Revista de Psicodidáctica, 2018, 23 (1), 1–8

Revista de Psicodidáctica

www.elsevier.es/psicod

Original

The Relationship of Botín Foundation's Emotional Intelligence Test (TIEFBA) with Personal and Scholar Adjustment of Spanish Adolescents☆

Pablo Fernández-Berrocal[a,*], Desireé Ruiz-Aranda[b], José M. Salguero[a], Raquel Palomera[c], and Natalio Extremera[a]

[a] *Universidad de Málaga, Málaga, Spain*
[b] *Universidad Loyola Andalucía, Sevilla, Spain*
[c] *Universidad de Cantabria, Santander, Spain*

ARTICLE INFO

Article history:
Received 2 September 2016
Accepted 18 May 2017
Available online 9 August 2017

Keywords:
Adolescent
Emotional intelligence
Personal and scholar adjustment
Ability model

ABSTRACT

This study analyzes the relationship of Botín Foundation's Emotional Intelligence Test for Adolescents (TIEFBA), a new ability-based measure to assess emotional intelligence (EI), with personal and scholar adjustment in Spanish adolescents. The instrument, based on the Mayer and Salovey model (1997), measures four branches of abilities while the participant is executing emotional tasks triggered by an emotion-eliciting situation. The TIEFBA was developed according to the Situational Judgment Test paradigm and it comprises eight scenes designed to evoke positive and negative emotions. A total of 1684 Spanish adolescents (48.2% males, mean age 14.37) completed the TIEFBA. Data on personality, empathy, intelligence and psychosocial adjustment were collected. The results provide evidence of instrument reliability and factorial, convergent, discriminant and some predictive validity. They further suggest that the TIEFBA is a promising new measure for assessing EI in Spanish adolescents, which will allow researchers and educators to understand better how EI affects youth as well as assess the impact of EI interventions.

La relación del Test de Inteligencia Emocional de la Fundación Botín (TIEFBA) con el ajuste personal y escolar de adolescentes españoles

Palabras clave:
Adolescente
Inteligencia emocional
Ajuste personal y académico
Modelo de habilidad

RESUMEN

Este estudio analiza la relación del Test de Inteligencia Emocional de la Fundación Botín para Adolescentes (TIEFBA), una nueva medida de habilidad para evaluar la inteligencia emocional (IE), con el ajuste personal y escolar en adolescentes españoles. El instrumento, basado en el modelo de Mayer y Salovey (1997), evalúa las cuatro ramas mientras el participante está resolviendo tareas emocionales generadas por una situación emocional. El TIEFBA fue desarrollado de acuerdo con el paradigma del Test de Juicio Situacional y comprende ocho escenas diseñadas para evocar emociones positivas y negativas. Un total de 1684 adolescentes españoles (48.2% varones, edad media 14.37 años) completaron el TIEFBA. Se recogieron datos sobre personalidad, empatía, inteligencia y ajuste psicosocial. Los resultados proporcionan evidencia de la fiabilidad de los instrumentos y su validez factorial, convergente, discriminante y también alguna predictiva. Estos resultados sugieren que el TIEFBA es una nueva medida prometedora para evaluar la IE en los adolescentes españoles, lo que permitirá a los investigadores y educadores entender mejor cómo la IE afecta a los adolescentes, así como evaluar el impacto de las intervenciones en IE.

☆ Please cite this article as: Fernández-Berrocal P, Ruiz-Aranda D, Salguero JM, Palomera R, Extremera N. La relación del Test de Inteligencia Emocional de la Fundación Botín (TIEFBA) con el ajuste personal y escolar de adolescentes españoles. Rev Psicodidáct. 2018;23:1–8. http://dx.doi.org/10.1016/j.psicod.2017.07.001

* Corresponding author.
E-mail address: berrocal@uma.es (P. Fernández-Berrocal).

Introduction

A quarter-century after Peter Salovey and John Mayer introduced the concept of emotional intelligence (EI) (Salovey & Mayer, 1990), it remains an important, expanding research area. In particular, how to reliably measure EI across the lifespan remains a significant challenge. Developing and validating new instruments to assess EI across the lifespan would advance research in EI theory and developmental processes. It would also help inform the use of EI-based interventions in the classroom, workplace or clinic, since such implementation requires accurate measurement of EI (Mayer, Salovey, & Caruso, 2008).

EI is habitually analyzed from the perspective of two primary theoretical models: the *ability* model and *trait* model (see Fernández-Berrocal & Extremera, 2006; Mayer et al., 2008). The *ability* model focuses on an individual's mental abilities to apply information provided by emotions for the improvement of cognitive processing. In this model, EI is 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 & Salovey, 1997, p. 10). This model conceives EI as an ability that should be assessed using maximum performance tests such as the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT, Mayer, Salovey, & Caruso, 2012). *Trait* model, in contrast, conceptualize EI as the combination of mental abilities, stable behavioral traits, motivation, and personality variables that should be assessed using self-report questionnaires such as the Bar-On Emotional Quotient Inventory (Bar-On, 2006).

Tests of ability capture maximal performance, whereas tests of self-report capture typical performance (MacCann, Joseph, Newman, & Roberts, 2014). The ability approach has been found to be relatively independent of personality constructs (Mayer et al., 2008), and it has shown moderate correlations with fluid and verbal intelligences (MacCann et al., 2014; Roberts, Zeidner, & Matthews, 2001; Van Rooy, Viswesvaran, & Pluta, 2005). For adolescents, several self-report questionnaires have been developed to measure EI as a trait in the Spanish context (e.g., Esnaola, Freeman, Sarasa, Fernández-Zabala, & Axpe, 2016; Salguero, Fernández-Berrocal, Balluerka, & Aritzeta, 2010), but few tests are available that measure EI as an ability.

