tool could be used to model the interventions.

However, a disadvantage of the first option is that some EI measures will not contain the specific set of EI constructs researchers/practitioners are interested in assessing. This will often be the case when practitioners are seeking a comprehensive measure of EI but prefer a freely available measure. The second option specified above would solve this problem. However, the trade-off would be increased complexity and the absence of a single underlying theory that relates to the selected measures. **Tables 2–8** describe facets within each measure as well as reliability and validity evidence for each facet and can be used to assist the selection of multiple measures if users choose to do this.

The Best Measure of Each Broad EI Construct (Evaluated Across all Reviewed Tests)

In some cases, researchers/practitioners will not need to measure overall EI, but instead seek to measure a single dimension of EI (e.g., emotion perception, emotion management etc.). In general, we caution the selective use of individual EI scales and recommend that users habitually measure and control for EI facets they are not directly interested in. Nevertheless, we acknowledge that in some cases users will have to select a single measure and consequently, this section specifies a selection of what we consider the “best” measures for each construct. We do this for both free measures and those requiring payment. In order to determine which measure constitutes the “best” measure for each construct, the following criteria were applied:

1. The measure should have been used in multiple research studies published in high quality journals.

TABLE 2 | Summary of major emotional intelligence assessment measures.

Name of tool and original citation	Explanation of the theoretical basis	Test length and description	Example item/s	Availability free vs. cost
Mayer-Salovey-Caruso Emotional Intelligence Test (MSEIT) Mayer et al. (2002a,b, 2003) Cited in more than 1,500 articles	<p>In 1997 Salovey and Mayer developed a 4 branch approach to ability EI called MEIS and since then this has been developed into the MSEIT (Mayer et al., 2002a,b) and revised with additional versions.</p> <p>The revised model is a process-orientated model that emphasizes stages of development in EI, potential for growth and the contributions emotions make to intellectual growth. The scale was developed based on a review of ability EI literature around focusing on individuals' processing of emotion related information.</p> <p>Each of the four branches is measured with two objective, ability-based tasks. There are different response formats. Some tasks such as the "picture task," use 5-point rating scales, whereas other tasks, such as the "blends task," use a multiple-choice response. For all questions however, answers can be considered correct or incorrect in a similar way to IQ tests.</p> <p>The facets can be defined as follows: Perceiving Emotion represents the ability to correctly identify how oneself and others are feeling. Facilitating Thought represents the ability to create emotions that impact thought processes. Understanding Emotion represents the ability to understand the causes of emotions. Managing Emotion represents the ability to create effective strategies that utilize emotions for a specific purpose.</p>	<p>Consists of 8 MSEIT tasks which are made up of a number of individual items. 141 questions in total.</p> <p>4 constructs including: Perceiving Emotions; Facilitating Thought; Understanding Emotions; Managing Emotions.</p>	<p>In the faces task (four item parcels; 5 responses each), participants view a series of faces and for each, respond on a five-point scale, indicating the degree to which a specific emotion is present in the face.</p>	<p>Cost Website https://www.mhs.com/</p>
Self-report Emotional Intelligence Test (SREIT) Schutte et al. (1998) Cited in more than 3,000 articles	<p>Schutte et al. (1998) developed a self-report EI questionnaire based on Salovey and Mayer's (1990) model. A factor analysis was conducted on 62 items using data from 346 participants from which a 33-item scale was created. The measure showed good internal consistency (Cronbach's alpha of 0.90) and test-retest reliability ($r = 0.78$). The scale was also tested against theoretically related constructs including alexithymia, non-verbal communication of affect, optimism, pessimism, attention to feelings, clarity of feelings, mood repair, depressed mood and impulsivity and found to have construct validity.</p> <p>The model however has been criticized for confusing ability and trait forms of EI (however this criticism can be applied to the development of most trait based models).</p> <p>Participants respond to items on a 5-point Likert-type scale ranging from 1 (strongly-disagree) to 5 (strongly-agree).</p>	<p>Consists of 33 self-report statements. Four factors including: 1. Optimism/ mood regulation 2. Appraisal of emotions 3. Social skills 4. Utilization of emotions</p>	<p>An example item is "I am aware of my emotions as I experience them".</p>	<p>Free</p>
Trait Emotional Intelligence Questionnaire (TEIQue). Long Form and Short Forms. Petrides and Furnham (2001) Cited in more than 2,000 articles	<p>TEIQue-Long Form The TEIQue is based on trait EI theory, which conceptualizes emotional intelligence as a personality trait. It has also been described as "emotional self-efficacy." Unlike Schutte et al.'s (1998) measure, it did not originally aim to measure ability based EI with self-report questions.</p> <p>Item and facets were developed by conducting a content analysis of the EI literature and available constructs (Salovey and Mayer, 1990; Goleman, 1995; Bar-On, 1997a,b).</p> <p>TEIQue-Short Form Petrides and Furnham also created a short-form questionnaire (TEIQue-SF) which contains 30 items and the same 4 factors from the long version. Additional adaptations such as a 360 degree measure can be found on their website http://psychometriclab.com/</p>	<p>Consists of 153 self-report statements. Four factors and 15 facets including: 1. Well-being (Trait optimism, trait happiness and self-esteem); 2. Sociability (Emotional management (others), assertiveness and social awareness); 3. Emotionality (trait empathy, emotional perception, emotion expression and relationships); 4. Self-control (emotion regulation, impulsiveness and stress management).</p>	<p>Example items include: "Understanding the needs and desires of others is not a problem for me"; "I'm usually able to influence the way other people feel" and "I can handle most difficulties in my life in a cool and composed manner."</p>	<p>Cost. Not freely available for commercial use. Details for obtaining permission are on website. Free for research purposes.</p>

(Continued)

TABLE 2 | Continued

Name of tool and original citation	Explanation of the theoretical basis	Test length and description	Example Item/s	Availability free vs. cost
Bar-On Emotional Quotient Inventory (EQ-i) Bar-On (1996, 1997a,b) Cited in more than 1,000 articles	Mixed position, considers EI as a mixed construct consisting of both cognitive ability and personality aspects. The scale emphasizes how the personality traits influence a person's general well-being. Bar-On's model was based on empirical research into personal factors related to EI and particularly into emotional and social elements of behavior. The concept was theoretically developed from logically clustering variables and identifying underlying key factors claimed to determine effective and successful functioning. The EQ-i measures abilities and the potential for performance rather than performance itself; it is process-oriented, rather than outcome-oriented. Bar-On's original report of EQ-i from 1996 is in a book form. However, since the development of the original EQ-i scale, Bar-On and others have revised the scale (Bar-On et al., 2000) thus creating EQ-i 2.0. The total EQ-i can be used to create total EI scores as well as factor and facet/subscale scores. The subscales have adequate internal consistency. Bar-On went on to develop additional test versions including a youth version (EQ-i:YV) and 360 multi-rater measure (EQ-360).	Revised model consists of 125 items. Five factors, 15 facets (subscales) including: 1. Self-Perception (Self-Regard, Regard, Self-Actualization, Emotional Self Awareness) 2. Interpersonal (Interpersonal Relationships, Empathy Social Responsibility) 3. Decision Making (Problem Solving, Reality Testing, Impulse Control) 4. Self-Expression (Emotional Independence) 5. Stress Management (Flexibility Stress Tolerance, Optimism)	Example items include: "When I'm angry with others, I can tell them about it," "I know how to deal with upsetting problems," and "I like helping people."	Cost http://www.reuvenbaron.org/wp/
The situational test of emotion management (STEM) The situational test of emotional understanding (STEU) MacCann and Roberts (2008) Cited in more than 250 articles	MacCann and Roberts (2008) developed ability-based measures of EI. MacCann and Roberts based their STEM and STEU scales on 2 of the four hierarchical ordered branches of emotion-related abilities outlined by Mayer et al. (2000): understanding and managing emotions which form the Strategic EI area (Mayer et al., 2001). STEM The STEM was developed to be administered in both multiple-choice and rate-the-extent formats (i.e., test takers rate the appropriateness, strength, or extent of each alternative, rather than selecting the correct alternative). Items for STEM were developed by conducting semi-structured interviews with 50 individuals who described emotional situations they experienced in the past 2 weeks (with a total of 290 situations). These items were categorized and tested. STEU Roseman's (2001) emotion appraisal theory was used as the basis for item construction and scoring of the STEU such that answers could be regarded as correct or incorrect. According to this model, the 17 most common emotions can be explained by a combination of seven appraisal dimensions. The STEU comprised 42 items with each item presenting emotional situations, and participants had to choose which emotion the situation will most likely elicit. Fourteen emotions were assessed in 3 separate contexts—de-contextualized, work and private life.	STEM—44 items Anger (18 items); sadness (14 items) and fear (12 items). STEU—42 items (14 context-reduced, 14 with a personal-life context, and 14 with a workplace context).	STEU—workplace example assessing relief includes: a supervisor who is unpleasant to work for leaves Alfonso's work. Alfonso is most likely to feel? (a) joy, (b) hope, (c) regret, (d) relief, (e) sadness	Can be freely obtained in Appendix 2.1 of MacCann's (2006) study. However permission is required to use the test for non-research purposes.
Emotional and Social Competence Inventory (ESCI). Boyatzis et al. (2000) Cited in more than 1,500 articles	The ESCI is based on a mixed model of EI and regards EI as consisting of both cognitive ability and personality aspects. The model focuses heavily on predicting workplace success. The ESCI utilizes 360 degree assessment that can include self-ratings, peer ratings and supervisor ratings. Boyatzis and Goleman include a set of emotional competencies within each construct of EI. Emotional competencies are not regarded as innate talents, but rather learned capabilities that must be worked on and can be developed to achieve outstanding performance. Boyatzis and Goleman argue that individuals are born with a general emotional intelligence potential that determines their potential for learning emotional competencies. Internal consistency of the scales ranges from 0.61 to 0.85 (Conte, 2005).	Consists of 110 items Assesses 12 competencies organized into four factors: 1. Self awareness 2. Social awareness 3. Self-Management 4. Relationship management	Example items includes: "I recognize my emotions and their effects on others," and "I can keep disruptive emotions or impulses under control."	Cost

Note the measures reviewed above were selected based on widespread use and validation. Although other measures exist, they were not reviewed based on either less research in general or poor psychometric support. However, if none of those reviewed above are considered appropriate, three further available measures could be considered. One relatively new measure with good preliminary support is the Genos Emotional Intelligence Inventory (Palmer et al., 2009). This is a commercial, mixed measure of EI and requires payment. A further, freely available measure is Wong's Emotional Intelligence Scale (WES) (trait-based; see Wong et al., 2004, 2007). A third very new measure is the Geneva Emotional Competence Test (GECOT) (see Schlegel and Morillano, 2019). It is an ability based measure designed for the workplace that looks very promising based on early work.

TABLE 3 | Review of selected studies detailing psychometric properties of the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT).

Citation and country	Participants (N, age, occupation, gender ratio etc.)	Study design	Reliability and validity evidence	Comment
Mayer et al. (2002a,b, 2003) Multiple countries, primarily USA sample.	<i>Non clinical</i> N = 2,112 Sample: Individuals from academic settings across multiple countries. Age: mean age was 26.25 years. Gender: 58.6% female.	The design was cross sectional: participants completed the MSCEIT. The test was administered via booklet or online. Scoring was based on how well-respondents' answers aligned with an expert sample (volunteer members of the International Society for Research on Emotions).	Internal consistency: Mayer et al. (2002b) reported reliabilities of 0.91 for the full scale, 0.81 for emotional management, 0.77 for emotional understanding, 0.76 for emotional facilitation, and 0.90 for emotional perception. Test-retest reliability: Mayer et al. (2003) reported a test-retest reliability of 86 and a full-test split-half reliability of 0.93.	
Brackett and Mayer (2003) USA	<i>Non clinical</i> N = 207 Sample: University students. Gender: 130 female, 77 male. Age: Mean age was 18.93 for females and 19.51 for males.	The study aimed to investigate the convergent, discriminant and incremental validity of the MSCEIT as well as two other EI measures (EQ-i and SREIT). Participants completed a self-assessed questionnaire and were assessed on their psychological well-being, personality, subjective well-being and academic ability.	Internal consistency: The authors did not report values for internal consistency from this study but rather cited the values from Mayer et al. (2002). Validity: The MSCEIT had discriminant validity against well-studied personality and well-being measures. Additionally, after personality and verbal intelligence were held constant, the MSCEIT was predictive of social deviance. MSCEIT scores were also found to relate positively and significantly to psychological well-being ($r = 0.28$, $p < 0.001$), agreeableness ($r = 0.28$, $p < 0.001$) and openness ($r = 0.25$, $p < 0.001$).	The generalizability of the findings to the general working population may be limited due to the student sample.
Rosete and Giarrochi (2005) Australia	<i>Non clinical</i> N = 41 Sample: Executives from a large Australian Public Service organization Gender: 24 male and 18 female. Age: Age ranged from 27 to 57 with an average age of 42 years. Tenure: 75% of participants had been in the organization for 10 years or more.	Participants were sought from the organization to participate in a career development exercise. Questionnaires were completed via pen or paper or online. Participants completed the MSCEIT (V2.0), along with a measure of personality traits, and a measure of cognitive ability. Leadership effectiveness was assessed using an objective measure of performance and a 360 degree assessment involving each leader's subordinates and direct manager (n = 149).	Internal consistency: The authors did not report values for internal consistency from this study but rather cited the values from Mayer et al. (2002). Construct validity: The study found that scores from the MSCEIT were correlated with cognitive intelligence, specifically verbal IQ ($r = 0.336$, $p < 0.05$); performance IQ ($r = 0.402$, $p < 0.05$), and full scale IQ ($r = 0.430$, $p < 0.01$).	The findings should be generalized with caution due to the small sample size and one industry sampled. Similarly, the executives in this study had significantly higher IQs than the average population which could also limit the generalizability of results.
Ruiz-Aranda et al. (2014) Spain	<i>Non clinical</i> N = 264 Sample: University students from the School of Health and Science—Specifically, students studying nursing, physiotherapy, occupational therapy and chiropody. Gender: All female. Age: Ages ranged from 18 to 50 with a mean age of 21 years.	Participants completed a Spanish version of the MSCEIT along with measures of well-being (life-satisfaction and happiness) and perceived stress.	Internal consistency: Total score Cronbach's alpha was 0.76. Construct validity: Higher EI scores were found to be related to lower levels of perceived stress and higher levels of life satisfaction and happiness.	The sample was made up of exclusively females, which means that the results obtained may not be generalizable to the male population. The authors also suggest the study did not control for personality which may have an impact on the results.

Note two of the studies reviewed in this table utilize student samples. As specified in the inclusion criteria section we targeted non-student samples and only utilized student samples where others were not available or not appropriate.

TABLE 4 | Review of selected studies detailing psychometric properties of the Self-report Emotional Intelligence Test (SREIT).

Citation and country	Participants (N, age, occupation, gender ratio etc.)	Study design	Reliability and validity evidence	Comment
Schutte et al. (1998) USA	<i>Non clinical</i> N = 346 Sample: University students and individuals from diverse community settings. Gender: 218 were women and 111 were men. Age: average age was 29.27 years.	Self-assessment questionnaire. All 346 participants rated themselves on the 62 EI items, with a number of participants also filling out one of several established scales to measure constructs theoretically related to EI. Additional scales included: an alexithymia scale which assessed difficulties in identifying and describing feelings; a communication test which assessed non-verbal expressiveness; a life orientation test which assessed optimism and pessimism; a mood scale including assessing attention to feelings and mood repair; a scale to measure depressed mood; and a measure of impulsiveness.	Internal consistency: Cronbach's alpha of 0.90 was obtained. Test retest reliability: 28 students repeated the test 2 weeks later, with a test-retest reliability of 0.78. Construct validity: validation studies showed that scores on the 33-item measure correlated with eight of nine theoretically related constructs, including, alexithymia ($r = -0.65, p < 0.0001$), attention to feelings ($r = 0.63, p < 0.0001$), clarity of feelings ($r = 0.52, p < 0.0001$), mood repair ($r = 0.68, p < 0.0001$), optimism ($r = 0.52, p < 0.006$), pessimism ($r = -0.42, p < 0.025$), depression ($r = -0.37, p < 0.021$) and impulse control ($r = -0.39, p < 0.003$). Predictive validity: a test was conducted on college students to assess the predictive validity. Results revealed that the EI measure completed at the start of the academic year, significantly predicted first year college grades at the end of the year ($r = 0.32, p < 0.01$). Discriminant validity: Scores on the measure were tested against the big five personality dimensions to assess discriminant validity and were only associated with the openness to experience trait.	
Kinman and Grant (2011) UK	<i>Non clinical</i> N = 240 Sample: Trainee social work students (69% of the sample were first-year students and 31% second-year students). Gender: 82% female Age: Mean age of 33.7 years.	Self-report questionnaire. Participants were invited to participate via email and completed the questionnaire online. The aim of the study was to explore the role of emotional and social competencies on resilience. The study also assessed measurements of reflective ability, empathy, social competence, resilience and psychological distress.	Internal consistency: Cronbach's alpha was 0.88. Construct validity: Emotional Intelligence was correlated to additional measures as expected. For example EI was positively correlated with resilience ($r = 0.61, p < 0.001$), reflective ability ($r = 0.59, p < 0.001$), and empathy ($r = 0.45, p < 0.001$).	The study is based on a cross-sectional and correlational data. Although some of the relationships found between emotional and social competencies and resilience and well-being were strong, cause and effect cannot be established using such methodology.
Por et al. (2011) UK	<i>Non clinical</i> N = 130 Sample: Student nurses. Gender: 117 female, 13 male. Age: Mean age of 28 years.	Data was collected through self-report questionnaire, an audit of students' academic performance and mapping of EI teaching material. The study aimed to explore the emotional intelligence of nursing students and its relationship to perceived stress, coping strategies, subjective well-being, perceived nursing competency and academic performance.	Internal consistency: Cronbach's alpha was 0.82. Construct validity: There was a strong negative correlation between EI and perceived stress ($r = -0.40, p < 0.01$). EI was positively related to perceived nursing competency ($r = 0.32, p < 0.01$) and subjective well-being ($r = 0.27, p < 0.01$).	There are some limitations to the study such as the small sample size and the fact that the study only involved students that may limit the generalizability to other occupations. Data being collected at a single point in time means that potential changes in participants over time were not captured.

TABLE 5 | Review of selected studies on psychometric properties of the Trait Emotional Intelligence Questionnaire (TEIQue).

Citation and Country	Participants (N, age, occupation, gender ratio etc.)	Study design	Reliability and validity evidence	Comment
Petrides (2009) Primarily UK participants	<i>Non clinical</i> N = 1724 Sample: mixed normative sample Gender: 912 females, 764 males, 61 unreported. Mean age: 29.65	The statistics provided in this paper were based on the full norm sample of the TEIQue at the time of publication. The study design is best regarded as cross sectional, with all participants having completed the TEIQue. Data from 58 students was presented for test-retest reliability.	Internal consistency: Cronbach's alpha for the global trait EI score was 0.89. Alpha for the 15 facets and 4 factors ranged from 0.67 to 0.92. Test-retest reliability: This was provided for the four factors (Emotionality, Self-control, Sociability, Well-being) and ranged from 0.59 to 0.86. Construct validity: Some evidence for construct validity was provided based on exploratory factor analysis. Self-other ratings: Self-other ratings were significant for global EI ($r = 0.48$) and ranged from 0.29 to 0.52 across the 15 facets and 4 factors.	This study was published as book chapter and is freely available to access online ¹ .
Mikolajczak et al. (2007) Short form Belgium	<i>Non clinical</i> N = 124 Sample: Nurses Gender: 85% female, 15% male Mean age: 39.4 years	This study used the TEIQue Short form survey to understand the relationship between trait emotional intelligence and occupational stress. Participants completed two separate surveys 3 months apart. Trait EI, the Big Five personality traits and emotional labor style were assessed at Time 1, whereas burnout and somatic complaints were measured at both T1 and T2.	Internal consistency: Cronbach's alpha for the TEIQue-SF scale was recorded as 0.87. Construct validity: Trait EI was correlated with a number of other constructs such as global burnout ($r = -0.58$, $p < 0.001$), diminished accomplishment ($r = -0.64$, $p < 0.001$), and emotional exhaustion ($r = -0.49$, $p < 0.001$). Incremental validity: Incremental validity was tested using hierarchical regression controlling for the Big Five personality traits. Trait EI demonstrated incremental validity over and above the Big Five for a number of outcomes.	Only self-report measures used.
Cooper and Petrides (2010) Short form UK	<i>Non clinical</i> Study 1: N = 1,119 Sample: University students and general community. Gender: 455 males and 653 females. Age: Age ranged from 15 to 89 years with an average age of 32 years. Education: high school diplomas (21%), undergraduate diplomas (41%), postgraduate diplomas (33%) and PhD (2%). Study 2: N = 866 Sample: University students and general community. Gender: 432 males and 416 females. Age: Age ranged from 17 to 80, with an average age of 27 years. Education: high school diplomas (20%), undergraduate diplomas (41%), postgraduate diplomas (26%) and PhD (3%).	The aim of the research was to conduct psychometric analysis on the TEIQue-SF and create a revised model. Study 1: Individuals were recruited via word of mouth, advertisement through social media, and course data collection. The 30-item TEIQue version 1 was administered with a pen and paper questionnaire. Confirmatory factor analysis was conducted and four of the items were re-written. Study 2: The students completed version 1.5 of the TEIQue developed in study 1. The same procedure was carried out in study 2.	Internal consistency: In study 1 (TEIQue -SF), Cronbach's alpha for men was 0.89 and 0.88 for women. In study 2 (TEIQue-SF 1.50), Cronbach's alpha for men was 0.88 and 0.87 for women. Construct validity: Each measure was tested using item response theory (IRT) which provides information about measurement precision for each item. Taken together, the results of the IRT analysis suggest TEIQue-SF has good psychometric properties	
Heffernan et al. (2010) Short form USA	<i>Non clinical</i> N = 135 Sample: RN nurses (34% medical unit, 12% surgery and 12% critical care). Gender: 95% of participants were female. Age: 34% of nurses were aged 41–60 and 31% were aged 52–60. Education: 42% bachelor level and 28% masters level.	The study assessed self-compassion and emotional intelligence using the TEIQue -SF in nurses. Nurses completed the self-report assessment online.	Internal consistency: Cronbach's alpha of 0.88 was reported for the study. Construct validity: The study found EI was significantly related to self-compassion ($r = 0.55$, $p < 0.0001$).	