Most theoretical models suggest that EI is developmental, yet research has tended to focus on understanding adult EI development (Cabello, Sorrel, Fernández-Pinto, Extremera, & Fernández-Berrocal, 2016), reflecting the fact that the first reliable measures of EI were developed for adults. Few studies have been conducted on ability EI in adolescents or on differences in ability EI across age groups; however, research suggests that age affects ability EI throughout the lifespan, following a complex pattern of decreases and increases (Cabello, Navarro-Bravo, Latorre, & Fernández-Berrocal, 2014; Cabello et al., 2016; Luebbers, Downey, & Stough, 2007; Rivers et al., 2012). Moreover, findings from studies conducted in Spain and other countries suggest that women show higher ability EI during the lifespan (e.g., Brackett & Mayer, 2003; Cabello & Fernández-Berrocal, 2015; Cabello et al., 2016).

Assessing emotional skills in adolescence is essential because of the significant, albeit preliminary, associations between adolescent EI and better psychological adjustment (Martins, Ramalho, & Morin, 2010; Resurrección, Salguero, & Ruiz-Aranda, 2014), higher empathy (Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006), higher-quality social relationships (Gil-Olarte, Palomera, & Brackett, 2006), and less aggression and better prosocial behavior (García-Sancho, Salguero, & Fernández-Berrocal, 2014). In addition, interest is growing in measures of positive youth development, especially to determine the effectiveness and success of programs that promote positive well-being in adolescents (Castillo, Salguero, Fernández-Berrocal, & Balluerka, 2013; Durlak, Weissberg, Dyminicki, Taylor, & Schellinger, 2011; Ruiz-Aranda et al., 2012). Thus, further research and development of performance instruments for adolescents are needed to assess their emotional skills and understand the impact of emotional learning programs (Durlak et al., 2011).

Measuring ability EI: Botín Foundation's Emotional Intelligence Test for Adolescents (TIEFBA)[1]

As a step in this direction, the present study describes the development and validation of the Botín Foundation's Emotional Intelligence Test for Adolescents (TIEFBA), and its relationship with intelligence, personality traits, and indicators of personal and scholar adjustment in Spanish samples. The TIEFBA was developed from the ability EI model of Mayer and Salovey (1997). Based on this model, the TIEFBA assesses four related sets of abilities (or branches) that are hierarchically interrelated: emotion perception, emotion facilitation of thought, emotion understanding, and emotion management. All the four primary abilities of EI (perception, facilitation, understanding, and management) together form one global factor of EI. The Mayer-Salovey model of EI also theorizes that the lower two branches (perception and facilitation) together form the *experiential* EI area, and the two higher branches (understanding and management) together form the *strategic EI* area (Mayer et al., 2008, 2012). This conceptualization of EI as being based on the ability to process emotional information, which is measured by performance tests, has not been applied to adolescents due to a lack of suitable age-appropriate measures. A new version of the MSCEIT exists for youth (MSCEIT-YV; Rivers et al., 2012), but no Spanish adaptation has yet been published.

The TIEFBA differs in several respects from other measures of ability EI. First, the TIEFBA is based on the most widely accepted EI model (Mayer et al., 2008), whereas other measures are grounded in other models. This facilitates the grounding of TIEFBA results in the larger context of theory-driven research, potentially allowing more accurate assessment of emotional skills and their interrelationships (Durlak et al., 2011). Second, whereas most performance tests of EI, such as MSCEIT and MSCEIT-YV, use tasks that assess each of the branches of the EI model separately, the TIEFBA, in line with recent developments in antecedent measurement (MacCann & Roberts, 2008), relies on a single emotion-eliciting situation, which provides the basis for several emotional tasks that assess all four branches of the EI model. The emotional situation in the TIEFBA is created when the participant reads short stories involving different characters, based on which the participant must perform various tasks related to the four emotional skills of the model. Third, whereas other measures of EI abilities are adaptations of adult measures (Rivers et al., 2012), the TIEFBA was designed based on the responses and feedback of Spanish adolescents in pilot studies. Therefore, it provides greater ecological validity for considering the four branches as interrelated.

The TIEFBA has an important advantage over other EI measures because it is not subject to the limitations of self-report. In contrast to EI measures that evaluate adolescents' perception of their own emotional skills, such as the Trait Meta Mood Scale (Salguero et al., 2010), the TIEFBA assesses an adolescent's actual EI performance level, i.e. his or her actual ability to use emotional skills to solve various emotional problems. In addition, the TIEFBA is less vulnerable to the various biases that affect self-report EI measures, such

[1] Throughout the text we have used the Spanish acronym: Test de Inteligencia Emocional de la Fundación Botín para Adolescentes (TIEFBA).

as social desirability and response style because it is not based upon self-perceptions and seemingly cannot be faked (Brackett et al., 2006).

Development of the TIEFBA

The TIEFBA was developed according to the Situational Judgment Test paradigm, incorporating five developmental stages to ensure ecological validity. In Step 1, a convenience sample of 100 adolescents, aged from 12 to 17 and equipared by sex, completed semi-structured interviews in which they were asked to describe two emotional situations they had experienced. They had to define the situation, the emotional state that they felt, and the outcome of the situation. In Step 2, these descriptions were used to create 40 situations meant to elicit positive and negative emotions; each situation involved either an intra- or interpersonal scene. These 40 situations were administered to another convenience sample of 100 adolescents (aged from 12 to 17 and equipared by sex). For each emotion-provoking situation, respondents were asked to describe (based on a semi-structure interview) the emotions the protagonist was feeling, the protagonist's thoughts or beliefs, and the emotion-regulating strategy the subject believed would be most effective for the protagonist to achieve a specified goal. In Step 3, of the previous 40 situations, those in which adolescent responses showed higher variability were used to generate twelve emotion-provoking situations. Then, a task evaluating each branch of the ability EI model was incorporated into each situation. The design of the situations considered different theories about emotions and emotion-regulating strategies (e.g., Mayer & Salovey, 1997; Niven, Totterdell, & Holman, 2009). The preliminary version of the TIEFBA consisted of 216 items. In Step 4, the number of items was reduced in the following manner: a convenience sample of 157 (aged from 12 to 17 and equipared by sex) adolescent students were asked to complete the preliminary version of the TIEFBA, after which the situations for which responses showed greater reliability and variability were selected. The final version of the TIEFBA comprises eight emotion-provoking scenes, four intrapersonal and four interpersonal, representing positive and negative emotions. Each scene allows assessment of all four branches of the ability EI model. The instrument contains 144 items.

Aims of the present study

The objective of the current study was to analyze the relationship of TIEFBA with personal and scholar adjustment in Spanish adolescents. Moreover, the internal structure and a broad network of convergent, discriminant and psychosocial variables were analyzed. Based on previous research (MacCann et al., 2014; Mayer et al., 2008, 2012), we expect that TIEFBA will be significantly correlated with fluid and verbal intelligences, but will be different from personality traits, showing small to zero correlations. Additionally, we expect that TIEFBA will be significantly correlated with empathy and psychosocial adjustment. Subgroup analysis based on gender and age was also performed.

Method

Participants

A convenience sample was used, with students coming from ten different schools of different regions of Spain (44.5% from Andalucia; 27.6% from Cantabria; 7.7% from Castilla La Mancha; 20.2% from Madrid), which were both private (22%) and public schools (78%), and mainly located in urban areas (60%). A total of 1684 Spanish adolescent students (48.2% males, 51.7% females, .1% with gender data missing), ranging in age from 12 to 17 (M = 14.37, SD = 1.29), completed the TIEFBA.

Instruments

Botín Foundation's Emotional Intelligence Test for Adolescents (TIEFBA). The TIEFBA comprises eight emotion-eliciting scenes. Each scene includes 2–3 sentences describing the emotionally salient aspect of a situation involving one or more protagonists. Based on each of these scenes, adolescents must perform four tasks that allow evaluation of the four branches of the ability model of EI. First, in the perceiving emotions task, the facial expression of the main protagonist is displayed, and the subject must rate on a 5-point Likert scale (from 1 = "not at all" to 5 = "very much") how much surprise, anger, sadness, fear, happiness, and disgust the protagonist feels. Second, in the using emotions task, adolescents are asked to use a 5-point Likert scale (from 1 = "not at all" to 5 = "very much") to rate the extent to which the protagonist's mood would help him or her perform three cognitive activities. This task measures the adolescent's knowledge of how emotions assist thinking and reasoning. Third, in the understanding emotions task, adolescents use a 5-point Likert scale (from 1 = "not at all" to 5 = "very much") to rate the extent to which four kinds of thoughts and beliefs are linked to the protagonist's emotional state. This task assesses the respondent's ability to associate emotions with cognitive evaluations. Finally, in the managing emotions task, adolescents use a 5-point Likert scale (from 1 = "completely ineffective" to 5 = "completely effective") to rate the effectiveness of four alternative emotion-regulation strategies for achieving a specific goal. In response to four scenes, respondents must rate the effectiveness of strategies through which the protagonist regulates his or her own emotions to achieve a goal, while in another four scenes, respondents must rate the effectiveness of strategies through which the protagonist regulates other peoples' emotions to achieve a goal.

The individual's performance in each task across the eight scenes is summed to obtain seven scores: four scores referring to the four branches (*perceiving emotions, using emotions, understanding emotions*, and *managing emotions*); two area scores referring to the *experiential area*, which summarizes the scores in the perceiving and using emotions tasks, and the *strategic area*, which summarizes the scores in the understanding and managing emotions tasks; and a *total score*, which summarizes the respondent's performance across the four tasks. An expert consensus criterion is used to correct the TIEFBA. The expert consensus score compares the individual's performance to the consensus of 22 emotion experts (7 males and 15 females), where each possible response on each item was weighted by the proportion of experts who selected that response. For example, if 80% of experts choose the response "1" in one item, whereas 10% choose the response "2", 5% the response "3", 5% the response "4", and 0% the response "5", a participant who choose the response "2" in this item, will have a score of .10, whereas a participant that choose the response "1" in this item will have a score of .80. This method has been used to correct other ability measures of EI (e.g., MSCEIT). In our study, the inter-rater reliability (intraclass correlation coefficient) was .98. The time of the test was 20–30 minutes. For information about obtaining the TIEFBA, contact with Fundación Botín (http://www.fundacionbotin.org/educacion-contenidos/test-inteligencia-emocional.html).

The *Interpersonal Reactivity Index* (IRI, Davis, 1983) was used to measure empathy. It is composed of 28 items rated on a 5-point Likert scale (from 1 = "does not describe me at all" to 5 = "describes me very well"). Responses to these items are assessed along two cognitive scales: *perspective taking*, which assesses the tendency to adopt others' points of view; and *fantasy*, which assesses the tendency to transport oneself imaginatively into the shoes of fictitious

characters and experience their emotions. Responses to these items are also assessed along two emotional scales: *empathic concern*, which measures feelings of sympathy and concern for others; and *personal distress*, which measures feelings of anxiety that may occur in conflict situations. The Spanish version of the IRI was used, and this has shown alpha coefficients ranging from $\alpha = .56$ to .70 (Mestre, Frías, & Samper, 2004). The time of the test was 5–7 minutes.

The *Eysenck Personality Questionnaire Junior* (EPQ-J; Eysenck & Eysenck, 1975), which was adapted into Spanish by Eysenck and Eysenck (1984), was used to assess personality traits. The EPQ-J is an 81-item scale, scored on a dichotomous scale (0 = no, 1 = yes) for assessing personality traits in children and adolescents. It yields five scales: Eysenck's three factors of personality, namely *extraversion, neuroticism*, and *psychoticism*; the *sincerity* scale; and the *antisocial behavior* scale, which measures proneness to antisocial behavior. The Spanish version used in the present study has shown adequate psychometric properties (Eysenck & Eysenck, 1984). The time of the test was 10 to 15 minutes.

The D-48 Intelligence Test (Anstey, 1990) was used to assess fluid intelligence. It is a general intelligence test that evaluates an individual's capacity to conceptualize and apply systematic reasoning to new problems. It contains 48 sets of dominoes displayed in logical series, with each set including a domino with one blank face that the individual must fill in. The D-48 Intelligence Test reveals adequate internal consistency (.89) and test–retest reliability (.69), with no ethnicity or gender bias (Domino & Morales, 2000). The time of the test was 30–40 minutes.