Note some of the studies reviewed in this table utilize student samples. As specified in the inclusion criteria section we targeted non-student samples and only utilized student samples where others were not available or not appropriate.
¹ <http://www.psychometrlab.com/adminsdata/files/TEIQue%20psychometric%20properties%20chapter.PDF>

TABLE 6 | Review of selected studies on psychometric properties of the Emotional Quotient Inventory (EQ-i) (Bar-On, 1997a,b).

Citation and Country	Participants (N, age, occupation, gender ratio etc.)	Study Design	Reliability and Validity Evidence	Comment
Bar-On et al. (2000); Dulewicz et al. (2003); and Bar-On (2006) USA and Canada	<i>Non clinical</i> N = 3,831 Gender: 49% male, 51% female. Sample: varied occupations. Age: Age ranged from 16 to 100, with an average age of 34.3 years. Ethnicity: The sample was 79% White, 8% Asian American, 7% African American, 3% Hispanic, and 1% Native American.	The EQ-i has been developed over 17 years by Bar-On. Numerous studies have been conducted by Bar-On testing the self-report measure to establish a valid and reliable tool. Many of his earlier works were not able to be located however information was drawn from a number of sources listed to the left.	Internal consistency: The overall internal consistency was reported at 0.97. Test-retest reliability: the average stability coefficient is 0.85 after 1 month and 0.75 after 4 months. Predictive validity: Bar-On (2006) noted 20 predictive validity studies that have been conducted on a total of 22,971 individuals across 7 countries. The EQ-i measure was found to predict performance in social interactions, at school and work as well as impacts on physical health, psychological health, self-actualization and subjective well-being. The average predictive validity coefficient is 0.59.	
Bar-On et al. (2000) Germany	<i>Non clinical</i> N = 167 Sample: Helping professionals including police officers (n = 85) and child care and mental health care workers (n = 81). Gender: 72% male and 28% female. Age: mean age was 33.2 years. Education: the average duration of education was 11.9 years.	Self-assessment questionnaire. Used the earlier version of Bar-On's EQ-i comprising of 133 items translated to German. The study assessed occupational stress and emotional expression within different high stress helping professions, namely the police force and child care and mental health care professions. The authors examined gender, age and occupational differences.	Internal consistency: Alpha coefficients ranged from 0.66 to 0.87 for the scales.	The authors noted that there may be social desirability bias present. Specific organizational stressors were not assessed in the study therefore there organizational or occupational differences may be present. Results may not be generalizable to the wider population due to the limited sample size. Cross-sectional study – a longitudinal study is required to assess causality. Self-report measure – this study relies on subjective self-report data.
Dawda and Hart (2000) Canada	<i>Non clinical</i> N = 243 Sample: University students Gender: 118 men and 125 women Age: Age ranged from 17 to 47 with a mean age of 21.27 years.	Students were recruited via posters advertising an "emotions study." The aim of the research was to assess the validity and reliability of the EQ-i measure, and was undertaken as part of a larger study examining the association between psychopathy and alexithymia. Participants completed the EQ-i measure, as well as two interview-based rating scales for alexithymia, and a range of self-report measures including alexithymia, personality, affect intensity, depression and psychosomatic complaints.	Internal consistency: Cronbach's alpha for the full scale was 0.96 with coefficients ranging from 0.81 to 0.94 for the factors. Construct validity: The correlations between EI and the additional scales generally were moderate, ranging from 0.32 to 0.83. In general, people with high EQ Total scores had low levels of negative affectivity and high levels of positive affectivity; were conscientious and agreeable; had fewer difficulties identifying and describing feelings; and were not prone to somatic symptomatology or increased somatic symptoms under stress.	One concern was that the Interpersonal scale had relatively small correlations with the other EQ composite scales, as well as a different pattern of convergent and discriminant validities. The authors were unable to explain below-normal EQ-i scores in the study however the low scores should not have much impact on the observed convergent/discriminant validity. For specific aspects of EI, the authors suggest to use the 15 subscale scores instead of the 5 factors, which are generally more internally consistent.

Note some of the studies reviewed in this table utilize student samples. As specified in the inclusion criteria section we targeted non-student samples and only utilized student samples where others were not available or not appropriate.

TABLE 7 | Review of selected studies on psychometric properties of the STEU and STEM.

Citation and country	Participants (N, age, occupation, gender ratio etc.)	Study design	Reliability and validity evidence	Critique/limitations
STEU and STEM MacCann and Roberts (2008) Australia	<i>Non clinical</i> Study 1: N = 207 Sample: Psychology undergraduate students. Participants were drawn from both a rural campus and urban campus of Sydney University. Gender: 140 female. Age: Average age was 21.1 years. Study 2: N = 149 Sample: Volunteers recruited from the Sydney area via advertising. Gender: 107 females. Age: Aged 18–59 with an average age of 35 years. Education: 68% of the sample had postsecondary school qualifications.	Study 1 – Quasi-experimental design using self-rated scenario questionnaires in which 2 groups of participants completed two different tests. Three emotion-related criteria were also used in the study including alexithymia, life satisfaction and academic achievement. Additional measures were used to test the validity and reliability of the scale including personality and depression and anxiety. Items for the STEU were developed using Roseman's (2001) emotional appraisal theory. Items for STEM were developed through semi-structured interviews assessing emotional situations individuals had recently experienced. The items were then tested on 2 groups: undergraduate students and a community sample.	Internal consistency: Study 1 – Cronbach's alpha for the STEU was 0.71, STEM (multiple choice) was 0.68 and STEM (rate the extent) was 0.92. Study 2 – Cronbach's alpha for the STEU was 0.42 and STEM (30 item) was 0.61. Construct validity: Relationships were established between STEU/STEM and vocabulary and university grades. Study 2 – The STEU correlated with Anxiety ($r = -0.25, p < 0.01$) and Stress ($r = -0.17, p < 0.05$), but not with Depression ($r = -0.15, ns$). The STEM correlated with Anxiety ($r = -0.27, p < 0.01$), Stress ($r = -0.26, p < 0.01$), and Depression ($r = -0.17, p < 0.05$). Predictive validity: Both the STEU and STEM incrementally predicted students' psychology grades, and the STEU also incrementally predicted students' overall grades.	The validation had some issues. Further validation of the measures is need such as against the full MSCEIT scale. The author suggests that a video or audio based version (rather than text) would also be useful to determine whether relationships of EI to intelligence are due to cognitive processing of emotional information rather than to the verbal ability required to comprehend the text-based items.
Austin (2010) UK	<i>Non clinical</i> N = 339 Sample: Undergraduate students Gender: 238 females, 101 males. Age: Average age was 21.96 years.	The aim of the research was to assess the STEM and STEU measures against other ability measures such as MSCEIT. Participants were recruited via a website advertising research participation. Participant were divided into 2 groups (G1 = 104; G2 = 135) and completed a number of different EI ability measures with group 1 also being assessed on the TEIQue EI trait measure.	Internal consistency: Cronbach's alpha for STEM was 0.67 and 0.48 for STEU.	The study used an undergraduate student sample therefore generalizability to the working population may be limited. The reliability for the STEM was considered adequate however the reliability for the STEU was quite low, especially when compared to the MSCEIT Cronbach's alpha of 0.90 shown in the study.
Grant (2013) USA	<i>Non clinical</i> N = 100 Sample: employees at an optometry company headquarters. Positions: managers (25%), patient services representatives (19%), optical consultants and sales representatives (18%), technicians (17%), doctors (14%) and administration staff (7%). Gender: 77% were female. Age: average age was 33 years. Tenure: average tenure in the organization was 4.21 years and in their current position of 3.95 years. Education: The majority had attended college (71%) and the remaining employees had attended high school (14%) or graduate school (15%).	Self-report questionnaire design. Emails were sent to all 209 full-time employees which provided a link to an initial survey containing self-report measures of emotional labor strategies and personality traits. Once completed a second survey was sent assessing emotion regulation (EI) knowledge (on average completed 3 weeks later). Employees were assessed on their emotional regulation knowledge (measured by STEM), as well as measures such as emotional labor strategies, voice and performance evaluation, helping and extraversion.	Internal consistency: Cronbach's alpha for the STEM was reported at 0.73.	Due to the correlational nature of the study, it makes it difficult to rule out alternative explanations for the relationships or to predict causality. Additionally, because the employees were tested for their emotional regulation knowledge (STEM) after the other constructs, this may influence the causality direction or relationship. Contextual factors were also not measured in the study that may impact the emotional regulation knowledge and strategies. Self-report measure.

Note some of the studies reviewed in this table utilize student samples. As specified in the Inclusion criteria section we targeted non-student samples and only utilized student samples where others were not available or not appropriate.

TABLE 8 | Review of selected studies on psychometric properties of the Emotional and Social Competence Inventory (ESCI).

Citation	Participants (N, age, occupation, gender ratio etc.)	Study design	Reliability and validity evidence	Comment
Technical Manual for Emotional and Social Competence Inventory (ESCI) (Boyatzis and Goleman, 2007 – manual updated 2011) US and UK	<i>Non clinical</i> The manual reported the development of the ESCI and ESCI utilizing 3 primary samples: N > 4,000 self-assessments from managers and professionals, and more than 10,000 other assessments (1998). N = 116 self-assessments, 1,022 other assessments (2007). N = 5,700 self-assessments and 62,000 other assessments (2010).	The studies reported in the technical manual relate primarily to the factor structure, reliability and validity of the ESCI. The factor structure and reliability studies utilize a cross sectional design. Validity studies comprised a combination of self-report and other-reports, including other reports of performance (e.g., supervisor ratings).	Internal consistency: The internal consistency of the 12 scales of the ESCI range from 0.79 to 0.91 ($r = 0.52, 0.363$; published in technical manual as well as Boyatzis and Gaskin, 2010). This is for the “other” assessments. Test-retest reliability data was only given from the ESCI, this ranged from 0.41 to 0.92. Construct validity: This was assessed by examining correlations with similar constructs from the MBT (N = 18 paramedics). MBTI intuiting types scored highly on several EI competencies including emotional self-awareness and self-control. MBTI feeling types scored highly on self-awareness, empathy and others. Evidence for discriminant validity was based on low correlations with subtests of the Watson-Glaser Critical Thinking Appraisal (N = 90 executives). Evidence for predictive validity was found for self-reports of job success, life success and salary across a range of sectors $N < 300$.	The technical manual is available online ¹ . It reports a combination of data from published industry reports as well as published peer-reviewed academic articles.
Morrison (2008) USA	<i>Non clinical</i> N = 92 Sample: registered nurses from 3 healthcare facilities in South Mississippi. Gender: of the 92 participants, 71 were female and 21 were male. Age: age ranged from 20 to over 60 years, with 47.8% of participants between 20 and 30 years of age. Ethnicity: the majority of the nurses were Caucasian (85.9%). Education: 72.8% had a Bachelor degree in nursing. Experience: over half of the nurses had four or less years of work experience.	Cross-sectional correlational design completed by both the participant and peer reviewer. The purpose of this study was to determine if a relationship exists between emotional intelligence (EI) and preferred conflict-handling styles of registered nurses. Each participant completed the ESCI 2.0 (later renamed to ESCI) as well as an instrument to measure conflict handling. The participants handed a second ESCI 2.0 instrument to a known manager, peer or subordinate they had worked with in the past year. The peer, subordinate or supervisor was asked to evaluate the participant using the ESCI 2.0 instrument.	Internal Consistency: The authors reported existing Cronbach's alpha scores. Cronbach's alpha for others-rating ranged from 0.73 (Trustworthiness) to 0.92 (Empathy), with an overall (other-rating) average internal consistency coefficient of 0.85. The internal consistency coefficients for self-rating ranged from 0.61 (accurate self-assessment) to 0.85 (service orientation), with an overall average internal consistency coefficient of 0.75. Construct Validity: The study indicated a positive and statistically significant relationship between collaboration and all four of the EI clusters: self-awareness ($r = 0.25$), self-management ($r = 0.32$), social awareness ($r = 0.31$), and relationship management ($r = 0.37$).	Small sample size which could limit the generalizability. The authors also noted that an organizational climate survey could be administered to assess whether the organizational climate affects how a registered nurse responds when faced with conflict.

(Continued)

TABLE 8 | Continued

Citation	Participants (N, age, occupation, gender ratio etc.)	Study design	Reliability and validity evidence	Comment
Reed et al. (2015) USA	<i>Non Clinical</i> N = 40 Sample: First year pediatric and medicine/pediatrics interns from a Children's Hospital. Gender: 32 females and 8 males.	Cross-sectional, self-report and peer-assessment design. The aim of the study was to determine: (1) performance of first-year pediatric residents in the delivery of bad news in a standardized patient (SP) setting; and (2) the role of EI in these assessments. Skill in bad news delivery was assessed via SP encounters using a previously published assessment tool and being exposure to a scenario. Residents completed the ESCI as a measure of EI. The ESCI was administered via a self-assessment to residents online, with eight relevant peers/supervisors invited to complete a confidential assessment of the resident. For each resident, a minimum of five other assessments were obtained and averaged to create the <i>Other</i> assessment. The <i>Other</i> assessment score was used for analysis.	Internal Consistency: The authors noted that the internal consistency of each ESCI subscale for <i>Other</i> assessments (i.e., peer ratings) was consistently high (Cronbach's alpha was not reported). Construct Validity: No ESCI subscales were significantly associated with residents' death notification skills, demonstrating no construct validity.	Limitations of this study include a small sample size drawn from a single institution, the use of a single SP encounter, and a reliance on only one type of bad news scenario (i.e., death notification) which is arguably among the most difficult. The study did not account for differences in trainees' previous experiences and/or training in breaking bad news and death notification. Additionally, limited reliability and validity data were obtained.
Boyatzis et al. (2017) USA and Northern Europe	<i>Non clinical</i> N = 40 Sample: Engineers in a multi-national manufacturing company. Gender: 37 males, 3 females. Age: Age ranged from 25 to 64 years with the modal age range of 35 to 44. Employment: The average tenure in the organization was 13 years. Country: 33 were from USA and 7 from Europe.	Cross-sectional, self-report and peer-assessment design. The survey was administered online. The total number of peers completing the surveys for the 40 engineers was 168 (average of 4.2 per person). Peers reported on the perceived emotional intelligence of the participant using the ESCI as well as perceived effectiveness measured with the Reputational Effectiveness Scale (RES). Self-report measures included job engagement, cognitive intelligence, personality and quality of relationships.	Internal Consistency: Coefficient of 0.95. This was based on the overall ESCI score since subscale scores were not used in this study. Construct Validity: ESCI correlated with engineer reputational effectiveness ($r = 0.70$, $p < 0.01$) but not with general mental ability or personality.	This study presents a number of limitations. There was a small sample size which may limit the generalizability of the findings. The low response rate (5% valid responses) may have resulted in more of a volunteer bias than is often encountered in survey research in organizations. Further, due to the limited sample, it may be possible that the findings may be a function of organizational culture. Statistically speaking, the ESCI was completed by subordinates, so there could be an inflated effect due to common source.

¹http://www.eiconsortium.org/pdf/ESCI_User_guide.pdf

2. There should be good evidence for the reliability of the measure in multiple academic studies incorporating the measure.
3. The measure should have obtained adequate validity evidence in multiple academic studies. Most importantly, evidence of construct validity should have been established, including findings demonstrating that the measure correlates meaningfully with measures of related constructs.
4. The measure should be based on a strong and well-supported theory of EI.
5. The measure should be practical (i.e., easy to administer, quickly completed and scored).

Where multiple measures met the above criteria, they were compared on their performance on each criterion (i.e., a measure with a lot of research scored higher on the first criteria than a measure with a medium level of research). **Table 1** summarizes these results.

Please note that the Emotional and Social Intelligence Inventory (ESCI) by Boyatzis and Goleman (2007) has subscales that are also closely related to the ones listed in **Table 1** (see full technical manual here (http://www.eiconsortium.org/pdf/ESCI_user_guide.pdf)). The measure was developed primarily to predict and enhance performance at work and items are generally written to reflect workplace scenarios. Subscales from this test were not consistently chosen as the “best” measures because it has not had as extensive published research as the other tests. Most research using this measure has also used peer-ratings rather than self-ratings which makes it difficult to compare with the majority of measures (this is not a weakness though). Nevertheless, it should be considered if cost is not an issue and there is a strong desire to utilize a test specifically developed for the workplace.

Qualifications and Training

Although our purpose in this paper is not to outline the necessary training or qualifications required to administer the set of tests/questionnaires reviewed, we feel it is important to make some comments on this. First, we recommend that all researchers and practitioners considering using one more of these tests have a good understanding of the principles of psychological assessment. Users should understand the concepts of reliability, validity and the role of norms in psychological testing. There are many good introductory texts in this area (e.g., Kaplan and Saccuzzo, 2017). Furthermore, we recommend users have a good understanding of the limitations of psychological testing and assessment. When using EI measures to evaluate suitability of job applicants, these measures should form only part of the assessment process and should not be regarded as comprehensive information about applicants. Finally, some of the tests outlined in this review require specific certification and/or qualifications. Certification and/or qualification is required for administrators of the ESCI, MSCEIT, and EQi 2.0).

LITERATURE REVIEW

The final section of this article is a literature review of the 6 popular measures we have covered. We have included our

review at the end of this article because we regard it as optional reading. We suggest that this section will be useful primarily for those seeking a more in depth understanding of the key studies underlying the various measures we have presented in earlier sections.

This literature review had two related aims; first to identify prominent EI measures used in the literature, as well as specifically in applied (e.g., health care) contexts. The emotional intelligence measures we included were those that measured both overall EI as well as more specific EI constructs common to multiple measures (e.g., those related to perceiving emotions in self and others, regulating emotions in self and others and strategically utilizing emotions). The second aim was to identify individual studies that have explored the validity and reliability of the specific emotional intelligence measures identified.

Inclusion Criteria

Four main inclusion criteria were applied to select literature: (a) focus on adult samples, (b) use of reputable, peer-reviewed journal articles, (c) use of an EI scale, and (d) where possible, use of a professional sample (e.g., health care professionals) rather than primarily student samples. The literature search therefore focused on empirical, quantitative investigations published in peer-reviewed journals. The articles reviewed therefore were generally methodologically sound and enabled a thorough analysis of some aspect of reliability or validity. We only reviewed articles published after 1990. Additionally, only papers in English were reviewed.

Sources

Papers were identified by conducting searches in the following electronic databases: PsycINFO, Medline, PubMed, CINAHL (Cumulative Index for Nursing and Allied Health Literature), EBSCO host and Google Scholar. Individual journals were also scanned such as The Journal of Nursing Measurement and Psychological Assessment.

Search Terms

When searching for emotional intelligence scales and related literature, search terms included: trait emotional intelligence, ability emotional intelligence, emotional intelligence scales, mixed emotional intelligence and emotional intelligence measures. Some common EI facet titles (e.g., self-awareness, self-regulation/self-management, social awareness, and relationship management) were also entered as search terms however this revealed far less relevant literature than searches based on EI terms. To access studies using professionals we also used terms such as workplace, healthcare, and nursing, along with emotional intelligence.

When searching for literature on the identified scales, the name of the respective scale was included in the search term (such as TEIQue scale) and the authors' names, along with terms such as workplace, organization, health care, nurses, health care professionals, to identify specific studies with a professional employee sample that utilized the specific scale. The terms validity and reliability were also used. Additionally, a similar search was conducted on articles that had cited

the original papers. This search was done conducted utilizing Google Scholar. **Table 2** summarizes the result of the first part of the literature review. It provides an overview of major Emotional Intelligence assessment measures, in terms of when they were developed, who developed them, what form of EI they measure, theoretical basis, test length and details regarding cost.

Tables 3–8 summarize research on the validity and reliability of the 6 tests included in **Table 2**. In these tables we summarize the methodology used in major studies assessing reliability and validity as well as the results from these studies.

Collectively, these tables indicate that all 6 of the measures we reviewed have received some support for their reliability and validity. Measures with extensive research include the MSCEIT, SREIT, and TEIQue, and EQ-I and those with less total research are the STEU/STEM and ESCI. Existing research does not indicate that these latter measures are any less valid or reliable than the others; on the contrary they are promising measures but require further tests of reliability and validity. As noted previously, this table confirms that the tests with the strongest *current* evidence for construct and predictive validity are the self-report/trait EI measures (TEIQue, EQ-I, and SREIT). We note that although there is evidence for construct validity of the SREIT based on associations with theoretically related constructs (e.g., alexithymia, optimism; see **Table 4**), some have suggested the measure is problematic due to its use of self-report questions that primarily measure ability based constructs (see Petrides and Furnham, 2000).

CONCLUSION

In this article we have reviewed six widely used measures of EI and made recommendations regarding their appropriate use. This article was written primarily for researchers and practitioners who are not currently experts on EI and therefore we also clarified the difference between ability EI, trait EI and mixed EI. Overall, we recommend that users should use single, complete tests where possible and choose measures of EI most suitable for their purpose (i.e., choose ability EI when maximal performance is important and trait EI when typical performance is important). We also point out that, across the majority of emotion-related outcomes, trait EI tends to be a stronger predictor and consequently we suggest that new users of EI consider using a trait-based measure before assessing alternatives. The exception is in employment contexts where tests utilizing 360 degree assessment (primarily mixed measures) can also be very useful.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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The Role of Emotional Intelligence in the Maintenance of Depression Symptoms and Loneliness Among Children

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Identifying factors that predict the maintenance of depression and loneliness in children is important for intervention design. Whilst emotional intelligence (EI) has been identified as a predictor of mental health, research examining how *both* trait and ability EI contribute to long-term patterns of symptomatology in children is markedly absent. We examined the impact of both TEI and AEI on the maintenance of loneliness and depressive symptoms over 1 year in children aged 9–11 years. Two hundred and thirteen children (54% male) completed the TEIQue-CF and the MSCEIT-YV at the first time point of the study, and the Child Depression Inventory and the Loneliness and Aloneness Scale for Children and Adolescents at Time 1 and, again, 1 year later. Findings indicate that emotional skills (AEI) are important for predicting the maintenance of depressive symptoms and loneliness in children over 1 year; emotional self-competency (TEI) is less influential, only contributing to long-term loneliness in girls. Moreover, whilst deficiencies in the ability to perceive and understand emotions were predictive of prolonged symptomatology, so, too, were *proficiencies* in using emotion to facilitate thinking and emotion management. Those findings carry important implications for EI theory and future research. They also indicate that EI interventions tailored to groups of “at risk” school children may be useful for reducing specific profiles of internalizing symptoms. Programs targeting AEI skills may be universally helpful for reducing the likelihood that depressive symptoms and loneliness will be maintained over time in middle childhood; girls at risk for prolonged loneliness would additionally benefit from opportunities to bolster TEI.

Keywords: emotional intelligence, emotional self-efficacy, depression, loneliness, children, internalizing problems, social emotional learning, gender

INTRODUCTION

Developments in how we understand, use, and manage emotions during childhood are important for understanding mental health in later adolescence and adulthood (Jones et al., 2015). But, those skills are also crucial for understanding wellbeing, including mental health and social connection, during the childhood years. Internalizing problems among children have increased

(Kieling et al., 2011; Husky et al., 2018) and feelings of loneliness are a particular issue, with 14% of children aged 10–12 reporting that they often feel lonely (Office for National Statistics [ONS], 2018a). It is therefore crucial to investigate whether individual differences in emotion capabilities can explain the maintenance of internalizing problems, including prolonged depression and loneliness (i.e., over a sustained period of time). In the current study, we explore the role of both emotional self-competency (Trait Emotional Intelligence; TEI) and emotional skills (Ability Emotional Intelligence; AEI) in the maintenance of loneliness and depressive symptoms over 1 year in a sample of children aged 9–11 years.

Although a recent meta-analysis suggested there has been no worsening of internalizing symptoms in the last decade among children and toddlers (Bor et al., 2014), when emotional distress among children is assessed through self-reports, a rise is evident (Husky et al., 2018). Thus it appears that once children have the cognitive capacity to self-report on their feelings, we are able to gain insight into the prevalence of depressive symptoms and feelings of loneliness that, by their very nature, may not be visible to external observers.

There is global concern for the mental health of young people and the scale of the problem calls for action (Kieling et al., 2011). UK data suggest that rates of mood disorders are increasing in children and adolescents, rising from 9.7% in 1999 to 11.2% in 2017 (Sadler et al., 2018). Studies have shown that in the general population 1.9–13.2% of boys and 1.2–26.0% of girls experience prolonged depressive symptoms (Wiesner and Kim, 2006; Dekker et al., 2007). If untreated, depressive symptoms during childhood and adolescence can lead to later impairments in adulthood (Costello et al., 2003; Belfer, 2008), impacting learning and academic performance (Vander Stoep et al., 2003) and eventual employment prospects (Veldman et al., 2015). Prevention science research suggests that key personal competencies (e.g., social and emotional competence) may play a protective role in the long-term maintenance of internalizing symptoms, including depressed mood (e.g., Obradović et al., 2010).

The number of people experiencing prolonged loneliness is also increasing (Victor et al., 2005; Gerst-Emerson and Jayawardhana, 2015), with a recent report stating that UK adolescents reported feeling lonely more often than adults (Office for National Statistics [ONS], 2018b). Loneliness among children in the UK is also highly prevalent (Office for National Statistics [ONS], 2018a). There has been little examination of the prevalence of enduring loneliness among children and adolescents, but where longitudinal studies have examined prolonged loneliness, prevalence varies from around 4.1–22% (Ladd and Ettekal, 2013; Qualter et al., 2013; Schinka et al., 2013), indicating that loneliness is a significant problem for some children. Loneliness is considered to be a normative experience that promotes reconnection with others (Qualter et al., 2015b), but when it is prolonged it impacts current well-being (Qualter et al., 2010; Eccles et al., in press), future physical health (Harris et al., 2013; Qualter et al., 2013), academic achievement (Benner, 2011), and increases in social withdrawal (Schinka et al., 2013). Thus, it is important to explore whether there are factors

that prevent the maintenance of loneliness over time and promote reconnection.

Key developments in emotional competencies are apparent across childhood and early adolescence, and they are important for mental health in later adolescence and adulthood (Davis and Qualter, 2019). Young people who possess good levels of emotional knowledge to help them identify and recognize emotional cues in themselves and others, and who are able to effectively regulate internal emotional states, are more likely to experience success in navigating complex social interactions, reading and responding to others' cues to establish and grow interpersonal relationships (Trentacosta and Fine, 2010). And, we would expect that youth with good knowledge of emotions are able to work out what they are feeling and why, making changes to their environment to ensure that negative affect does not become common-place or prolonged. Additionally, being adept at managing feelings, particularly negative affect, in a given situation should enable young people to deal with changes and challenges when they arise. Beliefs about emotional competencies, arising from prior experience, training etc., are also important for engaging in social interaction and effortful affect regulation (e.g., Tamir et al., 2007). Thus, having good emotional competencies may buffer children from the experience of prolonged internalizing behaviors (i.e., loneliness and depression).

In support of those ideas, early reports of emotional functioning (e.g., teacher reported emotion understanding and regulation) at 6 years of age have been found to predict internalizing problems (depressed, anxious, overcontrolled symptoms) 19 years later (Jones et al., 2015). Further, evidence shows that teaching emotion understanding and regulation as part of Social-Emotional Learning interventions is protective against the development of subsequent conduct problems and emotional distress, and useful for promoting social competency and pro-social attitudes (e.g., connectedness) (Taylor et al., 2017). Moreover, levels of emotional distress can be reduced among those reporting high levels at the start of interventions (Sklad et al., 2012; Domitrovich et al., 2017).

The field of emotional intelligence (EI) offers a useful organizing framework for examining the impact of emotional competencies on mental health in young people (Davis and Qualter, 2019). EI can be measured in two ways: either as a “trait” (TEI) tapping self-reported emotional competency (e.g., perceived emotional expressiveness) and personal qualities (e.g., assertiveness, empathic concern), or, as “ability” (AEI), through IQ-style testing of emotional skills (e.g., emotion perception, management etc.). AEI and TEI share differential patterns of association with broadband personality dimensions and cognitive ability and are often negligibly related (e.g., Davis and Humphrey, 2012). Rather than viewing AEI and TEI as competing, mutually exclusive perspectives on EI, many researchers now adopt the position that the two offer complementary approaches that shed important light on how maximal emotion knowledge, as well as typical emotional preferences, can influence everyday behaviors in meaningful ways (Mikolajczak, 2009).

Meta-analytic examination of emotion understanding in relation to mental health, using the AEI and TEI frameworks, has

established that they both predict mental health among adults and adolescents aged over 15 years (Martins et al., 2010). That work suggested perceived emotional competency (TEI) was a stronger predictor of mental health than actual emotional skill (AEI), although both were negatively associated with a wide range of mental health problems. Recent work with children and adolescents supports those trends, with AEI and TEI being variously associated with a range of clinical symptoms including depression, anxiety, self-harm, suicidal ideation and attempts, disruptive behavior, and attention deficit hyperactivity disorder (Mavroveli et al., 2008; Cha and Nock, 2009; Mikolajczak et al., 2010; Rivers et al., 2012; Kristensen et al., 2014). Few studies compare the influence of perceived emotional competency (TEI) and skill (AEI) on symptoms, but where that comparison is made in cross-sectional studies, TEI has a stronger influence than AEI on internalizing symptoms in young people, and this relationship survives tests of shared conceptual overlap with broadband personality dimensions, criterion outcomes and common method variance (Williams et al., 2009, 2010; Davis and Humphrey, 2012). TEI can also predict depression, anxiety, and social stress in adolescents across a 1 to 2 year period (Salguero et al., 2012; Gomez-Baya et al., 2017). However, it remains to be established whether emotional skills and self-perceptions are also important for the maintenance of depression over time among pre-adolescence and childhood, something which is important given the developmental trajectories of the disorder and associated negative sequelae.

Trait Emotional Intelligence and AEI are also associated with behavior that increase positive affiliation with other people. For example, TEI and AEI are associated positively with prosocial behavior (Ciarrochi et al., 2000, 2001; Charbonneau and Nicol, 2002; Lopes et al., 2004, 2005; Mavroveli et al., 2009; Frederickson et al., 2012) and negatively with aggressive behavior (García-Sancho et al., 2016; Qualter et al., 2019). Such findings support the thesis that lower AEI and TEI are implicated in the maintenance of loneliness because the behavioral foundations for good quality relationships are not in place. Findings support that idea, showing that AEI is linked to social network size and quality of group and friendship interaction (Brackett et al., 2004; Lopes et al., 2004), and with loneliness (Zysberg, 2012). Prospective work shows that, more specifically, poor emotion regulation skills predict increases in loneliness over time in samples of young adults (Vanhalst et al., 2012; Nightingale et al., 2013) and young adolescents (Wols et al., 2015). Missing from the literature, however, is an examination of TEI and loneliness, and there are gaps in our understanding about whether emotion self-efficacies and skills together are implicated in the maintenance of loneliness among pre-adolescence.

Evidence suggests that, during adolescence, females are more affected by depression than males (e.g., Hankin et al., 1998), and males are lonelier than females (Koenig and Abrams, 1999). Gender has been shown to moderate the relationship between EI and wellbeing in some previous studies. For instance, adult females reported higher TEI than males (Salguero et al., 2012) whilst higher levels of AEI and depression were reported in young females compared to males (Davis and Humphrey, 2012). Further, a meta-analysis established that the relationship between

TEI and mental health is stronger for females than males (Martins et al., 2010). The moderation of gender in the relationship between TEI and wellbeing is also evident in cross-sectional (Piqueras et al., 2019) and longitudinal work (Gomez-Baya et al., 2017), with the relationship between TEI (low levels of perceived clarity and repair; high levels of perceived attention to feelings) and depression over a two period more pronounced for adolescent females than males. Such evidence highlights the need to explore the moderating effects of gender in the relationship between AEI/TEI and maintenance of high levels of depressive symptoms and loneliness.

Empirical examination of factors that predict the maintenance of depression and loneliness is important because findings can influence the design of interventions, improving effectiveness. However, to date, most of the work linking EI and wellbeing uses cross-sectional designs with adolescent and adult groups, limiting its impact and significance to the debate regarding the maintenance of psychological conditions. Research examining how *both* TEI and AEI contribute to long-term patterns of symptomatology in children is markedly absent, despite cross-sectional data suggesting that emotional skill and perceived competency may differentially predict internalizing symptoms. Research designs where internalizing problems are monitored over time have the potential to offer clearer suggestions for interventions that will offer longer-term impacts on symptoms – this is pertinent to Social and emotional learning programs where the durability of intervention effects are yet to be established (e.g., Durlak et al., 2011). To address the gap in the extant literature for examination of the role of EI in the maintenance of internalizing problems, the current study explores the role of AEI skills and TEI in predicting the maintenance of high levels of loneliness and depressive symptoms in children over a 1-year period. We also examined whether that relationship was moderated by gender. Given the extant literature, we expected TEI to be a stronger predictor of prolonged depressive symptoms and prolonged loneliness than AEI. We also expected gender to moderate those effects.

MATERIALS AND METHODS

Participants and Procedure

The participants were a sample of children from the Lancashire Longitudinal Study of Social and Emotional Development (LLSSED), which is a prospective study of 417 children recruited from schools in Lancashire, United Kingdom. Children provided self-reports of loneliness and depressive symptoms, at two waves that took place 12 months apart; they completed an AEI test and a TEI measure at the first wave. It took, on average, 1 h to complete the questionnaires and AEI test at Time 1, and 20 min to complete the questionnaires at Time 2. 213 children provided full sets of data at both time points. Mean age of the children in the current sample at the first measurement wave was 9 years and 3 months (SD = 6.2 months); 54% of the sample was male. The schools included in the study were representative of schools across the UK as determined by the government Index of Multiple Deprivation and eligibility of free school meals. The participant's

primary caregiver gave written, informed consent at each wave of data collection, and all participants provided verbal assent to take part in data collection. Participants were tested in accordance with the national and local ethics guidelines according to the Declaration of Helsinki. The Ethics Committee at University of Central Lancashire provided ethics approval for the study.

Measures

The Child Depression Inventory (CDI; Kovacs, 1992)

The CDI was used to assess depressive symptoms. It is a 27-item scale, where each item consists of three choices (0, 1, and 2). Scores range from 0 to 20, with higher mean scores corresponding to higher depressive symptoms. An example item is “I do most things okay” (0), “I do many things wrong” (1), and “I do everything wrong” (2). The CDI scale has been found to display acceptable internal consistency, reliability, and validity (Kovacs and Beck, 1977; Kovacs, 1992). In the current study, the CDI demonstrated acceptable internal consistency at both time points [$\alpha = 82$, and 80. at Time 1 (T1) and Time 2 (T2), respectively]. We used the clinical cut-off ≥ 12 for mild depression using CDI (Allgaier et al., 2012) to explore clinical levels of depression in the current sample. We found at T1 20 (9.4%) children in the current sample would be classified as having clinical levels of depression; at T2, that number was 35 (16.4%); 16 (7.5) children reported those clinical levels at both T1 to T2. Those percentages are slightly above that found in the Allgaier et al. (2012), paper, but fit with the latest UK statistics on mood disorders for children of this age (Sadler et al., 2018). When using a more conservative cut-off ≥ 20 (Rivera et al., 2005), we do not find any children at T1 or T2 who would be classified as clinically depressed. No parents or children reported receiving treatment for depression during the 12 months of the study.

Louvain Loneliness Scale for Children and Adolescents (LACA; Marcoen and Brumage, 1985)

Loneliness in relation to peers was measured using the peer sub-scale of the LACA. LACA is a 48 item scale, separated into 4 scales of 12 items. The peer sub-scale was used in the present study and includes items “I feel isolated from other people” and “I feel excluded by my classmates.” Children are asked to indicate how often each item applies to them on a 4-point scale: 4 (often), 3 (sometimes), 2 (rarely), or 1 (never). Higher mean scores on the scale are indicative of greater loneliness in relation to peers. The LACA has been found to display acceptable internal consistency, reliability, and validity (Maes et al., 2015a,b). Although originally used with Dutch-speaking children it has also been used with English-speaking children (Terrell-Deutsch, 1999; De Roiste, 2000; Qualter and Munn, 2002, 2005; Harris et al., 2013; Qualter et al., 2013). In the current study, this sub-scale demonstrated acceptable internal consistency across the two waves of data collection ($\alpha = 79$ and 0.82. at T1 and T2, respectively). There are no clinical cut-off points for loneliness, but to explore how many children were scoring at the higher end of loneliness, we explored how many children answered “often” to more than half the questions at T1 and T2. Findings showed that 22 children (10.3%) at T1 and 41 children (19.2%) at T2

reported feeling lonely often; 21 children (9.9%) reported those high levels at both T1 and T2.

Mayer-Salovey-Caruso Emotional Intelligence Test-Youth Version (MSCEIT-Yv; Mayer et al., 2005)

The scale consists of 101 items (of which 97 are scored) that measure different aspects of AEI: (A) Perceiving Emotions – children identify certain emotions in photographed facial expressions, (B) Using Emotions – children rank, using a standardized scale, the extent to which different emotions impact behavior and decision making, (C) Understanding Emotions – children read vignettes and select the answer representing what emotion the protagonist is feeling, (D) Managing Emotions – children read several scenarios and pick, from several options, the best solution for managing emotions in each scenario. Multi-Health Systems, the test distributor, scored the data using expert norms, providing means for each branch of the MSCEIT-Yv, and a total MSCEIT-Yv score. Acceptable split-half reliabilities have been obtained for the MSCEIT, e.g., 0.67 (perceiving) to 0.86 (understanding) and 0.90 for total AEI (Papadogiannis et al., 2009), and the hierarchical four-factor structure has been recovered in data from youth aged 9 to 15 years (Rivers et al., 2012). In this sample, branch scores were significantly intercorrelated [0.24 (correlation between Perceiving and Using branches)] to 0.70 (correlation between Understanding and Managing branches); See **Table 1**.

Trait Emotional Intelligence Questionnaire-Child Form (TEIQue-CF; Mavroveli et al., 2008)

The TEIQue-CF comprises 75 statements, tapping 9 facets of emotional functioning (e.g., emotion expression; emotion regulation; affective disposition). The child is asked to respond to each item using a 5-point Likert scale, ranging from “completely disagree” to “completely agree.” Example items include “I find it difficult to understand what others are feeling” and “If someone makes me angry, I tell them.” The TEIQue-CF has satisfactory levels of internal consistency for the global trait EI dimension (e.g., $\alpha = 0.89$), but not at facet level (Russo et al., 2012; Stassart et al., 2017). Additionally, data collected with younger children suggest the tool is unidimensional in nature (Russo et al., 2012). In view of that evidence, current analyses were restricted to the use of the global TEI score (scored data provided by the test developers). In the current study, $\alpha = 0.87$ for the full TEIQue-CF.

Data Analysis

We hypothesized that enduring feelings of high loneliness and depression would be influenced by TEI and AEI. Duration scores for loneliness and depressive symptoms were computed by multiplying T1 and T2 scores (Qualter et al., 2010); higher scores were demonstrable of high, stable loneliness and high, stable depression over the 12 months of the study. Because we were interested in loneliness and depression scores that started high and stayed high over the 12 months of the study, we did not include the earlier T1 loneliness score in our regression model as a control variable.

To examine the effects of Global TEI and aspects of AEI on maintained loneliness and depressive symptoms, we ran two

TABLE 1 | Means and standard deviations with bivariate associations.

	Mean	SD	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. AEI perceiving emotion	85.62	13.27	0.24**	0.63**	0.52**	0.28**	−0.18**	−0.11	−0.11	−0.23**	−0.15*	−0.14*
2. AEI using emotion	104.11	10.71		0.34**	0.49**	−0.01	0.33**	0.35**	0.27**	0.20**	0.37**	0.29**
3. AEI understanding emotion	94.45	10.28			0.70**	0.15*	−0.13	−0.09	−0.04	−0.05	−0.10	−0.01
4. AEI managing emotion	96.95	8.79				0.25**	0.07	0.05	0.04	0.02	0.09	0.07
5. Global TEI	3.48	0.36					−0.33**	−0.24**	−0.13	−0.24**	−0.27**	−0.21**
6. Peer-related loneliness T1	28.79	8.54						0.80**	0.76**	0.75**	0.94**	0.80**
7. Peer-related loneliness T2	31.12	10.58							0.69**	0.71**	0.93**	0.72**
8. Depressive symptoms T1	5.57	3.86								0.76*	0.80**	0.91**
9. Depressive symptoms T2	6.48	4.42									0.81**	0.90**
10. Prolonged loneliness T1 × T2	978.55	559.05										0.87**
11. Prolonged depressive symptoms T1 × T2	57.77	69.54										

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; AEI, ability emotional intelligence (MSCEIT-Yv); TEI, trait emotional intelligence (TEIQue-CF).

regressions, one with T1 × T2 loneliness as the DV, and the other with T1 × T2 depressive symptoms as the DV. In each regression, the following predictors were all included in one step: gender, MSCEIT-Yv subscales, and Global TEIQue-CF. Gender was dummy coded (gender: −1 = female, and +1 = male) as recommended by Cohen, Cohen et al. (2003); the MSCEIT-Yv subscales and Global TEIQue-CF variables were centered before inclusion in the regression analyses. We performed bootstrapping, estimating a 95% bias-corrected confidence interval for all values of interest, using 1000 bootstrap sample.