The *Similarity Subtest* of the *Wechsler Intelligence Scale for Children-IV* (WISC-IV; Wechsler, 2003), adapted into Spanish by TEA (Wechsler, 2007), was used to assess *verbal intelligence.* This subtest measures verbal abstract reasoning and conceptualization abilities. The individual is asked in what way two things are alike (e.g., "How are a snake and an alligator alike?"). The time of the test was 5–7 minutes.

The *Behavior Assessment System for Children* (*BASC*; Reynolds & Kamphaus, 2004), *adolescent self-report form*, was used to assess psychosocial adjustment. The BASC is an international, well-validated instrument for socio-emotional evaluation of children and adolescents (Reynolds & Kamphaus, 2004). It consists of different adaptive subscales (which measure positive adjustment) and clinical subscales (which measure maladjustment), where participants rate the statements reflecting their personal thoughts and feelings as being true or false. In the current study, we used the global dimensions of the BASC: *clinical maladjustment*, comprising anxiety, atypicality, external locus, social stress and somatization scales; *scholar maladjustment*, comprising scales measuring negative attitudes toward school and teacher as well as sensation-seeking; *personal adjustment*, comprising scales measuring good relationships with parents and peers, self-esteem and self-confidence; and *index of emotional symptoms* (ISE), a global indicator of emotional alterations, specifically problems with internalizing, which includes scales assessing anxiety, interpersonal relations, self-esteem, social stress, depression and sense of inadequacy. The Spanish version we used has shown satisfactory psychometric properties (González, Fernández, Pérez, & Santamaría, 2004). The time of the test was 10–15 minutes.

Procedure

Of the total sample, a first subset of 469 participants (44.1% males, 55.6% females, .3% with gender data missing), ranging in age from 13 to 16 ($M = 14.7$, $SD = .74$), was randomly selected to complete additional tests to evaluate empathy and personality traits. A second non-overlapping subset of 130 participants (50.8% males, 49.2% females), ranging in age from 12 to 17 ($M = 14.7$, $SD = 1.51$), was randomly selected to complete additional tests to evaluate general intelligence. Finally, a third non-overlapping subset of 662 participants (51.1% males, 48.7% females, .2% with gender data missing), ranging in age from 13 to 17 ($M = 15.3$, $SD = 1.01$), was randomly selected to complete additional tests of psychosocial adjustment.

The study was carried out in accordance with the Declaration of Helsinki, and it was approved by the Technical Council of the Ethical Committee of the University of Malaga. Consent for each student to participate was obtained from school authorities and parents. Participants were volunteers who received no credit for their involvement.

Data analyses

SPSS 22.0 (IBM, Chicago, IL) was used to compute descriptive statistics, correlation analyses, internal consistency, and analyses of variance. EQS 6.1 (Bentler, 2005) was used to perform confirmatory factor analysis (CFA). Since departures from multivariate normality can have a significant impact on maximum likelihood (ML) estimation, we calculated descriptive analytical measures prior to conducting CFA. All skewness and Kurtosis values were within an acceptable range of ±2 (Gravetter & Wallnau, 2014); moreover, multivariate Mardia's coefficient showed a value of −1.76, under the cutoff point of 5.00 suggested by Bentler (2005). These statistics indicated normality, so CFA was carried out using the ML method. Following Schweizer's recommendations (Schweizer, 2010), we used the following additional measures of model fit: (a) the root mean square error of approximation (RMSEA); (b) the Bentler Comparative Fit Index (CFI); and (c) the standardized root mean square residual (SRMR). CFI values exceeding .90 signify acceptable fit. RMSEA values below .08 are considered acceptable fit, and values below .05 indicate good fit. Finally, SRMR values should remain below .10 (Schweizer, 2010). We analyzed two models and the observed variables in both models were tasks, reflecting previous studies on the factor structure of ability EI measures (Mayer et al., 2012; Rivers et al., 2012). One model was a general factor model, where a higher-order latent factor was allowed such that the four tasks loaded on a single general factor. The other model was a two-areas model, where *experiential* and *strategic* areas were allowed to be higher-order latent factors, such that tasks loaded on two related first-order latent factors. Missing data were minimal (less than 5%), and a listwise deletion criterion was used.

Results

Factor structure

Both the general factor model and the two-areas model showed good fit to the data. Fit parameters for the general factor model were χ^2 ($df = 2$) = 14.79, $p < .01$; normed $\chi^2 = 7.39$; RMSEA = .06 (90% CI = .03–.09); CFI = .99; and SRMR = .02. Fit parameters for the two-areas model were χ^2 ($df = 1$) = 3.01, $p = .08$; normed $\chi^2 = 3.01$; RMSEA = .03 (90% CI = .001–.08); CFI = 1.00; and SRMR = .01. However, the two-areas model showed a better fit than the general factor model: $\Delta\chi^2(1) = 12.08$; $p < .001$. This result argues for the importance of including the area scores. Figure 1 presents this model together with standardized beta coefficients.

Descriptive statistics, reliability and correlations between the TIEFBA subscales

Descriptive statistics and reliability (Cronbach's alpha, McDonald's omega, and Compound reliability) are shown in Table 1. Cronbach's alpha coefficients for the different branches ranged

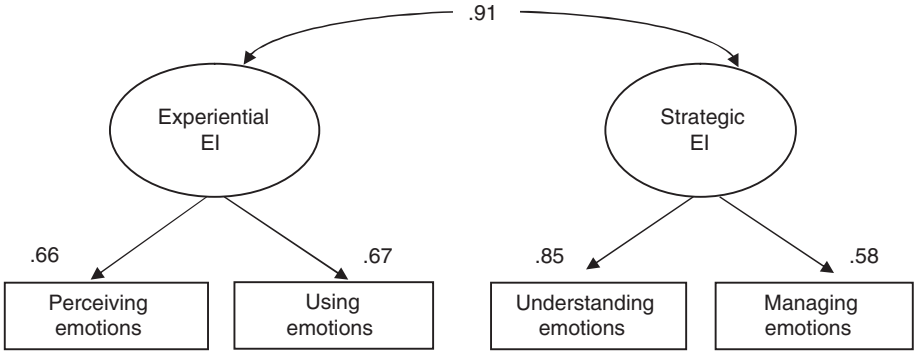

Figure 1. The two-areas (experiential and strategic) model of EI.