RESULTS

Means and standard deviations for each of measures are shown in **Table 1**, with bivariate associations between variables. Means show that the sample increased on loneliness and depressive symptoms from T1 to T2. Correlations suggest high stability of both loneliness and depressive symptoms over time. Loneliness and depressive symptoms were also related to one another within and over time. Loneliness at T1 and T2 was significantly negatively associated with the Perceiving Emotions branch of the MSCEIT-Yv, positively associated with Using Emotions, and negatively with the TEIQue-CF Global score. Depressive symptoms at T1 and T2 were positively associated with Using Emotions and at T2 higher reports of depressive symptoms were also negatively associated with scores on the Perceiving Emotions branch of the MSCEIT-Yv and the Global TEIQue-CF score.

Table 2 shows the bootstrap results from the regression analyses for prolonged depressive symptoms. There were no effects of gender on prolonged depressive symptoms, but Perceiving and Using Emotions branch scores of the MSCEIT-Yv predicted prolonged depressive symptoms. The positive beta for Using Emotions suggests that children in our sample who were skilled at using emotions to promote change in behavior were more likely than their peers to maintain depressive symptoms; the negative beta for Perceiving Emotions suggests that children in our sample who had difficulty reading the emotions of others were more likely than their peers to experience high levels of depressive symptoms over the 1 year of the study.

Bootstrap results from the regression analyses for prolonged loneliness are noted in **Table 3** and show that effects were moderated by gender. Follow-up analyses to examine those effects can be found in **Table 4**. For boys, higher scores on the Using Emotions branch of the MSCEIT-Yv and lower scores on the Understanding Emotions branch predicted the maintenance of peer-related loneliness. For girls, scoring higher on the Using

TABLE 2 | Bootstrapped regression analysis with AEI and TEI as predictors of prolonged depressive symptoms.

Time 1 measures	B	SE B	p	95% CI
Constant	57.47	4.51		
Gender	4.94	4.50	0.272	−3.90, 14.09
AEI				
Perceiving emotions	−1.05	0.53	0.037	−2.20, −0.14
Using emotions	1.94	0.65	0.006	0.86, 3.40
Understanding emotions	−0.17	0.75	0.803	−1.65, 1.26
Managing emotions	0.71	1.03	0.465	−1.40, 2.71
TEI				
Global TEI	−30.67	18.30	0.090	−69.48, 2.09

$F = 6.53$, $p < 0.001$, $R^2 = 0.16$, Adjusted $R^2 = 0.14$. AEI, ability emotional intelligence; TEI, trait emotional intelligence.

TABLE 3 | Bootstrapped regression analysis with AEI and TEI as predictors of prolonged loneliness.

Time 1 measures	B	SE B	P	95% CI
Constant	973.19	32.53		
Gender	87.74	33.71	0.009	20.97, 157.84
AEI				
Perceiving emotions	−4.97	4.32	0.244	−14.65, 2.47
Using emotions	19.92	5.01	0.001	11.14, 30.60
Understanding emotions	−15.35	5.89	0.010	−28.32, −4.01
Managing emotions	14.73	7.03	0.026	1.40, 29.11
TEI				
Global TEI	−350.98	145.33	0.016	−629.77, −52.29

$F = 14.26$, $p < 0.001$, $R^2 = 0.29$, Adjusted $R^2 = 0.27$. AEI, ability emotional intelligence; TEI, trait emotional intelligence.

TABLE 4 | Bootstrapped regression analysis with AEI and TEI as predictors of prolonged loneliness for boys and girls.

Time 1 measures	Boys				Girls			
	B	SE B	p	CI	B	SE B	p	CI
Constant	1063.51	48.59			887.99	45.14		
AEI								
Perceiving emotions	−0.72	4.84	0.866	−9.94, 9.45	−10.20	8.02	0.195	−29.75, 0.90
Using emotions	21.97	7.93	0.007	9.44, 40.32	20.31	6.79	0.005	8.88, 35.19
Understanding Emotions	−20.74	7.37	0.006	−37.30, −8.04	−11.44	9.20	0.197	−32.35, 4.99
Managing emotions	10.12	13.50	0.428	−15.10, 39.50	19.05	8.36	0.026	4.85, 37.82
TEI								
Global TEI	−204.21	226.73	0.360	−686.12, 207.98	−503.08	199.68	0.013	−897.50, −116.04
	$F = 9.38, p < 0.001, R^2 = 0.31, \text{Adjusted } R^2 = 0.27$				$F = 7.65, p < 0.001, R^2 = 0.29, \text{Adjusted } R^2 = 0.25$			

AEI, ability emotional intelligence; TEI, trait emotional intelligence.

Emotions and Managing Emotions MSCEIT-Yv branches and having a lower TEIQue-CF score predicted prolonged feelings of loneliness over the 12 months of the study.

For prolonged loneliness, we explored whether global TEI acted as a suppressor variable in the regression. We explored suppression effects given that (a) the MSCEIT-Yv understanding and managing emotion subscale scores were uncorrelated with loneliness at T1, T2, and prolonged loneliness ($T1 \times T2$), but were significant predictors in the regression models for boys and girls, respectively, and (b) global TEI was correlated with both branches and T1 and T2 loneliness, and prolonged loneliness, but was not significant in the regression for boys. We explored whether global TEI provided suppression by determining whether there was an increase in beta weights for understanding and managing emotions when global TEI was included in the regression model. Such an exploration is important for understanding the relationships between variables in our dataset. Bootstrapping results (see **Supplementary Materials I**) show that for girls, the inclusion of global TEI increased the standardized beta weight for MSCEIT-Yv Managing scores, so that it was now a significant predictor (B moved from 11.16 to 19.05, p moved from 0.178 to 0.018); for boys, the addition of global TEI, while not a significant predictor of prolonged loneliness, unsuppressed the underlying pattern so that now MSCEIT-Yv Understanding scores were more strongly related to prolonged loneliness (B moved from −19.24 to −20.74, p moved from 0.014 to 0.010) than when TEI was not included in the model.

DISCUSSION

In the current study, we explored the independent roles of emotional skills (AEI) and emotional self-competency (TEI) in the maintenance of depressive symptoms and loneliness in school children aged 9–11 years. This is the first examination of those longitudinal associations in middle childhood. Our findings showed that emotional skills are important for predicting the maintenance of depressive symptoms and feelings of loneliness during childhood, whereas emotional self-competency acted more selectively; TEI did not predict the maintenance of

depression and predicted enduring loneliness for girls only. Those findings conflict with existing youth-focused cross-sectional literature that has found TEI, not AEI, predictive of a broader range of disorders (Williams et al., 2009; Davis and Humphrey, 2012). Our findings also suggest that emotional skills play different roles in the maintenance of internalizing symptoms, and that universally “high” levels may not always be adaptive. Deficiencies in perceiving and understanding emotions were predictive of prolonged symptomatology, yet so, too, were *high* levels of emotion management skill and ability to use emotion to facilitate thinking. Such findings, discussed further below, have important implications for the theory and study of emotional intelligence, and the design of interventions that aim to teach children to perceive, understand, use, and manage emotions.

Emotional Intelligence and Internalizing Symptoms

In our sample of children, superior ability to “use” emotional information contributed to both the maintenance of depressive symptoms and loneliness. Although that predictive pattern appears at odds with AEI theory (i.e., that higher skills should relate to better wellbeing; Mayer et al., 2008), scrutiny of the MSCEIT-Yv “Using Emotion” test items helps to clarify why this might be important for the maintenance of internalizing disorder over time. The adult MSCEIT taps ability to use emotion to influence thinking (e.g., knowing which emotions might be useful for creativity, problem-solving or how changing thoughts can be useful for improving mood), but the youth test items provide an index of children’s conscious *awareness of emotional experience*. Items require children to compare their experience of specific feelings (e.g., liking someone) to different sensations, such as color, temperature, or speed (e.g., warm, soft, pink etc.). In order to do that task successfully, children need to have experienced the feelings and be able to recognize individual emotions when they occur. Such a skill, then, requires attending to feelings and monitoring emotions, which may not always be adaptive. Experiencing heightened emotional intensity (both positive and negative emotions) and increasing one’s attention to moods are both associated with

internalizing disorders (Mennin et al., 2007; Suveg et al., 2009; Lizeretti et al., 2012; Boden and Thompson, 2015). Indeed, it has been suggested that an inability to shift attention away from (negative) emotions may precipitate disorder through ruminative thinking (Joormann and Gotlib, 2008).

In order to fully understand why having heightened emotional insight is disadvantageous, we need to consider the combined “profile” of skills and perceived competencies that significantly predicted the maintenance of depression and loneliness in the current sample of children. That is important because individuals could possess a “vulnerable” EI profile, where imbalances in the levels of constituent EI skills or trait-level facets (e.g., emotionally perceptive/poor regulators) predict poorer intrapersonal outcomes (Davis and Nichols, 2016). In the context of internalizing disorders, high levels of emotional awareness have been linked to use of adaptive and maladaptive emotion regulation strategies in children, adolescents, and adults (Suveg et al., 2009; Eastabrook et al., 2014; Boden and Thompson, 2015), suggesting that by experiencing emotions, individuals develop an understanding of the suitability and efficacy of different management strategies for specific environmental contexts. Put simply, if children are not aware of their own emotions, they cannot build an understanding of how to regulate them effectively. Our data supports that pattern: girls who are highly skilled in using (feeling) emotion also had good knowledge of how to manage emotion in themselves and others. However, those girls also maintained their feelings of loneliness over 1 year. That can be qualified with reference to perceived emotional competency (TEI): those girls in our study with high levels of emotional skill also reported that they lacked confidence in their competencies. Without the confidence to enter the social arena to deploy their emotional knowledge, establishing meaningful social relationships may be difficult, maintaining feelings of loneliness. The interdependence of skills and self-efficacies in the prediction of internalizing disorder is an emerging theme in the EI literature that has been demonstrated elsewhere in cross-sectional work with adolescents (Davis and Humphrey, 2014) and female adults (Salguero et al., 2015). The current findings support the idea that without average-high levels of TEI, high levels of skill are redundant.

Interestingly, in our sample of boys, TEI was not important for predicting the maintenance of loneliness over time. For boys, having high levels of emotional awareness (using emotion) coupled with poor emotional understanding was influential. The MSCEIT-Yv measures knowledge of emotion vocabulary and complex emotional blends (e.g., the constituent components of calmness). It is possible, therefore, that boys who are good at recognizing the sensation of emotions they experience, but are unable to label those complex emotions and understand how they transition from more basic feelings, continue to experience loneliness. Without sufficient knowledge, those boys may be unsure how emotional interactions will play out – they are poorer at communication, yet feel their social disconnection acutely.

Contrary to previous literature (e.g., Gomez-Baya et al., 2017), we found no gender differences in the maintenance of depression symptoms. Across our sample of children, being skilled at feeling (using) emotion, but poor at identifying emotions in

others, predicted long-term internalizing problems, measured as enduring depressive symptoms and loneliness. Biases in the processing of emotional expressions are well established in the literature, with studies typically finding that depressed young people and adults perceive positive, negative, and ambiguous emotions as more negatively valenced, particularly those presented at lower intensities (Bourke et al., 2010; Schepman et al., 2012); loneliness is also related to the attribution of negative intentions to ambiguous social encounters (Qualter et al., 2013; van Roekel et al., 2015) and cognitive biases for negative affect (Qualter et al., 2013, 2015b; Bangee et al., 2014; Spithoven et al., 2017). Since successful interaction depends upon being able to accurately identify non-verbal emotional signals in others, continued misattribution of emotional signals (e.g., perceiving individuals as less happy) could prolong negative mood states in children and lead to further socio-emotional problems.

It is notable that we did not find a predictive effect of TEI in the maintenance of depressive symptoms in our sample because previous cross-sectional studies have shown a link (Williams et al., 2009; Davis and Humphrey, 2012). However, the age range of our sample necessitated the use of the TEIQue child form, which differs substantially in content coverage from the adolescent version, used in the related previous studies. The TEIQue-CF measures a complex blend of perceived emotional competencies (e.g., emotion expression), facets of emotional personality (e.g., affective disposition) and self-beliefs (e.g., motivation) (Mavroveli et al., 2008). The newly developed Emotional Self-Efficacy Scale (ESE; Qualter et al., 2015a) offers a “cleaner” examination of discrete perceived emotional competencies in children, and as a next step it would be desirable for researchers to validate and extend the current findings using this tool.

Strengths, Limitations and Future Directions for Research

The current study provides an examination of the association between emotional intelligence and the maintenance of depressive symptoms and loneliness over 1 year in children. Given that much of the previous work has been with older adults and older adolescents and has focused on cross-sectional influences, we have filled a knowledge gap, providing data on how AEI and TEI influence the maintenance of depressive symptoms and feelings of loneliness. The longitudinal design is a strength of the study, enabling the examination of how emotion skills and self-competencies impact the maintenance of depression and loneliness. However, data were collected over a relatively short period of childhood. Although this is an important first step for confirming relationships at an early stage of development, it will be important to extend this work to track symptomatology across a longer time period into adolescence, where we would expect normative increases in depression and loneliness (Laursen and Hartl, 2013; Wong et al., 2018). This is also important from a replication perspective, to establish that our results were not due to idiosyncratic cohort effects.

Researchers may also consider refining the tools used to capture those relationships. Specifically, the use of an

age-appropriate TEI measure that accommodates sub-facet analysis (e.g., ESE: Qualter et al., 2015a) would allow more fine-grained examination of how competency beliefs about specific emotion skills (e.g., confidence in regulating one's own emotions/the emotions of others etc.) impact wellbeing across time. Use of a TEI measure that includes subscales, and, thus, narrower bandwidths, would mean that the importance of lower level TEI facets could be examined alongside lower level AEI dimensions, offering greater predictive precision due to increased instrument fidelity (e.g., Ones and Viswesvaran, 1996; Paunonen and Ashton, 2001). In future work, it will be important for any comparison between EI measures to consider the level at which each test is assessed, and make them as comparable as possible. Additionally, it will also be important to examine the incremental validity of both AEI and TEI to predict prolonged symptoms beyond the influence of allied constructs (e.g., broadband personality dimensions and general cognitive ability) that are known predictors of wellbeing and/or EI. In adolescents, there is evidence that both AEI and TEI can explain unique variance in mental wellbeing (Davis and Humphrey, 2012; Frederickson et al., 2012; Rivers et al., 2012), but that has not been explored in children.

Implications for Theory and Practice

Our findings confirm the value of studying discrete groups (e.g., girls, boys) and EI profiles to establish patterns of specificity and commonality in the maintenance of internalizing disorders. These data clearly contrast with the theoretical notion that EI is universally beneficial for adaptive outcomes (e.g., Mayer et al., 2008), and suggest that EI theory should be modified and extended to incorporate contextual effects, akin to developmental theories of emotional competence (e.g., Saarni, 1999). Our findings also emphasize the importance of studying longitudinal links between both types of EI and any mental health problem: the current findings differ in important ways from cross-sectional data (e.g., compared with AEI, TEI is a weaker determinant of prolonged vs. concurrent disorder) and underscore the divergent roles played by perceptions of emotional competencies vs. actual abilities. It is notable that through our examination of the combined "EI profile" of skill and self-competency, we detected classical suppression effects in our loneliness data. Statistically, the inclusion of TEI in predictive models "purified" the direction of predictive effects of emotion skills (understanding, management, using) on prolonged loneliness. Whilst this could indicate that TEI and AEI share some common methodological elements that are irrelevant in the prediction of prolonged loneliness (e.g., measurement error), theoretically, this further underscores the importance of considering TEI and AEI as a *composite* predictor of adjustment outcomes (i.e., how important self-confidence in skills is for enabling abilities). By including TEI and AEI together in predictive models, researchers can better understand how social and emotional skills and self-efficacies can be trained in an optimal manner. Replication of our effects is now required to build consensus in the literature and develop clear guidelines for intervention design.

Our finding that global TEI was less predictive of enduring depression and loneliness than individual AEI subscales could

be seen to challenge previous work suggesting measurement reliability is maximized when global EI constructs are examined because there is broader bandwidth (Gardner and Qualter, 2010). Broader bandwidth can result in the prediction of a wider range of criteria (Ones and Viswesvaran, 1996), but in our study that was not the case: we found that global TEI score predicted less variance in enduring depressive symptoms and prolonged loneliness than subscale AEI scores across genders, suggesting a robust effect. Of course, one could argue that because global trait EI carries only one degree of freedom and the four AEI factors carry four degrees of freedom and are measured at similar bandwidths, comparison between global TEI and AEI subscales is non-equivalent. Thus, in future work, researchers will want to choose EI measures that can be treated similarly because they have comparable bandwidth, extending our understanding of the incremental validity of those tests to predict the maintenance of internalizing symptoms.

Our findings also have implications for the teaching of emotional information. Social and emotional learning interventions (SEL) aim to develop social and emotional skills through explicit instruction in schools (Humphrey, 2013) and there is evidence that universal (i.e., whole school) programs are effective in training socio-emotional competencies to improve wellbeing (Durlak et al., 2011; Sklad et al., 2012; Wigelsworth et al., 2016). Our finding that deficiencies in emotion perception, understanding, and emotion self-efficacies differentially predict the maintenance of depression and loneliness supports the theory of change that underpins SEL (CASEL, 2007), aligning well with the findings that SEL interventions promote effective coping and social engagement (Goodman et al., 2015). However, contrary to that movement, we found that some skills (e.g., feeling and emotion management knowledge) were not necessarily protective against prolonged internalizing symptoms and that this differed for girls and boys. Those findings suggest that to be most effective, SEL programs need to include a tiered system, where the needs of specific groups of "at risk" children can be addressed (Humphrey et al., 2016).

CONCLUSION

The current study explored the role of emotional knowledge, measured within the AEI and TEI frameworks, in the maintenance of depressive symptoms and loneliness in children aged 9–11 years. We found that deficiencies in the ability to perceive and understand emotions predicted the maintenance of symptomatology, but proficiencies in using emotion to facilitate thinking and emotion management were also important. Those findings have implications for EI theory and future research, and for intervention work designed to build emotional knowledge and/or reduce internalizing problems. First, there is a need to examine the combined profiles of AEI and TEI in future work with children and adolescents because it seems that having emotional skills is redundant if the child does not have the confidence to use those skills. Second, a modification to AEI theory is needed to incorporate contextual effects; our findings suggest that the utility of AEI skills cannot be

determined without reference to other qualities of the person (e.g., gender; levels of perceived emotional competency), but also the nature of behavioral outcomes studied. The maintenance of loneliness in the young girl who is emotionally skilled, but lacking in emotional confidence, may be precipitated by challenging situational factors (e.g., difficulty re-connecting with peers) and she may feel emotional setbacks acutely, perpetuating this cycle. There is a need to move beyond this narrow-band, static approach to AEI. Third, while there is an argument for universal interventions designed to build emotional knowledge among children and adolescents, we argued a tiered system that allows tailored interventions for groups of “at risk” children may also be useful for reducing specific profiles of internalizing symptoms.

DATA AVAILABILITY

The raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

ETHICS STATEMENT

Details of our ethical consent procedure can be found in the methods section of the manuscript. We can confirm that parental consent was provided by parents at both waves of data collection and child participants provided assent during data collection. This study was carried out in accordance with the recommendations of the ethics panel at The University of Central Lancashire, who approved the study.

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AUTHOR CONTRIBUTIONS

All authors conceived the study. SD participated in the study design, interpreted the findings, wrote the initial manuscript, and made revisions to the manuscript based on reviewers' feedback. PQ performed statistical analyses, interpreted the findings, and wrote the initial manuscript. RN helped to perform statistical analyses, interpret the findings, and contributed to the draft manuscript. PQ and RN coordinated the original data collection. All authors read and approved the final version of the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01672/full#supplementary-material>

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The Relationship Between Trait Emotional Intelligence, Cognition, and Emotional Awareness: An Interpretative Model

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Emotional awareness (EA) has been defined as the cognitive skill devoted to the identification and description of one's own and others' emotional experiences, an ability that has usually been conceptualized along with the development of cognitive intelligence. Despite this, EA has also been deemed a central constituent of Emotional Intelligence (EI), a construct that captures individual differences in how we perceive, communicate, regulate, and understand our own emotions, as well as the emotions of others. The overlap between the cognitive and the emotional domain in the definition of the EA construct has created several difficulties in both its understanding and its usage, so much so that several questions regarding its nature and structure remain unanswered. The aim of the present work was to test in a unique model the explanatory role of both trait EI and fluid nonverbal intelligence on EA variability in children, controlling for the effect of age, a variable strictly related to cognitive development, as well as gender, which is highly associated with trait EI during childhood. Four hundred and eighty-eight pupils (258 females and 230 males) ranging from 8 to 12 years old completed the Levels of Emotional Awareness Scale for Children, the Trait Emotional Intelligence Questionnaire – Child Form, and a measure of pure non-verbal reasoning ability, the Raven's Progressive Matrices. The results of a structural equation model showed a positive explanatory power of both Raven and TEIQue scores on EA, revealing that both cognitive intelligence and trait EI significantly explained EA. The same model also showed an indirect effect of age, *via* intelligence scores, on EA, suggesting that the increase of EA with age could be partially imputed to the development of intelligence. Finally, a relation between gender and TEIQue scores confirmed higher trait EI scores in girls than in boys. The implications emerging from this model are discussed.

Keywords: trait emotional intelligence, emotional awareness, fluid intelligence, childhood, Trait Emotional Intelligence Questionnaire – Child Form, Levels of Emotional Awareness Scale for Children, gender, age

INTRODUCTION

Emotional intelligence (EI) has been defined as a wide array of individual differences (Hughes and Evans, 2018) that convey the adaptability characteristic of intelligence and the subjective experiences based on emotions. It can be operationalized according to various theoretical frameworks (see Pertides, 2010; Hughes and Evans, 2018). Among these, the trait model

(Petrides et al., 2016) conceptualizes EI as a collection of affect-related personality traits measurable with self-reports (Petrides et al., 2007; Hughes and Evans, 2018). Recently, Petrides et al. (2016) provided a comprehensive overview of the fields of application of trait EI, such as the clinical, health, social, educational, and organizational fields. Although much still needs to be investigated and understood, evidence exists of the importance of trait EI not only among the adult population (Andrei et al., 2014) but also among young people given its potential in several real-life domains for both children (e.g., Mavroveli and Sánchez-Ruiz, 2011; Russo et al., 2012; Mancini, 2018) and adolescents (e.g., Mavroveli et al., 2007; Frederickson et al., 2012; Andrei et al., 2015; Mancini et al., 2017).

Specifically, the investigation of trait EI in children has suggested that a higher trait EI level appears to be an important predictive factor of health-related outcomes, such as improved wellbeing and social interactions during development (Andrei et al., 2014), as well as fewer somatic complaints (e.g., Jellesma et al., 2011). Even if gender differences have been highlighted in trait EI during childhood (Mavroveli et al., 2008; Davis and Humphrey, 2012), with higher trait EI scores in females than in males, research demonstrated an overall positive impact of trait EI on children's adaptive capacities. A number of studies on the role of trait EI through childhood have been conducted in educational contexts, showing that individual differences in trait EI can be relevant for positive adaptation within the classroom, with particular implications for social-emotional competences and for consequent adaptive behaviors with peers (Frederickson et al., 2012). For instance, Petrides et al. (2004) showed that pupils with high trait EI scores were less likely to be expelled from their schools and had a lower frequency of unauthorized absences. Additional studies revealed that high trait EI scores were positively associated with multiple peer ratings for prosocial behavior (Mavroveli et al., 2009). However, data from self-report surveys revealed that a high trait EI is negatively related to bullying (Mavroveli and Sánchez-Ruiz, 2011), victimization attitude (Kokkinos and Kipritsi, 2012) and behavioral problems in general (Poulou, 2014). Several studies also explored the relationship between individual differences in trait EI and academic outcomes. Although the literature still lacks clear and direct results regarding this relationship (Mavroveli et al., 2009; Hansenne and Legrand, 2012), it seems that the construct of trait EI may serve as a moderator of the relationship between intelligence and scholastic performance (Agnoli et al., 2012).

According to Lane (2000a), the most pivotal aspect of EI is probably related to the awareness of emotional experiences in oneself and others. Even if emotional awareness (EA) is not included in either ability or trait EI theoretical formulation, its relation to both constructs has been supported by past research. For instance, with regard to the ability model, higher levels of EA seem to be related to higher emotion perception ability (Lane et al., 1990).

EA has been conceptualized as the cognitive ability to perceive, describe and differentiate one's own and others' emotional experiences (Lane and Schwartz, 1987). This construct comprises meta-knowledge about emotional states and

experiences (Boden and Thompson, 2015), and it is characterized by attentional and interpretative processes through which the ongoing monitoring, differentiation and analysis of emotions occur. EA can be particularly important during late childhood, especially during the transition through preadolescence and adolescence, as internalizing symptoms, such as anxiety and depression, are often experienced during this period more intensively, and the ability to regulate emotions is not yet fully established (e.g., Lane and Schwartz, 1987; Rieffe and De Rooij, 2012; Eastabrook et al., 2014). Several questions, however, remain unanswered with regard to the relation between both ability and trait EI and EA, especially during development.

The present work is centered on the exploration of the relationship among EA, trait EI and cognitive intelligence during development, focusing on the specific measurement method used to quantify EA during childhood and preadolescence. Are the emotion-related dispositions and self-perceptions defining trait EI able to explain part of the variability in the measurement of EA during childhood and preadolescence over and above the explanatory power of cognitive abilities? This question was addressed through a specific exploration of EA in children and preadolescents.

The Levels of Emotional Awareness Model

The Levels of Emotional Awareness (LEA) theoretical model that Lane and Schwartz (1987) proposed describes EA as part of the cognitive development domain, unfolding simultaneously with the development of intelligence. In other words, the LEA model maintains that emotional experiences become more differentiated and integrated with age, with representations of emotional states moving from implicit to explicit forms (Lane, 2000b, 2008; Ciarrochi et al., 2003).

The model that Lane and Schwartz (1987) proposed hypothesizes that the organization of emotional experiences is based on the varying complexity of emotional representations. The structure of EA is based on cognitive schemata that are different among individuals and that strictly depend on past experiences expressed through language. On the basis of this theoretical proposition, one's own ability to be emotionally aware can be identified and measured through the ability to distinguish among various emotional experiences and the level of complexity in one's description. In the LEA model, emotional experience undergoes a structural transformation following a hierarchical development that defines five levels of emotional awareness (in progressive order): physical sensations, action tendencies, single emotions, blends of emotion, and blends of blends of emotional experience (Lane et al., 1990). During normal development, a continuous process of differentiation and generalization takes place: affective arousal (implicit and preconscious) is initially experienced as bodily sensations and as action tendencies or global states of positive or negative tension. Then, the representation of affective arousal becomes explicit, consciously perceived, and experienced as distinct states of feeling (conscious awareness of one feeling at a time; a mixture of feelings at a time; and an awareness of various mixtures of feelings in ourselves and in others). From this perspective, individuals may differ in their levels of emotional

awareness, and disturbances in somato-psychic development may lead to alterations in emotional awareness (Subic-Wrana et al., 2014). The LEA paradigm specifically defines a developmental trajectory of affective development similar to Piaget's theory of cognitive-sensory development (Piaget and Inhelder, 1972), moving from implicit to explicit processing.

The current literature seems to support the hypothesized relation between cognitive development, defined in terms of the increase with age of the cognitive abilities constituting intelligence, and EA levels (Veirman et al., 2011). In particular, positive but weak correlations between both general and fluid intelligence and EA showed a positive association between these abilities, as well as a relative independence of the two constructs (Mancini et al., 2013). When they were explored during development, a weak association also emerged between EA and both EI abilities and affect-related personality traits (Veirman et al., 2011). Again, this result seems to demonstrate both a positive association and a relative independence between EA and EI during late childhood and early adolescence. EA ended up being associated with specific aspects of intelligence, such as verbal intelligence (Veirman et al., 2011). This last result in particular seems to suggest that EA is related to the cognitive ability to describe emotions with words. However, we cannot exclude that this association is influenced by the nature of the methods used to measure EA, which are usually based on verbal descriptions (Veirman et al., 2011). Notwithstanding, as previously said, EA emerged as being associated with fluid intelligence as well (Mancini et al., 2013), revealing an association between intelligence and EA which is independent from verbal abilities.

EA is usually assessed through self-report-performance tests (Subic-Wrana et al., 2011). The Levels of Emotional Awareness Scale (LEAS; Lane et al., 1990) in particular is a measure that showed reliability and construct validity (Lane et al., 1996). Lower levels of EA have been linked to patients with somatoform disorders, eating disorders, depressive states, alcohol addiction and functional psychosomatic conditions (Bydlowski et al., 2005; Donges et al., 2005; Bochand and Nandirino, 2010; Pasquier and Pedinielli, 2010), as well as to individuals with impairments in mentalization (Subic-Wrana et al., 2010). The LEAS provides a self-assessment of the level of EA ability. As explained in Ciarrochi et al. (2003), the LEAS is neither a performance-based measure nor a self-report measure of affect-related personality dimensions. Rather, it is intended to assess the extent to which people perceive to be aware of emotions in both themselves and others.

Most research on EA has focused on adult and adolescent samples, whereas very few studies have explored its influence on children. In 2005, Bajgar and colleagues implemented a child-friendly version of the LEAS (LEAS-C). The LEAS and LEAS-C differ in the number and content of the scenarios, but the design and scoring procedure are very similar. The reliability of the LEAS-C resulting from validation studies is acceptable and inter-rater reliability is high (Bajgar et al., 2005; Veirman et al., 2011). Similar results on the validity of the tool were also reported in a preliminary study on the Italian validation of LEAS-C (Marchetti et al., 2010). The LEAS-C seems to represent an important research method for exploring emotional awareness during childhood. However, even if the LEA model that Lane proposed

is essentially a developmental model (whose roots are founded in the maturative patterns characterizing EA), evidence regarding this model during development is still scant. Research on the use of the LEAS-C during childhood can be defined as still being in an early state. Several questions remain unanswered on the model that Lane proposed and on the measure of EA that the LEAS-C provides during development.

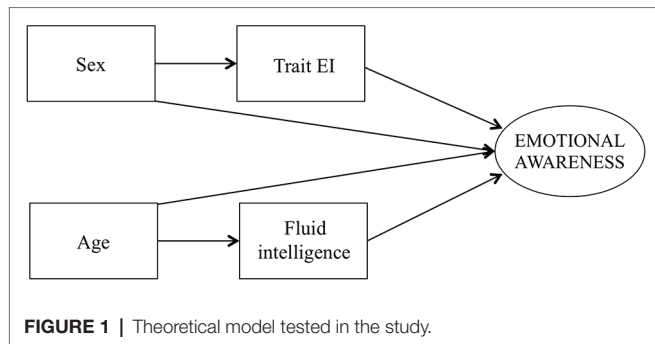
The Present Study

As previously mentioned, Lane's theory postulates that the internal world of experience finds its roots in integration among the cognitive schemata used to process emotional information. Under this approach, both cognitive and emotional domains should therefore be involved in the development of EA. This theoretical position is in line with other current approaches to the study of EA, which explain EA as a multisided construct defined by an attentional or cognitive dimension and by an emotional dimension (e.g., Boden and Thompson, 2015). When one measures EA during development, these two components should, thus, be taken into account to capture the multidimensional nature of the construct. One could hypothesize that the EA measure that the LEAS-C provides could be defined both by the child's cognitive developmental stage and by her/his capacity to self-assess her/his and others' emotional experiences. Given the self-report nature of the instrument, we could expect LEAS-C scores to be explained in part by emotion-related self-perceptions as measured through trait EI scores. On the other hand, if the EA developmental trajectory is defined by children's cognitive development, we could expect the measure of EA that LEAS-C provides to be explained by age-related changes in children's cognitive intelligence as well.

Hence, the present work investigated the relationship between trait EI, fluid nonverbal intelligence, and EA during childhood and preadolescence. Specifically, we examined a model in which trait EI and fluid intelligence were modeled as antecedents of EA. Moreover, individual differences in children's trait EI were considered, with the hypothesis being that they can explain EA scores' variability related to emotion-related self-perception. Finally, because differences among boys and girls in trait EI scores emerge during development (Mavroveli et al., 2008), the impact of trait EI on EA scores was controlled for gender.

Hypotheses

The main aim of the present study was to test, in a unique model, the explanatory role of trait EI in EA variability during development, controlling for gender differences, and age-related changes in fluid nonverbal intelligence. Our hypotheses are summarized in the theoretical model presented in **Figure 1**. Specifically, on the basis of past research (Mavroveli et al., 2008; Davis and Humphrey, 2012) we hypothesized that gender differences would be related to differences in trait EI scores and trait EI increase could, in turn, explain an increase in EA scores. In particular, we controlled for the effect of trait EI on EA for gender by exploring both a direct and an indirect effect of gender on EA. Because no gender differences in LEAS-C scores were highlighted in past literature, we did not expect a direct effect of gender on EA. At the same time,



we hypothesized that an increase in age would be related to increases in fluid intelligence, which, in turn, could explain EA scores. Besides these independent relationships, we expected that intelligence could mediate the effect of age on EA. This hypothesis is based on the aforementioned LEA model by Lane and Schwartz (1987), which assumes that the enhancement of EA during development is related to the increase of children's cognitive abilities with age. We specifically tested a mediation effect of age on EA *via* intelligence. Only through an indirect effect of age (*via* intelligence) on EA, could the hypothesis that Lane and Schwartz (1987) proposed be proved. Neither the effect of age on trait EI nor the effect of age on intelligence was tested because, on the basis of past literature, no specific hypothesis could be formulated on these relationships for our tested age. Through the use of a structural equation model approach, our intention was to test whether trait EI scores, controlling for gender, and the development of fluid intelligence can independently explain variability in EA scores during development over and above the role that the other variable exerts.

MATERIALS AND METHODS

Participants

The participants included 514 students ranging in age from 8 to 12 years. All participants were recruited through contacts with primary (3th, 4th, and 5th grade) and middle (6th grade) schools in Northern Italy. Pupils with special educational needs ($n = 12$) and those who were not fluent in Italian ($n = 14$) were excluded from the sample. No further socio-demographic information was collected. Complete data were available for 488 pupils (258 females; mean age = 10.08 years; SD = 1.38 years).

Measures

Levels of Emotional Awareness Scale for Children

Twelve scenarios based on everyday social situations—with each involving two people, oneself and another person—compose the LEAS-C, a tool specifically aimed at children from 8/9 years of age up to preadolescence (Bajgar et al., 2005). An example of a scenario is: “Your teacher tells you that your homework is all wrong and needs to be done again”. Then, two questions are presented: “How would you feel?” and “How would the other person feel?”. Children are asked to respond by indicating how they might feel and how they think the other person

might feel in each situation. The scenarios are organized around four emotions (anger, fear, happiness and sadness) presented in mixed order. In particular, in the present study we used the LEAS-C Italian version that Marchetti et al. (2010) developed. Scoring procedures for the LEAS-C are the same as those followed for the adult-based LEAS (Lane et al., 1990). Three scores were assigned to each scenario, reflecting self, others, and overall emotional awareness. Scores for self and others were independently computed on a five-point scale as follows: 0 (no answer and cognitions), 1 (bodily sensations), 2 (actions and general emotional states), 3 (unidimensional emotions), and 4 (blends of emotions). The total score was the largest of the scores for self and others, except in the case of two level-four scores, when a total score of five was given (the maximum possible rating was 60). For the purpose of analyzing the LEAS-C answers, each scenario was coded and scored separately from the remaining scenarios. Four independent, experienced and trained evaluators each assessed about 25% of the responses to the open-ended questions. To aid in the scoring of emotion words, the judges referred to the scoring manual (Bajgar and Lane, 2004) and to its supplement, which includes a glossary of words and specific examples of child response styles. Then, scores awarded were compared. In the case of important discrepancies in codes, coders reviewed the discrepancies, and scores were assigned by consensus. Inter-rater reliability using “Cohen's κ ” was comprised between 0.71 and 0.87, which is esteemed as experimentally congruous (Hartmann, 1977). The validity study, gender effects in LEAS-C performance, and relationship between the scale and other emotion assessments are widely reported in Bajgar and Lane (2004). In the current sample, the LEAS-C scales' internal consistency, calculated using Cronbach's alpha coefficient, was acceptable: $\alpha = 0.68$ for Total scores, $\alpha = 0.69$ for self-scores, and $\alpha = 0.73$ for others' scores.

Trait Emotional Intelligence Questionnaire – Child Form

Specifically developed for ages 8–12, the Trait Emotional Intelligence Questionnaire – Child Form (TEIQue-CF) is composed of 75 short statements (e.g., “It's easy for me to show how I feel”) that require a response on a five-point Likert scale, ranging from “completely disagree” to “completely agree” (Mavroveli et al., 2008). The TEIQue-CF showed good levels of internal consistency and temporal stability over a three-month interval (see Mavroveli et al., 2008; Mavroveli and Sánchez-Ruiz, 2011). In the present study the Italian version of the TEIQue-CF was used (Russo et al., 2012). For each participant, a global trait EI score was computed. The reliability of the questionnaire was very high (Cronbach alpha = 0.88). For an introduction to the theory and psychometric properties of the TEIQue as the operationalization vehicle for trait EI, see Petrides (2009) and Petrides and Furnham (2003).

Raven's Colored Progressive Matrices

The CPM is a measure of pure nonverbal reasoning ability that is meant to be independent of the specific cultural or educational context (Raven, 2000). It is widely applied in both practice and

the research field due to how easy it is to administer and to interpret in a clear, theoretically relevant way (Raven, 2000). The test is specific for children from about 4/5 to 12 years of age, and it consists of 36 items presented in three sets of 12 each, progressively arranged in order of difficulty to assess the ability to form perceptual relations and reason with analogies. Each item depicts an abstract pattern in a two by two or three-by-three matrix; all cells contain a figure except for the cell in the lower right corner. Participants were asked to find the missing piece in a set of matrices that become progressively more difficult. In accordance with the Italian user manual, CPM has been assessed using answer sheets. A score of 1 was given to each correct answer. A sum of the correct answers has been obtained for every child. Finally, total raw CPM scores were transformed to percentile scores according to age-normative data (see Belacchi et al., 2008). Past research consistently revealed good psychometric properties for this test (Raven, 2000; Belacchi et al., 2008). The CPM demonstrated good validity and reliability indices, and it is considered to be a suitable measure for assessing nonverbal intelligence, particularly that of preschool (Lúcio et al., 2017) and primary school (Cotton et al., 2005) children.

Design and Procedure

The study received approval from the Ethical Committee of the University of Bologna, and was then presented to school principals and teachers. Informed consent was obtained from parents and caregivers of the schools that decided to participate in the study. For each classroom, a researcher briefly explained answer formats during school hours, and pupils filled out the tests thereafter in the presence of both a researcher and a teacher who was there for safety reasons. The test administration lasted for about 45 min. Pupils were also informed that their participation was voluntary, and that they could decide whether or not to take part in the research. Pupils were additionally assured as to the confidentiality and anonymity of data treatment.

Data Analysis

Descriptive statistics and Pearson correlations among the study variables were calculated using SPSS 21.0 software (SPSS Inc., Chicago, Illinois, USA). The pattern of relations specified *via* our theoretical model (Figure 1) was investigated through a structural equation model tested with Mplus software (Muthén and Muthén, 1998–2015), with a single observed score for each variable (Trait EI was defined by the TEIQue global score, whereas fluid intelligence was defined by CPM scores) except for the latent variable of Emotional Awareness, which two manifest variables—LEAS self-scores and LEAS scores for others—defined. The main predictors and the hypothesized mediation effects were examined using a bootstrap estimation with 5,000 samples (Muthén and Muthén, 1998–2015). The model fit was estimated with the following indices: the chi-square statistic and the related *p*, the Tucker-Lewis index (TLI), the comparative fit index (CFI), the root mean squared error of approximation (RMSEA), and the standardized root mean squared residual (SRMR). According to Marsh et al. (2004) as well as Hu and Bentler (1999), a good model fit is indicated by a TLI and a CFI above 0.95, an RMSEA below 0.06, an

SRMR under 0.08 and a small ratio (< 3) between the chi-square and the degrees of freedom (χ^2/df).

RESULTS

Preliminary Analyses

Descriptive statistics and correlations among the study variables are reported in Table 1. Significant correlations between EA for self and EA for others EA emerged, and so did slightly positive associations between the two LEAS-C scales and both cognitive intelligence and trait EI. As expected, a positive association between cognitive intelligence and age emerged, whereas no correlation between cognitive intelligence and trait EI was highlighted.

Structural Equation Model

The model depicted in Figure 1 was tested. The tested model fit the data well: $\chi^2(6) = 6.04$, $p = 0.41$; TLI = 1.00; $\chi^2/\text{df} = 1.01$; CFI = 1.00, RMSEA = 0.01; SRMR = 0.01. All hypotheses were confirmed through the model. As shown in Figure 2, a positive direct link was found between both fluid intelligence ($\beta = 0.30$, $p < 0.01$) and Trait EI ($\beta = 0.11$, $p = 0.03$) scores and the latent variable Emotional Awareness, i.e., both cognitive and trait EI emerged as significant predictors of emotional awareness. Moreover, age was positively associated with fluid intelligence scores ($\beta = 0.72$, $p < 0.01$), displaying an increase of cognitive intelligence with age, whereas the total direct effect of age on Emotional Awareness emerged as not significant ($\beta = 0.01$, $p = 0.83$). However, a specific indirect effect of age on Emotional Awareness emerged through fluid intelligence scores ($\beta = 0.21$, $p < 0.01$). It should be noted that, according to Hayes (2009), because no evidence exists that age directly affects Emotional Awareness, we cannot assume that intelligence mediates the effect of age on Emotional Awareness. Instead, we can refer to an indirect effect of age on Emotional Awareness through the effect of intelligence. Moreover sex emerged as being negatively associated with trait EI scores ($\beta = -0.21$, $p < 0.01$), showing higher EI scores in females than in males. Finally, neither a direct ($\beta = -0.08$, $p = 0.11$) nor an indirect ($\beta = -0.02$, $p = 0.06$) effect of sex on Emotional Awareness emerged from the analysis.