Table 1
Descriptive statistics (means with standard deviations in parentheses) and reliability coefficients for the TIEFBA subscales ($n = 1684$)

Subscale	Mean (*SD*)			Alpha	Omega	Compound reliability	A.V.E.
	Total	Men	Women				
Perceiving emotions	.43 (.10)	.42 (.11)	.45 (.10)	.86	.94	.86	.33
Using emotions	.31 (.08)	.30 (.08)	.33 (.08)	.76	.85	.75	.20
Understanding emotions	.28 (.08)	.27 (.08)	.30 (.08)	.76	.85	.78	.13
Managing emotions	.32 (.09)	.30 (.09)	.34 (.08)	.74	.86	.71	.14
Experiential area	.37 (.08)	.36 (.08)	.39 (.07)	.88	.95	.90	.32
Strategic area	.30 (.08)	.29 (.08)	.32 (.07)	.83	.92	.86	.13
Total score	.34 (.07)	.32 (.07)	.35 (.06)	.91	.96	.94	.15

Note. A.V.E.: Average Variance Extracted.

Table 2
Correlations among the TIEFBA subscales and between the subscales and age ($n = 1684$)

	1	2	3	4	5	6	7
Perceiving emotions	–						
Using emotions	.44**	–					
Understanding emotions	.51**	.53**	–				
Managing emotions	.36**	.34**	.49**	–			
Experiential area	.88**	.81**	.61**	.41**	–		
Strategic area	.48**	.47**	.78**	.93**	.56**	–	
Total score	.75**	.70**	.80**	.79**	.85**	.91**	–
Age	–.12**	–.06*	–.05*	–.16**	–.11**	–.14**	–.14**

* $p < .05$.
** $p < .01$.

from .74 to .86. Alpha coefficients were .88 and .83 for the *experiential* and *strategic* areas, respectively, while the alpha coefficient for the *Total score* was .91. Omega values for all branches appeared to be in a good-to-high range (range: .85–.94), with higher scores for areas (.95 and .92) and *Total score* (.96). Similar results were found with respect the compound reliability, with higher scores for areas (.90 and .86) and *Total score* (.94). We also examined the correlations between TIEFBA subscales (see Table 2). Correlations between TIEFBA subscales ranged from $r = .34$ (between *using emotions* and *managing emotions*) to $r = .53$ (between *perceiving emotions* and *understanding emotions*). Correlation was $r = .56$ between the two areas, $r = .85$ between *experiential area* and *total score*, and $r = .91$ between *strategic* area and total *score* (Table 2).

Gender differences and correlations with age

Multivariate analyses of variance were conducted to analyze gender differences in branches and areas; means and SD values for males and females are shown in Table 1. The multivariate main effect for gender was significant for branches [Wilk's lambda (4, 1677) = 26.46, $p < .0001$] and areas [Wilk's lambda (2, 1679) = 48.13, $p < .0001$]. The univariate test showed that female adolescents had higher scores than males on all branches: *perceiving emotions*, $F(1, 1680) = 45.44$, $p < .001$, $d = 0.33$; *using emotions*, $F(1, 1680) = 43.66$, $p < .001$, $d = 0.32$; *understanding emotions*, $F(1, 1680) = 36.35$, $p < .001$, $d = 0.29$; and *managing emotions*, $F(1, 1680) = 83.40$, $p < .001$, $d = 0.45$. The same result was obtained for the two areas: *experiential* area, $F(1, 1680) = 62.08$, $p < .001$, $d = 0.38$; and *strategic* area, $F(1, 1680) = 84.18$, $p < .001$, $d = 0.45$. According to the criteria of Cohen (1977), the effect size of these differences was small to moderate.

Analysis of variance was conducted to analyze gender differences in the *total score*. Similar to the results with branches and areas, female adolescents had higher *Total scores* than males: $F(1, 1680) = 95.67$, $p < .001$, $d = 0.48$. The effect size was moderate. Pearson correlations showed low negative associations between the TIEFBA subscales and age (Table 2), ranging from $r = -.05$ (*understanding emotions* subscale) to $r = -.14$ (*strategic* area and *total* score).

Associations with personality traits, empathy and intelligence

Correlations between the TIEFBA subscales and measures of *personality traits*, *empathy* and *fluid* and *verbal intelligence* are shown in Table 3. Non-significant correlations were found between the TIEFBA subscales and personality traits of *neuroticism* and *extraversion*, whereas significant negative correlations were found for *psychoticism*, mainly between *perceiving emotions* and *psychoticism*, as well as between *strategic area* and *antisocial behavior*. With respect to empathy, positive and significant correlations were

Table 3
Correlations between the TIEFBA subscales and measures of personality traits, empathy and intelligence, and reliability coefficients

	n = 469								*n* = 130	
	N	*E*	*p*	Antisocial behavior	Fantasy	Perspective taking	Emphatic concern	Personal distress	*Gf*	*VI*
Perceiving emotions	−.07	−.02	−.16**	−.10	.14**	.17**	.25**	−.13**	.05	.21*
Using emotions	.06	−.06	−.06	.00	.11**	.10**	.23**	−.05	.13	.35**
Understanding emotions	.03	−.08	−.06	−.05	.24**	.16**	.28**	−.10**	.25**	.38**
Managing emotions	.02	.06	−.11*	−.10	.22**	.18**	.36**	−.03	.11	.26**
Experiential area	−.01	−.04	−.13**	−.10	.14**	.16**	.28**	−.11**	.11	.33**
Strategic area	.03	−.01	−.11*	−.16**	.25**	.19**	.36**	−.06	.19*	.35**
Total score	.01	−.02	−.14**	−.10	.22**	.19**	.35**	−.09*	.17	.39**
Alpha	.80	.70	.72	.68	.74	.71	.67	.50	–	–
Compound reliability	.84	.78	.80	.51	.88	.84	.82	.78	–	–
A.V.E.	.22	.14	.21	.13	.41	.39	.34	.34	–	–
Omega	.90	.88	.88	.91	.78	.72	.71	.62	–	–

Note. A.V.E.: Average Variance Extracted, E: Extraversion, Gf: Fluid Intelligence, N: Neuroticism, P: Psychoticism, VI: Verbal Intelligence.
* $p < .05$.
** $p < .01$.