TABLE 1 | Descriptive statistics and correlations among the study variables.

	1	2	3	4	5
1. Self-emotional awareness	—				
2. Others emotional awareness	0.63**	—			
3. Cognitive intelligence	0.19**	0.15**	—		
4. Trait EI	0.12**	0.15*	0.02	—	
5. Age (months)	0.12**	0.06	0.72**	−0.01	—
Mean	30.81	29.28	35.89	3.61	126.81
SD	5.14	6.15	9.02	0.39	18.69
Skewness	−0.48	−0.99	0.09	−0.02	0.04
Kurtosis	0.59	1.83	−0.48	−0.15	−1.26

N = 488. * $p < 0.01$; ** $p < 0.001$.

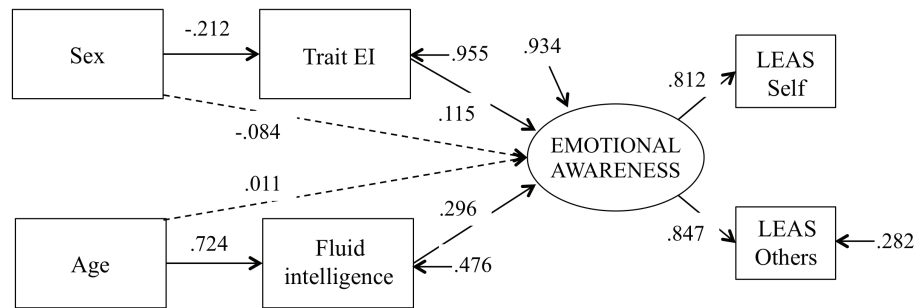


FIGURE 2 | Structural equation model for the prediction of emotional awareness.

DISCUSSION

The aim of the present work was to consider in a unique model the explanatory role of both trait EI scores, controlling for gender differences and the development of fluid non-verbal intelligence in EA variability in children. The current study's aim was to explain part of the multifaceted nature of EA and to clarify the measure of EA that the LEAS-C instrument provides during childhood and pre-adolescence. Although past research already demonstrated that EA is subject to developmental changes (Mankus et al., 2016), prior research had not examined whether part of the variability characterizing EA measurement during childhood could be captured through both children's affect-related personality traits (i.e., trait EI) and cognitive intelligence. This research question lies within the theoretical position explaining EA as a two-sided construct constituted both by an attentional or cognitive dimension, mainly related to skills allowing one to attend to emotions, and by an emotional dimension, mainly related to the ability to understand emotions (Boden and Thompson, 2015). Even if LEA theory mainly posits that EA involves cognitive skills that develop throughout childhood, it also recognizes the close relationship of EA with multiple emotionally adaptive skills.

First of all, the structural equation model tested in the present study showed that both trait EI and cognitive intelligence explain EA. The model was then enriched by a significant indirect effect of age (*via* intelligence) on EA. This result is in line with the LEA theory, which posits that the development of the knowledge or experience of the internal emotional states of self and others is related to the increase with age of the cognitive understanding intended to be a progression toward greater levels of abstraction in thought (Smith et al., 2018). This finding provides the first evidence that the increase of cognitive intelligence could explain a significant part of the variability in EA during childhood and preadolescence. Specifically, it demonstrates that age has an effect on EA only *via* intelligence, suggesting that the increase of EA during development unfolds the development of intelligence as Lane and Schwartz (1987) posited. This result seems to highlight that the increase of EA scores with age is explained by the progressive sophistication of cognitive abilities. It is worth noting that in the present work no effect of age on trait EI was tested, as this affect-related personality dimension has been demonstrated to be highly stable over our tested ages.

Moreover, it is worth highlighting that EA scores as measured through the LEAS-C represent children's self-perception when it comes to cognitive skills that allow them to be aware of the concept of emotion (Lane and Schwartz, 1987; Lane, 2000a,b; Wright et al., 2018). The present study allowed for disambiguating whether trait EI could explain part of the variability in EA scores during childhood. The results showed that EA scores as measured by the LEAS-C in children and preadolescents are indeed related to participants' trait EI in that part of their variability is significantly explained by trait EI scores. Moreover, the role of trait EI in explaining EA was independent and incremental to the predictive power of fluid nonverbal intelligence. This effect was controlled in our model for gender, namely for the typical difference characterizing trait EI during childhood, with girls generally showing higher trait EI scores than boys (Mavroveli et al., 2008). Consistent with past research, no direct effect of gender emerged on EA during development. Our results may imply that cognitive skills are not sufficient for understanding and explaining EA and its measure during childhood. In fact, the study showed that trait EI predicts a different source of variability in EA that is independent from cognitive development. Being that trait EI is a personality construct related to the self-perception of affect-related variables (Petrides et al., 2007; Hughes and Evans, 2018), we hypothesized that it can capture a portion of children's emotional attitudes at the basis of the self-perception of EA skills. As already demonstrated in past research, the broad construct of trait EI led to substantial improvements in the ability to predict behaviors, attitudes and achievement (e.g., Petrides et al., 2007; Agnoli et al., 2015, 2019; Rubaltelli et al., 2015). The results of the present study led to further improvement, as the study showed the capacity of trait EI to predict EA scores in childhood and preadolescence. Thus, it adds to the literature demonstrating the utility of trait EI in explaining EA during development. Moreover, these findings could represent a first step in testing more comprehensive models aimed at understanding the integrative role of cognitive and emotional intelligence on emotional development. For example, starting from these results, it would be particularly intriguing to perform testing with the Integrated Model of Affect-related Individual Differences (IMAD) by Hughes and Evans (2018), which proposes that various EI-related constructs interact with cognitive intelligence to influence affective outcomes, particularly emotion regulation. The exploration of EA during childhood and its association with emotional regulation using

integrative frameworks could be a direction for future research. Finally, we auspicate that future research would analyze the development of EA in special samples of participants (e.g., children with learning or cognitive disabilities), which could help to further unravel the weight of trait EI and cognitive skills in the emergence of the awareness of emotional experience in oneself and in others.

A specific research implication for trait EI research is to contribute to greater understanding of the measurement and definition of the trait EI construct in association and in contrast with other emotion-related constructs. Moreover, because of the relevance of trait EI and of EA for children's well-being, health, and peer relationships, our results may have practical implications particularly relevant for programs and policies addressing the prevention of emotional distress in children and pre-adolescents, by helping to build specific training programs to support emotional competences, acting on multiple layers of children's emotional experience.

However, we recommend caution in interpreting the results emerging from this work. Our results could indeed be limited by the sample tested in the present study and by the sociocultural context in which the study was conducted. Further studies are required to test and eventually generalize these empirical data in other contexts and countries. In addition, we cannot exclude that the findings of the present study may depend on

the chosen instruments and that the generalizability of our results on the explored theoretical constructs could be limited. Again, we hope that further studies will be conducted in order to corroborate our results by exploring the complex relationship among trait EI, cognitive development, and emotional awareness through different sets of instruments.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Italian Psychological Association with written informed consent from the parents of all subjects. The protocol was approved by the ethical committee of the Department of Psychology, University of Bologna, Italy.

AUTHOR CONTRIBUTIONS

SA and GM contributed to the design of the work, data collection, drafting the article, and its critical revision. SA contributed to data analysis and interpretation. FA contributed to data collection, drafting the article and its critical revision. ET contributed to final approval of the version to be published.

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A Model of Academic, Personality, and Emotion-Related Predictors of University Academic Performance

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This paper investigates the relationships between personality (i.e., trait Emotional Intelligence – trait EI – and the Big Five) and academic performance (AP). Academic motivation, procrastination, and major satisfaction were also studied. The sample consisted of 201 Lebanese undergraduates. The model represented a good fit. There was a negative direct effect of procrastination on AP and positive direct effects of major satisfaction and absorption on AP. Trait EI showed a negative direct effect on procrastination and a positive direct effect on major satisfaction, which, in turn, significantly predicted AP. Also, conscientiousness indirectly predicted AP, via procrastination, major satisfaction, and absorption. Findings point at individual differences contributing to AP and can be helpful to students, educators, and counselors in higher education.

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INTRODUCTION

The factors contributing to one individual's achievement over another's in educational settings is an issue of extensive debate and continues to draw vast investigative interests (e.g., Tavani and Losh, 2003). However, evidence is mixed on the extent to which cognitive ability predicts academic achievement versus personality factors (Bratko et al., 2006; Boerchi et al., 2018). A number of studies have concluded that cognitive ability is a strong predictor of academic performance (AP; Kuncel and Hezlett, 2010), while others have indicated incremental validity of personality traits over cognitive ability (Sanchez-Ruiz et al., 2013).

With the large body of research currently available on the role of personality traits in influencing AP (e.g., Petrides et al., 2004; Laidra et al., 2007; Perera and DiGiacomo, 2013; Boerchi et al., 2018), the conception that cognitive and task-specific abilities are the only, if not the most, significant factors in predicting achievement has become questionable.

Although research so far has led to mixed findings (Mavroveli and Sanchez-Ruiz, 2011), the study by Sanchez-Ruiz et al. (2016) has shown that trait Emotional Intelligence (*trait EI* or *emotional self-efficacy*) has implications on AP, with effects mainly relevant to groups with lower cognitive ability (see Petrides et al., 2018, for a review). Perera and DiGiacomo (2013) reported the validity of trait EI in predicting AP, and Parker et al. (2016) added more evidence on the link between the two variables. Trait EI is a constellation of emotional perceptions and inherent qualities at the low-lying levels of personality structures, and it is measured by Likert-scale questionnaires (Petrides et al., 2007).

Studies have focused their attention mainly on the Big Five personality traits in relation to AP. Research by Petrides et al. (2007) has shown that trait EI is distinct from the Big Five and comprehensively measures the facets of personality related to emotion. Therefore, with the

growing body of evidence revealing a possible significant interaction between emotion-related personality constructs, specifically the construct of trait EI, and AP, measured by GPA (Grade Point Average), this paper will include trait EI alongside the Big Five personality traits in examining their effects on AP.

Contrary to trait EI, which has been shown to moderate the effect of stress (Mikolajczak et al., 2006), procrastination is viewed as a maladaptive coping strategy against academic stress (Alexander and Onwuegbuzie, 2007), with detrimental effects on AP (De Paola and Scoppa, 2015). A study conducted by Deniz et al. (2009) reported that adaptability and coping with stress, which are subscales of EI, and overall EI were negatively associated with procrastination. These findings suggest that trait EI can facilitate self-management in demanding educational environments, which protects against procrastination and might consequently promote AP.

Very few studies have investigated the relationship between trait EI and major satisfaction. One such study was conducted by Urquijo and Extremera (2017), who found there was a positive association between EI and academic satisfaction, though not exactly satisfaction with the chosen field of study. Other personality and emotion-related constructs such as academic engagement have also been found to contribute to AP (Boerchi et al., 2018; Vizoso et al., 2018) and psychological well-being (Ayyash-Abdo and Sanchez-Ruiz, 2012). In the study by Vizoso et al. (2018), all three dimensions of academic engagement (i.e., vigor, dedication and absorption) were positively related to AP. AP, then, is best viewed as a product of the interaction between cognitive as well as personality processes (Chamorro-Premuzic and Furnham, 2005).

The Present Study

The uniqueness of the present study lies in that, to our knowledge, it is the first study that brings the studied variables together in the same research design. Moreover, research on academic outcomes in Lebanon is sparse and outdated, and has focused specifically on differential analysis of academic achievement between American and Asian students (Baran, 2008), and grade retention in relation to academic history (El-Hassan, 1998). To our knowledge, there are no studies exploring the relationship between emotion-related variables and AP in the Lebanese context. The present study aims to contribute in this direction.

The central aim of this study is to achieve a better understanding of how individual differences in personality and emotion-related traits (with special emphasis on trait EI) play a role in AP. In addition, we are interested in investigating the contribution of other personality variables, namely, procrastination, academic engagement, satisfaction with university major, and personality (Big Five) to AP. In this paper, we explore the associations among these variables and present a model of direct and indirect effects on AP using structural equation modeling. The novelty of the present study is twofold. First, it presents a model to explain AP in relation to non-cognitive variables such as trait EI and academic motivation in the context of higher education. Second, it contributes to the limited research on emotion-related variables and AP using a Lebanese sample.

MATERIALS AND METHODS

Participants

Participants consisted of 201 (131 females) Lebanese university students. The mean age of the participants was 19.76 ($SD = 1.85$) years old. The students were enrolled in majors related to arts and humanities (26%), technical and/or natural sciences (35%), business (27%), and social sciences (12%), and were either freshmen (10%), sophomore (35%), junior (26%), or senior (27%).

Measures

Academic Performance

Academic performance was measured using each student's self-reported current university GPA. The GPA is measured on a scale ranging from 0 to 4, with 4 being the highest grade.

Trait Emotional Intelligence

The *Trait Emotional Intelligence Questionnaire – Short Form* (TEIQue-SF; Petrides, 2009). The TEIQue-SF includes statements such as “I often pause and think about my feelings.” Participants responded to all survey items using a seven-point Likert scale (from 1 = “Disagree strongly” to 7 = “Agree strongly”). On this sample, the internal reliabilities for Well-being, Self-control, Emotionality, Sociability, and global trait EI were 0.82, 0.50, 0.67, 0.52, and 0.86, respectively.

Big Five Personality Traits

The *International Personality Item Pool* (IPIP; Goldberg, 1999). Items include “I see myself as someone who has an assertive personality.” Participants responded to all survey items using a five-point Likert scale (from 1 = “Disagree strongly” to 5 = “Agree strongly”). The internal reliabilities for this sample were 0.80 for extraversion, 0.71 for agreeableness, 0.78 for conscientiousness, 0.83 for emotionality, and 0.74 for openness to experience.

Academic Engagement

The English version of the *Utrecht Work Engagement Student Scale* (UWES-SS; Schaufeli et al., 2002). The Scale of Academic Engagement is a 17-item questionnaire. Participants responded to all survey items using a seven-point Likert scale (from 0 = “Never” to 6 = “Always”). The items represent three underlying dimensions: Vigor (e.g., “when I get up in the morning, I feel like going to class”), Dedication (e.g., “I am enthusiastic about my studies”), and Absorption (e.g., “when I am studying, I forget everything around me”). In this sample, the internal reliabilities obtained for this scale were 0.89 (total score), 0.72 (Vigor), 0.64 (Dedication), and 0.80 (Absorption).

Procrastination

The *General Behavioral Procrastination Scale* for student populations (GPS; Lay, 1986). The GPS consists of 20 items, including “I generally delay before starting on work I have to do.” Participants responded to all survey items using a five-point Likert scale (from 1 = “Extremely uncharacteristic” to 5 = “Extremely characteristic”). The alpha coefficient for this scale on the present sample was 0.88.

Satisfaction With University Major

Satisfaction with university major was measured through a one-item question, which asked “How satisfied are you with the major you are in?” and was responded to on a seven-point Likert scale (from 1 = “Extremely dissatisfied” to 7 = “Extremely satisfied”).

Procedure

This study has been approved by the Institutional Review Board (IRB) of ethics at the Lebanese American University. Participants completed the battery of questionnaires during class time. A small percentage of the participants were given the questionnaires after class, which they returned to the researchers after completion. Testing sessions lasted 50 min approximately and were monitored by the researchers. Data were analyzed using SPSS version 25, and its AMOS module.

RESULTS

Bivariate Correlations

Intercorrelations among the study variables are presented in **Table 1**. GPA positively correlated with conscientiousness ($r = 0.23$, $p = 0.004$), absorption ($r = 0.27$, $p = 0.001$), and major satisfaction ($r = 0.29$, $p < 0.001$), and negatively with procrastination ($r = -0.26$, $p = 0.001$). Global trait EI was positively associated with conscientiousness ($r = 0.29$, $p < 0.001$) and major satisfaction ($r = 0.23$, $p = 0.004$), and negatively with procrastination ($r = -0.28$, $p < 0.001$). Conscientiousness positively correlated with absorption ($r = 0.32$, $p < 0.001$) and major satisfaction ($r = 0.22$, $p = 0.005$), and negatively with procrastination ($r = -0.58$, $p < 0.001$).

Path Analysis

Model Fit

The model tested included indirect effects between global trait EI and GPA, via procrastination, and major satisfaction. Conscientiousness was hypothesized to have indirect effects on GPA, with procrastination, major satisfaction, and absorption as mediators. Major satisfaction and absorption were expected to have a positive direct effect on GPA. Conscientiousness and global trait EI were allowed to covary, as they have shown to relate in previous research. **Figure 1** illustrates the model with the respective path coefficients. The following indices were used to assess the model fit (Byrne, 2010): the overall chi-square statistics and relative/normed chi-square (CMIN/df), with values below 2 and $p > 0.05$ indicating good fit; the Comparative Fit Index (CFI), with values above 0.90 indicating good fit; the Standardized Root Mean Square Residual (SRMR), with values below 0.08 indicative of good fit; and the Root Mean Square Error of Approximation (RMSEA), with values between 0 and 0.05 indicative of good fit, between 0.05 and 0.08 indicative of acceptable fit, and above 0.1 indicative of poor fit; and the respective closeness of fit (PCLOSE), with a $p > 0.05$. Based on the above indices, the model hypothesized revealed a good fit with an acceptable RMSEA, $\chi^2(5, 160) = 9.048$, $p > 0.05$, CMIN/df = 1.810, CFI = 0.971, SRMR = 0.0448, and RMSEA = 0.071, PCLOSE > 0.05.

Direct and Indirect Effects

Procrastination, absorption, and major satisfaction had significant direct effects on GPA, with $\beta = -0.164$, $p < 0.05$, $\beta = 0.170$, $p < 0.05$, and $\beta = 0.211$, $p < 0.01$, respectively. There was a significant direct effect from global trait EI to major satisfaction ($\beta = 0.181$, $p < 0.05$), and a marginally significant direct effect from global trait EI to procrastination ($\beta = -0.117$, $p < 0.10$). Conscientiousness had a significant effect on procrastination ($\beta = -0.548$, $p < 0.001$), major satisfaction ($\beta = 0.167$, $p < 0.05$), and absorption ($\beta = 0.277$, $p < 0.001$). Major satisfaction had a significant direct effect on absorption ($\beta = 0.195$, $p < 0.05$). Conscientiousness and global trait EI were correlated positively ($r = 0.290$, $p < 0.001$). The R^2 indicates that the model accounts for 14% of the variance in GPA.

DISCUSSION

The hypothesized model revealed the indirect effects of global trait EI on AP via procrastination and major satisfaction, and the indirect effect of conscientiousness on AP via procrastination, major satisfaction, and absorption. The model explained 14% in the total variance of AP with a good fit, which is considerably high when compared to previous similar models exploring indirect effects on AP via personality traits, ranging from 6 to 14% (McIlveen et al., 2013).

Direct Effects

Our results showed that global trait EI negatively predicted procrastination. The delay feature of procrastination lies within the students' self-control (Ackerman and Gross, 2005), and a method of coping with stress (Alexander and Onwuegbuzie, 2007), with a negative association with EI (Deniz et al., 2009). Furthermore, procrastination has been conceptualized as a form of self-regulatory failure, with a consistent negative relation with self-efficacy (Steel, 2007). Students with high global trait EI have “superior emotion information processing skills, regulation, and coping skills” and may be more successful in coping with the demands of school and peer context (Mavroveli and Sanchez-Ruiz, 2011). Therefore, high trait EI is directly incompatible with the self-regulatory deficiency associated with higher procrastination.

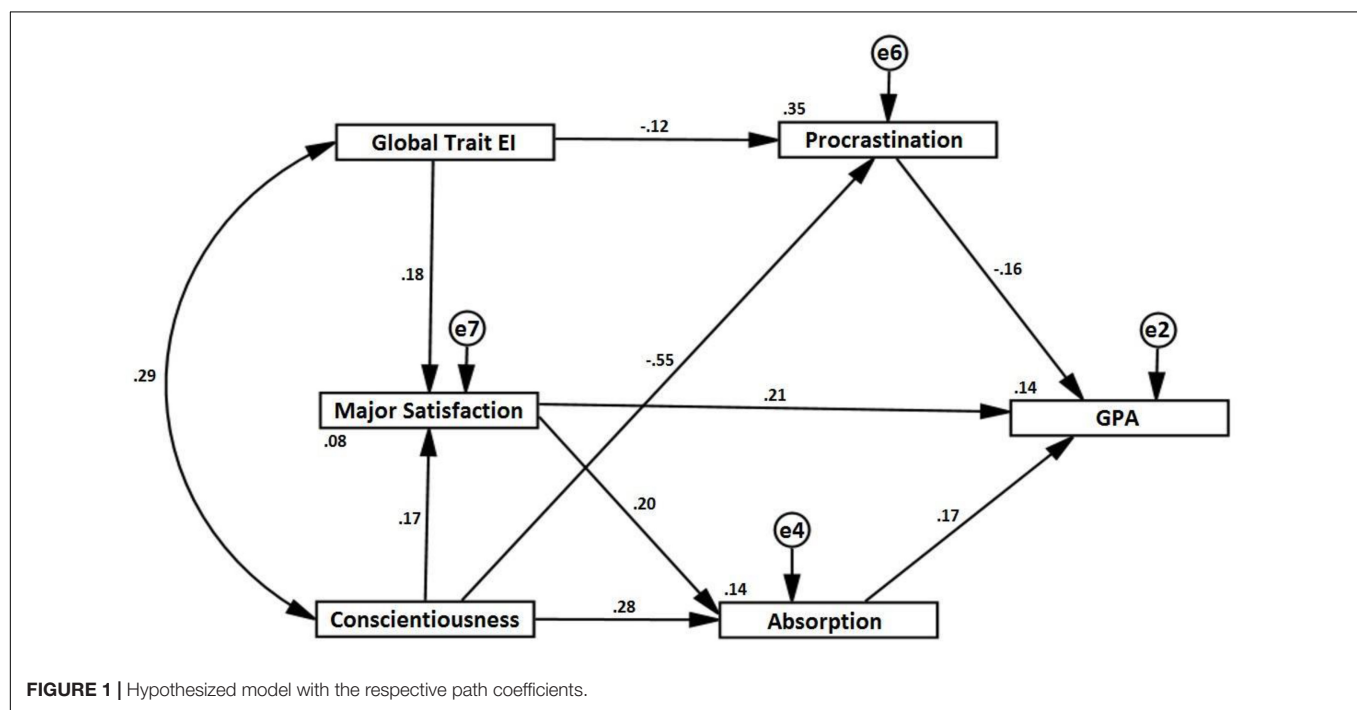
In addition, global trait EI had a direct effect on major satisfaction. This adds to the scarce evidence on this link, which might be driven by certain facets of trait EI such as optimism (Logue et al., 2007), which, in turn, positively correlates with AP (Martirosyan et al., 2014). High trait EI students have greater self-knowledge, which affords higher capabilities in making wiser vocational and occupational decisions that are compatible with their personality; therefore, conducive to personal and academic satisfaction (see Sanchez-Ruiz et al., 2010 for a brief discussion on this idea).

Conscientiousness negatively predicted procrastination in the model, in line with previous studies (e.g., Steel, 2007). This can be explained by the fact that conscientiousness implies self-discipline, acting dutifully, and preference for planning. In

TABLE 1 | Bivariate correlations among study variables ($N = 160$).

	1	2	3	4	5	6	7	8	9	10	11
(1) GPA											
(2) Extraversion	−0.07										
(3) Agreeableness	0.08	0.17*									
(4) Conscientiousness	0.23**	0.06	0.21**								
(5) Emotional stability	−0.05	−0.05	0.00	0.01							
(6) Openness to experience	0.19*	0.16*	0.07	0.22**	−0.01						
(7) Global trait EI	−0.01	0.39***	0.14*	0.29***	0.57***	0.33***					
(8) Procrastination	−0.26**	0.04*	−0.07	−0.58***	−0.06	−0.02**	−0.28***				
(9) Vigor	0.20**	0.08	0.07**	0.32***	0.01	0.32***	0.19**	−0.34***			
(10) Dedication	0.19*	0.06	0.05	0.17*	−0.04	0.26**	0.09**	−0.21**	0.68***		
(11) Absorption	0.27**	0.06*	0.07	0.32***	−0.03	0.29***	0.04**	−0.29***	0.81***	0.69***	
(12) Major satisfaction	0.29***	0.04	0.04	0.22**	0.11	0.07*	0.23**	−0.24**	0.32***	0.30***	0.26**

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.



support of this claim, a study revealed punctuality as one of the behavioral indicators of conscientiousness (Jackson et al., 2010).

Furthermore, the direct association between conscientiousness and major satisfaction was positive (e.g., Kirwan et al., 2014). Because conscientious students strive for achievement and are more responsible (Clark and Schroth, 2010), they are more likely to choose majors that are compatible with their interests and in which they excel at (Denissen et al., 2007).

The model showed a positive direct effect between conscientiousness and absorption. Previous studies conducted on work engagement found similar results between the two variables (Kim et al., 2009), which suggests that such a relation could also be relevant in academic engagement. In addition, the association between conscientiousness and effort strategies (Corker et al., 2012), and task focus (Saklofske et al., 2012),

may reflect the high academic absorption conscientious students preserve.

The direct effects on AP were all significant. The results showed that procrastination has an aversive effect on AP, as with previous studies (Kennedy and Tuckman, 2013). Similar to our findings, previous studies revealed a positive relation between AP and major satisfaction (Martirosyan et al., 2014), and academic engagement (Casuso-Holgado et al., 2013).

Indirect Effects of Trait EI and Conscientiousness

The indirect effects of global trait EI and conscientiousness on AP, via major procrastination, were both significant. This might indicate that the two personality traits contribute as protective

factors against maladaptive coping, such as procrastination, in an academic context. Besides procrastination, absorption also mediated the effect between conscientiousness and AP, which highlights the importance of such a trait regarding concentration, attention, and engagement while studying.

Global trait EI and conscientiousness had an indirect effect on AP, via major satisfaction. The indirect effects of lower-order personality traits, such as trait EI, and higher-order personality traits, such as conscientiousness, on AP serve as personality predispositions to aim for higher levels of compatibility between the student's personality and academic major choice and in turn higher performance.

Implications, Limitations, and Future Directions

Our results shed light on the importance of personality traits such as trait EI and conscientiousness for success in higher education. Our findings can inform education professionals who, knowing the individual predictors of AP for their students, can use this information to develop strategies that reinforce the underlying behaviors associated with such traits. For example, instructors might want to promote conscientious behaviors, which in turn might have an impact on the student's engagement and satisfaction, and subsequently on higher levels of achievement. Likewise, career counseling practitioners can use this information to develop implementation programs to foster adaptive emotion-related approaches, which have shown to be effective (e.g., Slaski and Cartwright, 2003) to orient students toward affective and behavioral coping when experiencing academic stress (Mavroveli and Sanchez-Ruiz, 2011) and increase engagement and satisfaction in university studies. This can be done under the umbrella of Emotional Education, which is a current interest within professional and research arenas (e.g., Sanchez-Ruiz et al., 2010). Also, our results can assist the development of interventions and guidance services for students at risk of academic difficulties (McKenzie and Schweitzer, 2001).

This study has several limitations. First, this is a cross-sectional study conducted on a convenience sample. Second, all variables are assessed using self-report measures, which allows for the possibility of mono-method bias. Longitudinal, mixed-method designs on larger, and more diverse samples would increase validity. In addition, it is advisable to use official transcripts from educational institution whenever available, as a more reliable estimation of the GPA than self-reported data. Future research can also benefit from incorporating objective measures (e.g., cognitive ability) and potential moderators of the relationships under investigation, such as major of study. Lastly, upcoming studies could explore the relationship between trait EI and AP (and its correlates) at the factor level because trait EI has shown

to relate differently to a variety of constructs depending on whether the focus is on the sociability, emotionality, self-control, or well-being factor (e.g., Sanchez-Ruiz et al., 2011).

CONCLUSION

This study provides preliminary data that can serve to develop a thorough and parsimonious predictive model of AP of practical utility in educational assessment and counseling in higher education. Finally, this study has contributed to the scarce research on emotion-related personality dispositions, and specifically trait EI, in the educational context in the Lebanese population.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Institutional Review Board at the Lebanese American University. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

M-JS-R designed the study, coordinated the data collection, cleaning, and analysis, reviewed the theoretical and empirical background, and drafted the section "Discussion." JE critically reviewed the relevant literature and contributed to the sections "Materials and Methods" and "Results." Both authors wrote and reviewed the manuscript.

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Do Trait Emotional Intelligence and Dispositional Mindfulness Have a Complementary Effect on the Children's and Adolescents' Emotional States?

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Mindfulness is both a non-judgmental and present-centered awareness, which has been applied to reduce negative emotions. On the other hand, Trait Emotional Intelligence (TEI) is the way of how good people perceive their emotional intelligence abilities (perceiving, expressing, understanding, and regulating emotions), which are involved in people's social functioning. This empirical study was designed to analyze whether dispositional mindfulness (DM) and TEI have a potential combined role for children and adolescent's emotional states. In a sample of primary school students ($N = 318$), age ranged from 8 to 16 years old ($M = 11.25$, $SD = 2.20$), participants filled a TEI measure (ESCQ, Emotional skills and competence questionnaire) and two measures of DM (CAMM, Child and Adolescent Mindfulness Measure and AFQ-Y, Avoidance and Fusion Questionnaire for Youth). Measures selected included: PANAS (Positive affect and negative affect schedule), White Bear Suppression Inventory (a thought suppression inventory), and STAIC (State-Trait Anxiety for Children). Findings pointed out that TEI measures (labeling and expression, understanding, and managing emotions) were positively and significantly related to positive emotional states (especially, positive affect and balance) and negatively with a lower association with state anxiety. However, DM measures were both negatively and strongly associated with negative emotional states (thought suppression, negative affect, and anxiety). Conclusions indicate that a combined effect of both TEI skills and DM based interventions would be more complete than each one separately for better social functioning of children and teenagers.

Keywords: trait emotional intelligence, ability emotional intelligence, dispositional mindfulness, emotional intelligence, adolescents

INTRODUCTION

The mental and emotional health of both primary and secondary students is a growing concern. There is a relationship between the low-level adaptive-emotional states and serious outcomes regarding both academic (Jayalakshmi and Magdalin, 2015; Frajo-Apor et al., 2016) and social adaptation to school (Mestre et al., 2006).

When a person reaches adolescence, social-emotional development begins to have an important impact with several relevant outcomes in their lives. For example, this may have an effect on having an adequate social identity (Van Tilburg and Igou, 2011), good social functioning with peers (Lopes et al., 2012), better possibilities of school adaptation (Nathanson et al., 2016), and better mental health and well-being (Afzal et al., 2016). Therefore, everything that favors an adjustment in the adolescents' affective sphere is of interest to be included in their training processes (Gross and John, 2003). According to the accumulated empirical evidence, two factors seem to have positive impacts on the emotional states at the beginning of adolescence: emotional intelligence (f. i., Mavroveli et al., 2008; Laborde et al., 2014; Perera, 2016) and dispositional mindfulness (f. i., Cullen, 2011; Hinterman et al., 2012; MacBeth and Gumley, 2012).

In the case of EI, two ways of conceptualizing it seem to coexist. On one hand, *Ability Emotional Intelligence* (AEI), which considers EI as a set of cognitive abilities (perceiving, using, understanding, and managing) for making decisions based on hot information processing — it refers to all information that has a vital meaning for people (Mayer et al., 2016) for adequate personal and social functioning (Peña-Sarrionandia et al., 2015). However, some authors have considered not including “the emotional using” branch in the EI framework because they believe it should be considered as part of the other three branches (Mestre et al., 2016). On the other hand, *Trait Emotional Intelligence* (TEI) has been defined as a set of emotional self-perceptions placed at the lower standards of personality hierarchy (Petrides et al., 2016). There are also two different approaches to measure EI. While AEI advocates the exclusive use of performance instruments (Brackett and Salovey, 2006) and/or emotional-situation judgment tests (MacCann and Roberts, 2008), like any other type of intelligence, the TEI just uses self-reported instruments, like the TEIQue (Trait Emotional Intelligence Questionnaire, Laborde et al., 2016).

However, when non-adult samples are used to measure emotional intelligent behaviors, investigations have shown stronger relationships with both negative (see Windingstad et al., 2011) and positive (see Mavroveli et al., 2008) emotional states with TEI measures than with AEI ones. Nonetheless, we should admit that the AEI framework has shown advantages (Fiori, 2009), but the theoretical AEI framework might be better explained using the Cattell-Horn-Carroll mental abilities model and emotional appraisal theory (Roberts et al., 2016) since measures of AEI only have assessed a part of the emotional intelligent behavior, the emotional conscious part (Fiori, 2009; Fiori and Antonakis, 2011). Hence, AEI measures still lack information about how extent emotions, AEI measures, and

intelligence are related (Roberts et al., 2006; Maul, 2012). Especially for under-17-year-old samples, it would a possibility to build a TEI instrument according to the AEI theoretical foundations (Billings et al., 2014; Davis et al., 2015). Therefore, we used a self-report of AEI (Faria et al., 2006) that encompasses TEI principles to assess emotional intelligent behavior (Azghandi et al., 2007) to study its relationships with both positive and negative emotional outcomes.

Regarding Mindfulness tradition and theories among adolescents, this concept used to be defined as a quality of consciousness (Brown et al., 2009), which implies drawing attention to the experiences occurring in the present moment and developing a non-judgmental accepting awareness of moment-by-moment experience (Kabat-Zinn, 2003). However, *dispositional mindfulness* (DM) has been defined as a trait in which individuals differ in how they accept and live with commitment (Goodall et al., 2012). Hence, DM might be a predisposition or trait for living in a mindfulness way (Petrides et al., 2017; Turanzas et al., 2018).

A systematic review by Tomlinson et al. (2017) reported how DM was related to the psychological health of people. The authors reviewed non-interventional and quantitative DM's articles in non-clinical samples. According to their review, DM was negatively related to non-adaptive emotions (such as anxiety or depression symptoms), and positively linked to adaptive cognitive strategies of emotional regulation processes (such as reappraisal and acceptance) and positive emotions (f. i., joyful) (Tomlinson et al., 2017). Similar findings have been reported in samples of adolescents, in which DM was positively related to subjective well-being (Brown et al., 2009), but mostly DM showed negative relationships with some criteria that indicated a certain level of protection, such as lower levels of dysphoric mood and better tolerance to the effects of stress (Ciesla et al., 2012), lower social anxiety (Hambour et al., 2018), and even in gifted adolescents lower levels of depression, anxiety, and negative emotions have been found (Turanzas et al., 2018).

However, there are few and incomplete studies which have included both EI and DM. Most of these studies have used either DM (from EI-experienced authors) or EI as a mediating variable (conversely, from DM-experienced authors). Hence, there is not enough evidence yet to establish moderating and/or mediating factors between DM and EI regarding positive or negative affective criteria. For example, Teal et al. (2018) studied the influence of EI and DM in the well-being of school programs in a sample of 294 male adolescents. Authors hypothesized that EI mediated the relationship between DM and wellbeing (measured using subjective happiness and psychological stress). Findings supported their previous ideas, using multiple mediation models, where different dimensions of EI (measured with SUEIT, Swinburne University Emotional Intelligence Test, Palmer and Stough, 2001) were significantly and positively related to DM. Besides, EI partially mediated the relationship between DM and subjective happiness. However, the authors were not persuasive enough in explaining the reason why they considered DM as a criterion instead of a predictor. Another concern was that the authors did not include female participants so we cannot know to what extent gender roles affected (a potential

qualitative moderating factor). Another example, Park and Dhandra (2017a), studied an Indian sample with 319 participants to ascertain whether TEI (using the WLEIS, Shi and Wang, 2007) might moderate the relationship between DM and the impulsive buying tendency. The authors checked this mediator role of TEI and showed that DM was positively related to all components of the TEI measure. Therefore, it is unclear how DM and EI work together, or separately, or under mediating or moderating factors.

Consequently, both previous DM-EI antecedents, mentioned above, pointed to DM as a predictive factor without considering TEI as a predictive variable too, and without enough theoretical explanations of why TEI had to be viewed as mediator. Some interesting reviews about AEI (see Fernandez-Berrocá and Extremera, 2016) or TEI (see Petrides et al., 2016) have highlighted EI as a proven moderator of health outcomes rather than a mediator. However, they have also pointed out that EI's role as a mediator is still at an early stage.

Following Kazdin (2007), a moderator variable affects the direction and strength between predictors and criteria. However, a mediator variable counts as “a milestone” for the relationship between predictors and criteria. While mediators explain how external variables take on internal psychological significance, moderators highlight when and/or how much the effects will affect a criterion. Hence, how should the DM and/or EI role be explained as a mediator or as a moderator? Some recent studies may have clarified this question.

For example, Miao et al. (2018) conducted a meta-analytic revision of 17 eligible studies to examine in greater depth the potential relationship between EI (no AEI measures were included in the review, just TEI measures) and trait mindfulness (or DM). They concluded that it was not possible to identify all potential moderators in this EI-DM relationship. However, they pointed out that future research should examine “the relationships among EI, mindfulness, and various other outcome variables need further examination and replication” (Miao et al., 2018, p. 106). However, in their review, they state that the DM and the TEI can be both mediators and moderators.

We have also found some more related antecedents such as emotion regulation (ER), as a mediator, where DM was related to some emotional criteria. For example, in a sample of 572 adolescents, it was found that the ER difficulties mediated the relationship between DM and anxious attachment (Pepping et al., 2016). Ciesla et al. (2012) also described a mediating role of ER between DM and psychological health. However, others consider DM has an assisting role with ER (Hambour et al., 2018).

In our opinion, we believe that both DM and EI (including ER, TEI or AEI) require more attention and research on whether some of them have a potential mediating or moderating role in the relationships sought, with interesting criteria for both constructs, such as self-personal (self-cognitive/emotional regulatory processes) and/or social functioning (social anxiety, for example). Especially in heterogeneous samples, like adolescents (without scholar filters yet), it is necessary to explore previously what type of relationships EI, in our case TEI, and DM have with criteria of positive and negative affectivity before considering different models of mediation. The need to study both DM and self-regulatory processes with more attention

were already pointed out by Masicampo and Baumeister (2007) since we are still in the initial stages of how DM or TEI are related to adolescents' affective sphere.

The main purpose of this cross-sectional study, in a sample of Spanish children and adolescents, was to observe the potential significant relations of TEI and DM may have with various criteria of the affective sphere, anxiety trait vs. state, psychological flexibility and the suppression of thought. We also explored the potential mediating effects between TEI and DM with both positive and negative affect of children and adolescents. We hypothesized that while TEI is positively associated with the positive emotional states and negatively with thought suppression, DM will negatively relate to both negative affect and non-adaptive states.

MATERIALS AND METHODS

Participants and Procedure

The sample comprised 318 Spanish children and adolescents who were selected by quota sampling from various primary and secondary schools in Cadiz (South of Spain). The average age was 11.25 (range = 8–16, $SD = 2.20$). Subjects were nearly equally divided by gender (49.1% female). Participants completed questionnaires during class time in a single session. Participation was anonymous and voluntary, and data collection followed the ethical guidelines applicable to people under 18. Before completing the questionnaire, participants also presented parental authorization. The ethical recommendations led to 21 participants being excluded from the sample for not providing informed consent from their parents.

Instruments

TEI (Trait Emotional Intelligence)

The *Spanish version of the Emotional Skills and Competences Questionnaire* (ESCQ, Takšić, 2009) was used to measure emotional competence. This self-report measure was developed using the Mayer and Salovey (1997) model of Emotional Intelligence (EI, perceiving, using, understanding, and managing emotions). Participants had to rate the items on 5-point scales (1-never, 2-seldom, 3-occasionally, 4-usually, 5-always). The short version consists of 45 items combined into three subscales: *Perceiving and understanding emotions*, which has 15 items (e.g., “When I see how someone feels, I usually know what has happened to him”); *Expressing and Labeling emotions* scale, 14 items (e.g., “I am able to express my emotions well”), and *Managing and Regulating emotions* scale, 16 items (e.g., “When I am in a good mood, every problem seems soluble”). The questionnaire was translated into more than ten languages and shows good reliability and constructive validity (Faria et al., 2006). We used an average score (from 1 to 5) for each ESCQ's scale.

Dispositional Mindfulness

To assess DM, we used the *Child and Adolescent Mindfulness Measure* (CAMM; Greco et al., 2011). The CAMM consist of 10 items, responded to on a 5-point Likert scale, ranging from

0 (never true) to 4 (always true). Lower scores would indicate a disposition for having mindful skills in everyday life. This measure is based on the Kentucky Inventory of Mindfulness Skills (KIMS) (Baer et al., 2004), which assesses acting with awareness of the present moment and accepting without judgment. For this study, we used an 8-item CAMM's Spanish adaptation of Turanzas (2013), which has shown good psychometric properties (Cronbach alpha = 0.82). Turanzas's CAMM version erased two items (#5 and #10) due to among children produced biased interpretations and misunderstandings. Similar issues have been found in non-English versions (for instance, Italian see Saggino et al., 2017). In this study, we computed this measure as the averaged total score (from 0 to 4). Since items were written in a negative sense, we also recoded the scoring for an easier interpretation. Hence, higher scores indicated higher DM.