Table 4
Correlations between the TIEFBA subscales and measures of psychosocial adjustment, and reliability coefficients (*n* = 662)

	Clinical maladjustment	Scholar maladjustment	Personal adjustment	Index of emotional symptoms
Perceiving emotions	−.34	−.30	.32	−.36
Using emotions	−.26	−.21	.25	−.28
Understanding emotions	−.28	−.24	.27	−.30
Managing emotions	−.27	−.28	.23	−.27
Experiential area	−.34	−.30	.33	−.37
Strategic area	−.30	−.29	.27	−.31
Total score	−.35	−.32	.32	−.37
Alpha	.86	.80	.82	.86
Compound reliability	.90	.85	.89	.90
A.V.E.	.65	.66	.67	.62
Omega	.87	.82	.84	.88

Note. A.V.E.: Average Variance Extracted. All correlations were significant at $p < .01$.

found between the TIEFBA subscales on one hand and *fantasy, perspective taking* and *empathic concern* on the other. In contrast, negative correlations were found between some of the TIEFBA subscales and *personal distress*. The highest correlations were found between *managing emotions* and *strategic area* on one hand and *empathic concern* on the other. Finally, *understanding emotions* and *Strategic area* were positively and significantly associated with *fluid intelligence*, while positive and significant correlations were found between all TIEFBA subscales and *verbal intelligence*. In this case, the highest correlation appeared between *total score* and *verbal intelligence*.

Associations with psychosocial adjustment

Correlations between the TIEFBA subscales and measures of psychosocial adjustment are shown in Table 4. All subscales of the TIEFBA were significant and negatively related with measures of *clinical, scholar* and *emotional maladjustment* (correlations ranged from $r = -.21$ to $r = -.37$), with the highest correlations found between the TIEFBA *total score* and the *index of emotional symptoms*. In contrast, significant and positive correlations were found between all the TIEFBA subscales and *personal adjustment*. In this case, correlations ranged from $r = .23$ to $r = .33$ and the highest correlations were for the *experiential area*.

Discussion

The aim of the present study was to analyze the relationship of TIEFBA with personal and scholar adjustment in Spanish adolescents and to describe the development and validation of the TIEFBA.

Our results confirm the validity and reliability of the TIEFBA as a measure to evaluate ability EI in Spanish adolescents. The four tasks of the TIEFBA correspond to the four branches of the ability EI model, which reflect the two areas of experiential and strategic EI. This structure is empirically and theoretically justified (Mayer et al., 2012). The present study found that females had higher levels of EI, which mirrors previous findings (Brackett & Mayer, 2003; Cabello & Fernández-Berrocal, 2015; Cabello et al., 2016). This suggests that gender differences in EI already exist in adolescence. In fact, age showed a low negative association with TIEFBA. Although further research is needed, our findings appear to suggest a decline in EI during adolescence in line with prior research (Rivers et al., 2012). This decline may be due to the relationship between emotion and cognition changes with age, and these changes appear to be linked to biological changes in puberty. Particularly the problems in manage emotions and life dilemmas have adolescents during this challenging period without the necessary regulatory abilities (Steinberg, 2005).

Our results suggest that TIEFBA meets main criteria for evaluating the validity of EI test (MacCann et al., 2014; Mayer et al., 2008, 2012): (1) TIEFBA was positively related with fluid and verbal intelligences; (2) it was distinct from personality traits; and (3) it was related to indicators of emotional functioning and psychosocial adjustment. Analysis of the relationship of TIEFBA with intelligence showed a moderate association with verbal intelligence and a smaller association with fluid intelligence. This is consistent with recent research on the relationship between Cattell-Horn-Carroll (CHC) theory and ability EI that suggest that EI can be considered a second-stratum factor of intelligence alongside other CHC broad abilities as fluid intelligence and visual processing (MacCann et al., 2014). In contrast to self-report EI measures, TIEFBA do not

appear to correlate with personality traits, showing that evaluates emotional skills different from personality traits in agree with ability EI research (MacCann et al., 2014; Mayer et al., 2008, 2012). We also found significant moderated correlations between TIEFBA scores and the most emotional dimension (empathic concern) of a self-reported empathy measure. Empathic concern includes the tendency to become emotionally implicated with other people and to feel what others feel. Since EI refers to the ability to perceive, understand and manage others' emotions, it is coherent that EI would relate to a higher level of empathic concern as previous research has shown (Brackett et al., 2006). However, we used a self-report scale of empathy that has only shown a moderate association with ability EI measures (Brackett et al., 2006). Future studies it will attempt to better capture empathy by measuring real-time empathy behaviors. Finally, the results of the relationship of TIEFBA with measures of psychosocial adjustment provide preliminary evidence of positive associations between ability EI and indicators of personal and scholar adjustment in Spanish adolescents, and support previous research indicating that adolescent EI is positive related to social-psychological adjustment (Brackett et al., 2006; García-Sancho et al., 2014; Gil-Olarte et al., 2006; Gómez-Ortiz, Romera-Félix, & Ortega-Ruiz, 2017; Martins et al., 2010; Resurrección et al., 2014; Rivers et al., 2012; Serrano & Andreu, 2016).