CRITERIA

Cognitive Styles Related to Emotional Functioning

Psychological Inflexibility: Cognitive Fusion and Experiential Avoidance

Psychological inflexibility was measured using the Spanish adaptation of Avoidance and Fusion Questionnaire for Youth (Spanish version of AFQ-Y, Valdivia-Salas et al., 2016). Greco et al. (2008) developed the original instrument to measure psychological inflexibility, comprised of two subscales: cognitive fusion and experiential avoidance, in children and adolescents. According to Hayes et al. (2006), *cognitive fusion* refers to how verbal processes interfere in the regulation of behavior, while *experiential avoidance* explains how people react to private of events "even when doing so causes behavioral harm" (p. 7). The AFQ-Y has 17-Likert items ranged from "0" (not at all true) to "4" (very true). Example items include "I must get rid of my worries and fears, so I can have a good life" and "I push away thoughts and feelings that I don't like." High scores imply a trend to fuse with own thoughts and feelings. This measure only assesses the negative tendency of cognitive flexibility. Greco et al. (2008) found high Cronbach reliability. For this study average scores were used (from 0 to 4).

Thought Suppression and Intrusion

The *White Bear Suppression Inventory* (WBSI, Wegner and Zanakos, 1994). Based on previous ideas (Wegner et al., 1987), this instrument comprises 15 items to evaluate chronic thought suppression tendencies. The respondents are requested to indicate their agreement with statements on a 5-point Likert scale ranging from 1 "strongly disagrees" to 5 "strongly agree." Thus, the total score ranges from 15 to 75, with higher scores indicating greater tendency to suppress unwanted thoughts. It contains statements such as "There are things I prefer not to think about" or "I always try to put problems out of mind." The WBSI has demonstrated high internal consistency in Spanish (and Portuguese) samples (Ros et al., 2015). This inventory is an indicator of the frequency individuals have intrusive and ruminative thoughts and has been found to correlate positively

with depressive symptoms, anxiety, and obsessive-compulsive behavior (Wegner and Zanakos, 1994). For this study, we used average scores (from 1 to 5). According to Schmidt et al. (2009), two subscales would be used (six items each one) - Suppression and Intrusion thoughts.

Emotional and Affective Criteria Positive and Negative Affect

The Positive and Negative Affect Schedule for Children PANAS-C (Spanish validation is named as "PANASN" by Sandín, 2003). The PANASN was based on the original instrument (Laurent et al., 1999). This is a 30-item measure for children and young adolescents, which assesses Positive affects (PA; e.g., cheerful) and Negative affect (NA; e.g., lonely) using 15 items for each. PANASN also provides a measure of *Balance* (PA - NA). Participants were asked to describe how they felt during the past few weeks on a 5-point Likert scale ranging from 1 "slightly or seldom" to 3 "much or often." Spanish PANASC (PANASN) has shown appropriate values of internal consistency, as well as convergent and discriminant validity (Sandín, 2003). For this empirical study, an average score of PANASN was used (from 1 to 3).

Anxiety State-Trait

The State-Trait Anxiety Inventory for Children (STAIC; Spanish version see Spielberger et al., 1982) is a self-report measure which has been widely used to assess state and trait anxiety of children and adolescents. This questionnaire contains two separate, 20-item self-report rating scales for measuring trait and state anxiety. The participant is asked to rate on a 3-point scale the degree to which they are currently experiencing a particular symptom (e.g., I feel 1-not scared, 2-scared, and 3-very scared). Total anxiety scores for the state-anxiety and trait-anxiety scales are obtained by adding up the scores for the 20 items on each scale. Total scores for situational and baseline questions range separately from 20 to 60, with higher scores denoting higher levels of anxiety. Nonetheless, we did not use average scores for STAIC due to their computation.

Data Analysis

To describe features of the sample we conducted a simple analysis to report the sample. To find relevant relations among variables, we conducted Pearson correlations. Probably, the study will have signs of collinearity due to it has several variables as subscales of similar theoretical constructs. In order to find significant relationships, we did regression analyses and mediating and moderating studies using the MACRO plugin in SPSS.

RESULTS

Descriptive data and reliability indices are summarized in **Table 1** and correlations between variables are reported in **Table 2**.

Note that gender was related significantly with positive and negative affect of PANASN, anxiety state of STAI-C, and two subscales of ESCQ (expression and labeling emotions, and emotional managing and regulation). According to this finding,

TABLE 1 | Descriptive values for the empirical study ($N = 316$, 49.1% females).

Variables	MIN	MAX	M	SD	α
Age	8	16	11.25	2.20	—
Trait Emotional Intelligence-TEI (measured using ESCQ, ranged all from 1 to 6)					
ESCQ_Total	1	5.98	4.30	0.90	0.95
Perceiving and understanding emotions	1	6	4.33	0.90	0.87
Expressing and Labeling emotions	1	6	4.37	0.89	0.8
Managing and regulating emotions	1	6	4.2	0.84	0.84
Dispositional Mindfulness (measured using Spanish CAMM-8, ranged from 0 to 4)					
CAMM (DF children and adolescents)	0.13	4	2.81	0.80	0.79
Cognitive Style Criteria (AFQ-Y 16, ranged from 0 to 4, and WBSI ranged from 1 to 5)					
AFQ Total	0	3.53	1.47	0.72	0.82
Fusion cognition	0	3.38	1.07	0.70	0.65
Experiential Avoidance	0	4	1.87	0.89	0.76
WBSI (White Bear)	1	4.93	3.11	0.88	0.88
Suppression of thoughts	1	5	3.16	0.99	0.76
Intrusion of thoughts	1	5	3.03	0.93	0.73
Affective Criteria (PANASN ranged from 1 to 3) and Spanish STAI-C (from 20 to 60)					
Positive-affect	1	3	2.35	0.37	0.72
Negative-affect	1	2.6	1.61	0.39	0.76
Balance	−0.80	2	0.74	0.58	—
Anxiety state	20	55	29.97	6.41	0.82
Anxiety trait	20	54	3.77	7.19	0.85

Cronbach reliabilities for the study are also reported.

we checked whether there were significant outcomes with these criteria. In light of the observed gender differences and the theoretical considerations outlined in the introduction, we report all subsequent analyses separately by gender only for PANASN and Anxiety state. Apparently, on this occasion gender is a natural/cultural factor rather than a mediator. Hence, we used multiple regression analyses to examine associations between TEI and CAMM with these criteria controlling for just age.

Among boys, and after controlling for age, *Expression and labeling emotions* remained significantly associated with *positive affect* [$F(5,155) = 14.42, p < 0.01; \beta = 0.42, p < 0.001$]. However, *DM*, CAMM (Spanish 8-items version) was associated with *negative affect* (PANASN) [$F(5,155) = 11.92, p < 0.001; \beta = -0.47, p < 0.001$], but no measures of TEI (ESCQ) were related to negative affect.

Among girls, and after controlling for age, however, Age, DM, and TEI were related to *positive affect* of PANASN affect [$F(5,149) = 25.69, p < 0.001$]. *Emotional managing and regulation* ($\beta = 0.55, p < 0.001$) and *dispositional mindfulness* ($\beta = 0.21, p < 0.01$) remained significantly and positively associated with *positive affect*. However, *age* ($\beta = -0.16, p = 0.012$) was negatively related to *positive affect*. Regarding *negative affect*, only *dispositional mindfulness* was significant [$F(5,149) = 8.88, p < 0.001; \beta = -0.48, p < 0.001$]. As with boys, and controlling for age, *anxiety state* remained negatively significant [$F(5,149) = 9.26, p < 0.001$] with *dispositional mindfulness* ($\beta = -0.45, p = 0.002$) and *emotional managing and regulation* ($\beta = -0.33, p < 0.001$). Reported multiple regression analyses that control for age were just significant among girls in negative affect, which may be explained because age is confused with academic achievement in this sample, given that students who repeat a grade tend to

be older. However, we repeated the main analyses controlling simultaneously for age with the rest of the criteria and did not find essentially identical results.

Regarding AFQ-Y, *cognitive inflexibility*, we did not run further analyses beyond correlations due to the fact that it is well known the strong relationship existing between dispositional mindfulness and cognitive inflexibility (see Tay and Kuykendall, 2016). Our study found moderate and negative relationships (we recall that we recode CAMM items for a better interpretation) between *DM* and *fusion cognitive* ($r = -0.58, p < 0.01$) and *experiential avoidance* ($r = -0.57, p < 0.01$). However, TEI measures did not show significant relationships for these criteria.

All measures from White Bear Suppression Inventory (WBSI) were negatively and significantly ($p < 0.001$) related to *DM* ($r_{\text{total}} = -0.59, r_{\text{suppression}} = 0.51$, and $r_{\text{intrusion}} = 0.55$). However, just total scores of WBSI had significant correlations with *age* and *emotional managing and regulation*. Nonetheless, only *DM* was significant after multiple regression [$F(3,313) = 55.78, \beta = 0.57, p < 0.001$].

Regarding *Anxiety trait*, while among boys just *DM* remained significant [$F(4,156) = 63.93, p < 0.001, \beta = 0.68, p < 0.001$], girls obtained also *Emotional managing and regulation* (MR) [$F(4,150) = 31.11, p < 0.001, \beta_{\text{MR}} = 0.24, p < 0.05, \beta_{\text{DM}} = -0.65, p < 0.001$].

Finally, *Anxiety state* was significant with *emotional regulation* (MR) and *dispositional mindfulness* (DM) for both boys [$F(4,155) = 9.09, p < 0.001, \beta_{\text{MR}} = -0.43, p < 0.01, \beta_{\text{DM}} = 0.41, p < 0.001$] and girls [$F(4,150) = 11.65, p < 0.001, \beta_{\text{MR}} = -0.33, p < 0.01, \beta_{\text{DM}} = -0.45, p < 0.001$]. This is the only moderation relationship among CAMM, TEI, and a criterion (anxiety state) that was significant. Below, **Figure 1** shows the moderation effect

TABLE 2 | Intercorrelations of empirical study's variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Age	—																
2 Gender	−0.02	—															
3 ESCQ	0.04	0.11*	—														
4 PU	0.03	0.05	0.95**	—													
5 EL	0.03	0.11*	0.96**	0.87**	—												
6 MR	0.06	0.13*	0.94**	0.83**	0.85**	—											
7 CAMM	0.19**	−0.00	−0.04	−0.02	0.01	−0.07	—										
8 AFQ	−0.29**	0.01	0.02	0.02	0.00	0.06	−0.64**	—									
9 FC	−0.12*	0.02	0.01	0.01	−0.00	0.08	−0.58**	0.86**	—								
10 EA	−0.36**	0.00	0.02	0.02	0.01	0.03	−0.57**	0.93**		—							
11 WBSI	−0.14**	0.01	0.06	0.06	0.08	0.11**	−0.59**	0.59**	0.49**	0.57**	—						
12 Suppre.	−0.07	−0.01	0.06	0.04	0.05	0.09	−0.51**	0.54**	0.43**	0.52**	0.93**	—					
13 Intrus.	−0.13**	0.02	0.09	0.06	0.07	0.10	−0.55**	0.52**	0.45**	0.49**	0.95**	0.75**	—				
14 POS	−0.05	0.15*	0.53**	0.53**	0.57**	0.58**	0.03	−0.04	−0.07	−0.02	0.04	0.01	0.07	—			
15 NEG	−0.11**	0.13*	−0.07	−0.07	−0.08	−0.01	−0.48**	0.40**	0.40**	0.33**	0.35**	0.32**	0.32**	−0.15**	—		
16 BAL	0.04	0.01	0.42**	0.39**	0.42**	0.38**	0.34**	−0.30**	−0.31**	−0.24**	−0.21**	−0.21**	−0.17**	0.75**	−0.77**	—	
17 ANX-S	−0.09	−0.15**	−0.16**	−0.12*	−0.14**	−0.19**	−0.39**	0.31**	0.34**	0.24**	0.26**	0.23**	0.27**	−0.29**	0.37**	−0.48**	—
18 ANX-T	−0.18**	0.07	0.04	0.01	0.01	0.10	−0.60**	0.55**	0.50**	0.49**	0.48**	0.41**	0.47**	−0.01	0.62**	−0.42**	0.37**

In bold significant relationships. * $p < 0.05$; ** $p < 0.01$ 3 ESCQ, TEI Total average scores; 4 PU, Perceiving and Understanding Emotions; 5 EL, Expressing and Labeling Emotions; 6, Managing and Regulating Emotions; 7 CAMM, DM Total Average; 8 AFQ, Cognitive Inflexibility Total Average; 9 FC, Fusion cognitive; 10 EA, Experiential avoidance; 11 WBSI, White bear suppression inventory; 12 Suppre., suppression of thoughts; 13 Intrus., Intrusion of thoughts; 14 POS, Positive Affect PANASN; 15 NEG, Negative Affect PANASN; 16 BAL, Balance (POS – NEG) PANASN; 17 ANX-S, Anxiety state STAI-C; and 18 ANX-T, Anxiety Trait STAI-C.

when CAMM (DM) is predicting anxiety state, moderated by TEI (ESCQ total score).

DISCUSSION AND CONCLUSION

Our main purpose was to study potential significant relations that both TEI and the DM may have with diverse criteria of the affective sphere, anxiety (trait and state), psychological inflexibility, and suppression and intrusion of thoughts. As it was noted earlier, we expected that TEI were more related to positive affect rather than with negative affect and suppression and intrusion of thoughts. But we also hypothesized a better prediction of DM (negatively) among negative emotional and cognitive criteria than TEI.

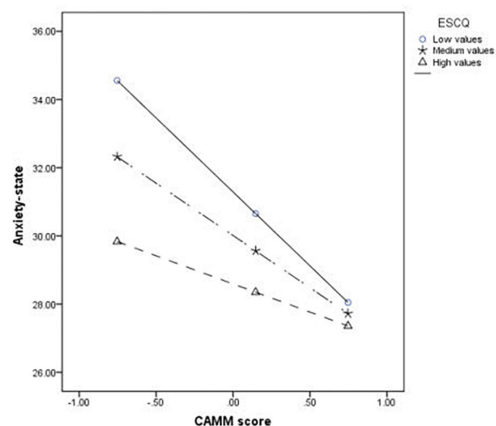
Regarding EI, our TEI measure is theoretically based on AEI theory (Mayer et al., 2016) and it was cross-culturally validated by Faria et al. (2006) and, besides, ESCQ has been reported to have good psychometric properties (Takšić et al., 2009). However, it should be considered as a TEI measure rather than an AEI one because TEI is measured using self-report tests and has been described as an “emotion-related dispositional trait which forms part of the personality domain” (Narula and Rugman, 2014, p. 1). Hence, ESCQ should have also common variance with the scales derived from similar constructs (convergent validity) of personality trait (see Faria et al., 2006). Furthermore, TEI factor has been reported as a distinct oblique within the Big Five space (Pérez-González and Sánchez-Ruiz, 2014).

With these caveats in mind, our TEI findings should be interpreted as tentative. Nevertheless, it is interesting how once again gender presented a key role in understanding how participants perceived themselves differently their emotional skills, especially children and adolescents (Windingstad et al., 2011). Among boys, we found that *expressing and labeling emotions* were positively and significantly related to positive affect. However, among girls, positive affect was combined, related to *emotional managing and regulating* and DM. We have already pointed how Teal et al. (2018) studied the influence of EI and DM in the well-being school programs

in a sample of 294-male adolescents, where DM and TEI were linked to explain happiness. Despite using a different measure of TEI and positive criterion than these authors, we did not find this mediating relationship among boys, but we did among girls.

Male and female adolescents may use their emotional skills differently to develop a better perception of their positive affect. Although ESCQ is a self-reported measure, as TEI instruments are, it is also based on an AEI framework. In this same direction, others studies using AEI performance measures in male-and-female adolescents have pointed out how girls prefer to use emotional regulation abilities to improve their social functioning and positive states while male adolescents prefer to use them to achieve goals (Mestre et al., 2006; Lopes et al., 2012; Billings et al., 2014; Hawn et al., 2015; Fernandez-Berrocal and Extremera, 2016).

In our study, female participants that scored higher in DM also scored higher in the positive affect of PANASN. Some meta-analyses have reported a mediating effect of TEI in DM (Tomlinson et al., 2017; Miao et al., 2018), although gender was not considered as a factor of positive mental health. Regarding the possibility of female adolescents having better dispositional mindfulness for both social and self-functioning, further research including both factors (EI and DM) is needed. This is especially important if samples are heterogeneous (without academic filters), and more studies are necessary to examine gender as a mediator. In earlier stages of development, boys and girls have shown differences both in TEI studies (O'Connor and Little, 2003; Tett et al., 2005; Billings et al., 2014; Mikolajczak et al., 2014) and AEI measures (Allen et al., 2014; Fernandez-Berrocal and Extremera, 2016; Lopes et al., 2012; Mestre et al., 2006, 2017). These consistent outcomes involve an integrated intervention for developing positive outcomes among adolescents considering these gender differences. For example, Turanzas et al. (2018) have reported a combined treatment of DM and EI for gifted children based on second-generation of mindfulness-based on interventions (Van Gordon et al., 2015), where gifted children received mindful sessions and EI sessions with promising findings.



	coefficients	SE	t	p
constant	63.6217	6.7726	9.394	0.000
CAMM (DM)	-10.0336	2.3649	-4.2426	0.000
ESCQ (TEI)	-0.1313	0.0334	-3.9269	0.000
CAMMxESCQ	0.0359	0.0117	3.058	0.002

Note: R squared=.155
Anxiety state

FIGURE 1 | Moderation effect of TEI among DM and Anxiety state.

Another point of view and two questions also arise from our research: Does emotional intelligence predict the criteria of positive psychology better than dispositional mindfulness? Is DM a better predictor of outcome related to clinical psychology (anxiety, stress, negative emotions) than EI? Further research is needed to clarify this question but some antecedents from both EI models suggest a tentative-affirmative answer for the first question. From AEI research with children and adolescents, EI is related to a healthier psychological functioning (Rivers et al., 2012), a better resilience linked to emotional regulation ability (Mestre et al., 2017), a good understanding of complex emotional written (Barchard et al., 2013), a promoting adaptation (Davis et al., 2015), and more adaptive and positive emotional strategies (Peña-Sarrionandia et al., 2015). From TEI research with children and adolescents, individual differences in TEI appear to be a good predictor for social functioning: across the life span (Petrides et al., 2016), better academic performance (Petrides, 2016), social acceptance (Windingstad et al., 2011), and for personal functioning (Waugh et al., 2008; Laborde and Allen, 2016). However, with negative social functioning criteria (f.i., social misconduct), the findings have been indicated with the label “shreds of evidence are not as strong as we would like,” especially with AEI (Mavroveli et al., 2008; Fiori and Antonakis, 2011; Kong, 2014; Laborde and Allen, 2016). So, EI may be a stronger predictor for positive than negative adaptive criteria.

Regarding the second question, whether DM is a better predictor or not of outcomes related to clinic psychology (anxiety, stress, negative emotions) than EI. While our TEI measure was more related to positive outcomes, higher scores of DM were more related to lower scores of both negative emotional and cognitive criteria. Our findings matched with various studies about DM and positive and negative criteria [for children-and-adolescent studies (see Zhang and Wu, 2014; Roemer et al., 2015; Park and Dhandra, 2017b; Tomlinson et al., 2017)]. And female participants showed a combination of DM and EI effects for some criteria.

Due to some limitations (measures, sample sizes, and sample without EI and/or DM interventions among others), our findings should be interpreted tentatively. Further research may clarify if it is worth combining DM and EI designs in interventions with children and adolescents can combine DM and EI designs. If EI increases positive emotions and DM can slow-down negative emotions, then instructors could achieve wider outcomes in their interventions.

COMPLIANCE WITH ETHICAL STANDARDS

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. We also followed the Spanish Law regarding Data Protection. According to article 13.1 of the Spanish Organic Law of Data Protection, the “data of persons over 14 years of age may be processed with their consent, except

in those cases in which the Law requires the assistance of the holders of parental authority or guardianship. In the case of minors under 14 years of age, the consent of the parents or guardians will be required.”

INFORMED CONSENT

Children and adolescents from this research participated voluntarily and they had to sign an informed consent according to the Spanish Organic Law of Data Protection. Written informed consent was obtained from the parents/legal guardians of all participants.

According to the Research and Ethical Committee of INDESS (Institute for University Research on Social and Sustainable Development, University of Cadiz, Spain), we had to follow following ethical recommendations: (a) all participants had to bring an informed consent from their parents, especially minors under 14 years old; (b) we had to inform and receive permission from AMPA —“Asociación de Padres y Madres del Centro Escolar” (every Spanish school has its own parents association), and (c) the study had to be approved by the Cadiz Education Office of the Andalusian Government. Accordingly, the study was approved by the AMPA and, the Cadiz Education Office of the Andalusian Government, and Ethics and Research Committee of INDESS.

ETHICS STATEMENT

This study was carried out following the recommendations of the Scientific Integrity and Ethics at CSIC guidelines (Spanish Higher Council for Scientific Research). We also proceeded to gather the written informed consent from all participants, which was written under the Declaration of Helsinki. The protocol was also approved by the Ethical Research Committee of INDESS (University Institute of Research on Sustainable and Social Development, Universidad de Cádiz, Spain).

AUTHOR CONTRIBUTIONS

JM and VL-R designed the research and wrote and revised the whole process of the manuscript. JT, MG-G, and JG led the research and conducted the investigation. JC and JM made the statistical analyses. GT revised and contributed to the writing and revision of the manuscript.

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