Our findings suggest that TIEFBA provides a valuable assessment of EI in Spanish adolescents. One of the distinctive characteristics of this measure is an innovative format that focuses on emotional tasks involving a single emotion-eliciting situation. Moreover, the instrument shows clear internal structure, and its testing reveals that TIEFBA meets main criteria for evaluating the validity of EI test (Mayer et al., 2008, 2012). Nevertheless, future research should test reliability further, such as by examining whether TIEFBA scores remain stable over time using a test–retest design and confirming that the test shows adequate reliability in other adolescent populations. It will be also required to explore the convergent validity of TIEFBA with existing ability-based measures for adolescents such as MSCEIT-YV (though a Spanish version is still unavailable), analyze the invariance of the test across gender, and examine whether the TIEFBA predicts important criterion variables related to the psychological and social well-being of Spanish adolescents in prospective studies. For example, studies should examine whether the TIEFBA can help school psychologists and counselors identify students who are unable to cope adequately with daily problems and who are more likely to develop behavioral problems or psychological maladjustment (García-Sancho et al., 2014; Rivers et al., 2012). In addition, Cronbach's alpha for the *personal distress* scale was low (.50), and this will have attenuated the correlation between this scale and the other used measures. Therefore, it would be useful to replicate the current study using a variety of empathy measures.

The TIEFBA is proposed to be a valid and reliable instrument to evaluate how Spanish adolescents apply their emotional knowledge to daily life. For these reasons, the TIEFBA may be an important addition to researchers' tools for measuring EI throughout the life cycle. The survey may also be an effective tool for exploring how emotional skills measured by TIEFBA are related to emotional self-efficacy measured by self-report tests of EI. Additionally, TIEFBA may be useful in cross-cultural research examining, for example, similarities and differences in EI growth in adolescents from Spain and other countries.

The TIEFBA may be useful for evaluating the effects of programs aimed at improving the emotional skills of Spanish adolescents. Many studies attempting to determine the effectiveness of emotional learning programs have not used reliable and valid outcome measures, and Durlak et al. (2011) have shown the importance of the psychometric properties of measures of social and emotional skills. Future studies should examine whether training can significantly affect TIEFBA scores.

This study suggests that the TIEFBA is a promising new measure for assessing the ability of Spanish adolescents to perceive, access and generate feelings when they facilitate cognition, understand affect-laden information and regulate emotions in adolescents. In this way, the TIEFBA may prove useful both to researchers and educators requiring a reliable and validated way to evaluate EI changes in adolescence as well as the impact of EI interventions.

Acknowledgments

This research was supported by Foundation Botín.

References

Anstey, E. (1990). *Test de dominós D-48*. Madrid: TEA Ediciones.
Bar-On, R. (2006). The Bar-On model of emotional-social intelligence (ESI). *Psicothema*, *18*(Suppl.), 13–25.
Bentler, P. M. (2005). *EQS 6 structural equations program manual*. Encino, CA: Multivariate Software.
Brackett, M. A., & Mayer, J. D. (2003). Convergent, discriminant and incremental validity of competing measures of emotional intelligence. *Personality and Social Psychology Bulletin*, *29*, 1–12. http://dx.doi.org/10.1177/0146167203254596
Brackett, M. A., Rivers, S. E., Shiffman, S., Lerner, N., & Salovey, P. (2006). Relating emotional abilities to social functioning: A comparison of self-report and performance measures of emotional intelligence. *Journal of Personality and Social Psychology*, *91*, 780–795. http://dx.doi.org/10.1037/0022-3514.91.4.780
Cabello, R., & Fernández-Berrocal, P. (2015). Implicit theories and ability emotional intelligence. *Frontiers in Psychology*, *6*, 700. http://dx.doi.org/10.3389/fpsyg.2015.00700
Cabello, R., Navarro-Bravo, B., Latorre, J. M., & Fernández-Berrocal, P. (2014). Ability of university-level education to prevent age-related decline in emotional intelligence. *Frontiers in Aging Neuroscience*, *6*, 37. http://dx.doi.org/10.3389/fnagi.2014.00037
Cabello, R., Sorrel, M. A., Fernández-Pinto, I., Extremera, N., & Fernández-Berrocal, P. (2016). Age and gender differences in ability emotional intelligence in adults: A cross-sectional study. *Developmental Psychology*, *52*, 1486–1492. http://dx.doi.org/10.1037/dev0000191
Castillo, R., Salguero, J. M., Fernández-Berrocal, P., & Balluerka, N. (2013). Effects of an emotional intelligence intervention on aggression and empathy among adolescents. *Journal of Adolescence*, *36*, 883–892. http://dx.doi.org/10.1016/j.adolescence.2013.07.001
Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York, NY: Academic Press.
Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*, 113–126. http://dx.doi.org/10.1037/0022-3514.44.1.113
Domino, G., & Morales, A. (2000). Reliability and validity of the D-48 with Mexican American college students. *Hispanic Journal of Behavioral Sciences*, *22*, 382–389. http://dx.doi.org/10.1177/0739986300223007
Durlak, J., Weissberg, R., Dyminicki, A., Taylor, R., & Schellinger, K. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, *82*, 405–432. http://dx.doi.org/10.1111/j.1467-8624.2010.01564.x
Esnaola, I., Freeman, J., Sarasa, M., Fernández-Zabala, A., & Axpe, I. (2016). Validity evidence based on internal structure of scores of the Emotional Quotient-Inventory: Youth Version Short (EQ-i: YV-S) in a Spanish sample. *The Spanish Journal of Psychology*, *19*, 1–9. http://dx.doi.org/10.1017/sjp.2016.12
Eysenck, H. J., & Eysenck, S. B. G. (1975). *Manual of the Eysenck Personality Questionnaire Junior (EPQ-J) y Adult (EPQ-A)*. London: Hodder y Stoughton.
Eysenck, H. J., & Eysenck, S. B. G. (1984). *EPQ – cuestionario de personalidad para niños y adultos*. Madrid: TEA Ediciones.
Fernández-Berrocal, P., & Extremera, N. (2006). Emotional intelligence: A theoretical and empirical review of its first 15 years of history. *Psicothema*, *18*(Suppl.), 7–12.
García-Sancho, E., Salguero, J. M., & Fernández-Berrocal, P. (2014). Relationship between emotional intelligence and aggression: A systematic review. *Aggression and Violent Behavior*, *19*, 584–591. http://dx.doi.org/10.1016/j.avb.2014.07.007
Gil-Olarte, P., Palomera, R., & Brackett, M. A. (2006). Relating emotional intelligence to social competence, and academia achievement among high school students. *Psicothema*, *18*, 118–123.
Gómez-Ortiz, O., Romera-Félix, E. M., & Ortega-Ruiz, R. (2017). Multidimensionality of social competence: Measurement of the construct and its relationship with bullying roles. *Revista de Psicodidáctica*, *22*, 37–44. http://dx.doi.org/10.1387/RevPsicodidact.15702
González, J., Fernández, S., Pérez, E., & Santamaría, P. (2004). *Adaptación española del sistema de evaluación de la conducta en niños y adolescentes: BASC*. Madrid: TEA.
Gravetter, F., & Wallnau, L. (2014). *Essentials of statistics for the behavioral sciences* (8th ed.). Belmont, CA: Wadsworth.

Luebbers, S., Downey, L. A., & Stough, C. (2007). The development of an adolescent measure of EI. *Personality and Individual Differences*, *42*, 999–1009. http://dx.doi.org/10.1016/j.paid.2006.09.009

MacCann, C., Joseph, D. L., Newman, D. A., & Roberts, R. D. (2014). Emotional intelligence is a second-stratum factor of intelligence: Evidence from hierarchical and bifactor models. *Emotion*, *14*, 358–374. http://dx.doi.org/10.1037/a0034755

MacCann, C., & Roberts, R. D. (2008). New paradigms for assessing emotional intelligence: Theory and data. *Emotion*, *8*, 540–551. http://dx.doi.org/10.1037/a0012746

Martins, A., Ramalho, N., & Morin, E. (2010). A comprehensive meta-analysis of the relationship between emotional intelligence and health. *Journal of Personality and Individual Differences*, *49*, 554–564. http://dx.doi.org/10.1016/j.paid.2010.05.029

Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey, & D. Sluyter (Eds.), *Emotional development and emotional intelligence: Implications for educators* (pp. 3–31). New York: Basic Books.

Mayer, J. D., Salovey, P., & Caruso, D. R. (2008). Emotional intelligence: New ability or eclectic traits? *American Psychologist*, *63*, 503–517. http://dx.doi.org/10.1037/0003-066X.63.6.503

Mayer, J. D., Salovey, P., & Caruso, D. R. (2012). The validity of the MSCEIT: Additional analyses and evidence. *Emotion Review*, *4*, 403–408. http://dx.doi.org/10.1177/1754073912445815

Mestre, M. V., Frías, M. D., & Samper, P. (2004). La medida de la empatía: Análisis del Interpersonal Reactivity Index. *Psicothema*, *16*, 255–260.

Niven, K., Totterdell, P., & Holman, D. (2009). A classification of controlled interpersonal affect regulation strategies. *Emotion*, *9*, 498–509. http://dx.doi.org/10.1037/a0015962

Resurrección, D. M., Salguero, J. M., & Ruiz-Aranda, D. (2014). Emotional intelligence and psychological maladjustment in adolescence: A systematic review. *Journal of Adolescence*, *37*, 461–472. http://dx.doi.org/10.1016/j.adolescence.2014.03.012

Reynolds, C. R., & Kamphaus, R. W. (2004). *Behavior assessment system for children* (2nd ed.). Circle Pines, MN: American Guidance Service.

Rivers, S. E., Brackett, M. A., Reyes, M. R., Mayer, J. D., Caruso, D. R., & Salovey, P. (2012). Measuring emotional intelligence in early adolescence with the MSCEIT-YV: Psychometric properties and relationship with academic performance and psychosocial functioning. *Journal of Psychoeducational Assessment*, *30*, 344–366. http://dx.doi.org/10.1177/0734282912449443

Roberts, R. D., Zeidner, M., & Matthews, G. (2001). Does emotional intelligence meet traditional standards for an intelligence? Some new data and conclusions. *Emotion*, *1*, 196–231. http://dx.doi.org/10.1037//1528-3542.1.3.196

Ruiz-Aranda, D., Castillo, R., Salguero, J. M., Cabello, R., Fernández-Berrocal, P., & Balluerka, N. (2012). Short- and mid-term effects of emotional intelligence training on adolescent mental health. *Journal of Adolescent Health*, *51*, 462–467. http://dx.doi.org/10.1016/j.jadohealth.2012.02.003

Salguero, J. M., Fernández-Berrocal, P., Balluerka, N., & Aritzeta, A. (2010). Measuring perceived emotional intelligence in the adolescent population: Psychometric properties of the Trait Meta-Mood Scale. *Social Behavior and Personality: An International Journal*, *38*, 1197–1209. http://dx.doi.org/10.2224/sbp.2010.38.9.1197

Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality*, *9*, 185–211.

Schweizer, K. (2010). Some guidelines concerning the modeling of traits and abilities in test construction. *European Journal of Psychological Assessment*, *26*, 1–2. http://dx.doi.org/10.1027/1015-5759/a000001

Serrano, C., & Andreu, Y. (2016). Perceived emotional intelligence, subjective well-being, perceived stress, engagement and academic achievement of adolescents. *Revista de Psicodidáctica*, *21*, 357–374. http://dx.doi.org/10.1387/RevPsicodidact.14887

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, *9*, 69–74. http://dx.doi.org/10.1016/j.tics.2004.12.005

Van Rooy, D. L., Viswesvaran, C., & Pluta, P. (2005). A meta-analytic evaluation of construct validity: What is this thing called emotional intelligence? *Human Performance*, *18*, 445–462. http://dx.doi.org/10.1207/s15327043hup1804_9

Wechsler, D. (2003). *WISC-IV technical and interpretive manual*. San Antonio, TX: Psychological Corporation.

Wechsler, D. (2007). *Wechsler intelligence scale for children fourth edition (WISC-IV)*. Madrid, España: TEA Ediciones.