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# The impact of implicit theories on students' emotional outcomes

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**Abstract**
This study examined and compared the impact of implicit theories (IT) of emotional intelligence (EI) and intelligence on different students' emotional outcomes. Three hundred forty-three students in secondary school completed measures of IT (EI and intelligence), trait and ability EI, and emotions towards school across a two-wave study. In the first round of data collection, the students were between 14 and 18 years old ($M_{age}$ = 15.4; SD = .63); the majority were female (58.0%) and the largest group had a high socioprofessional status 35.8% (32.2% middle and 31.9% low status). The results showed that incremental IT of EI on the first year of secondary school had a positive impact on students' self-perceptions of emotional competence, positive emotions towards school and understanding of emotion performance in the following year. The IT of intelligence had an impact only on students' future emotional performance, underlining the domain-specificity of the constructs. These findings highlight the importance of addressing students' implicit theories in the academic context, due to their relevance in promoting students' positive emotional experiences, which can ultimately impact their academic adaptation and success.

**Keywords** Implicit theories · Intelligence · Emotional intelligence · Emotions towards school · Secondary school

## Introduction

The transition to secondary school can constitute a crucial and challenging developmental opportunity for students, while also providing multiple occasions for academic progress and personal and emotional growth (Somerville et al. 2010). The progressive autonomy and responsibility, diversity of social contexts, development of new roles within peers and family, and demanding academic period (Lerner and Steinberg 2009), all with progressive autonomy and independence from parents and teachers (Romero et al. 2014), can pose particular challenges for students. Therefore, how students adapt, cope effectively with their new tasks and roles, and move forward successfully throughout this period has gained increasing interest from researchers (Lerner et al. 2005).

Research has drawn attention to the particular emotional, motivational and contextual factors that are associated with or affect students' emotional well-being, adaptation and achievement. The literature in the field has highlighted that implicit theories (IT) can constitute an important factor because they can either reinforce or compromise students' emotional and academic outcomes (Romero et al. 2014). In general, incremental theorists' students have improved mental health, well-being and academic achievement (Dweck 2012). However, research addressing the predictive and discriminant validity of different IT in the academic context is still scarce. Therefore, this study intends to examine and compare the effect of two types of IT relevant to the academic context (IT of intelligence and IT of emotional intelligence) on students' emotional outcomes.

### Implicit theories

Implicit theories (IT) are a type of pre-existing framework that individuals hold about diverse personal attributes, such as intelligence, emotion, personality, relationships and health. Essentially, individuals hold beliefs about the extent to which these personal attributes are fixed (entity or static beliefs) or malleable (incremental beliefs or growth mindset; Dweck et al. 1995a). A vast body of literature in this field indicates that the type of IT that an individual hold maps his or her processing, understanding, and motivational and behavioural responses (Crum et al. 2013; Dweck et al. 1995a; Dweck et al. 1995b). "Entity theorists" believe that such attributes are fixed, hardly changeable and predetermined, while the "incremental theorists" tend to believe that those particular

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characteristics are flexible, malleable, and essentially mutable through processes of learning and training (Dweck et al. 1995a; Dweck and Leggett 1988). The literature has contributed to highlighting that holding incremental theories concerning domains such as relationships, leadership, and attributes such as intelligence or emotions tend to be associated and predict positive outcomes (Burnette et al. 2010; Cabello and Fernández-Berrocal 2015; Cobb et al. 2013; Costa and Faria 2018; Dweck 2012; Howell 2016).

Implicit theories of intelligence have been extensively researched. In the academic context, as a crucial domain of cognitive development and effective learning, the comprehension of the effect of students' types of beliefs about their intelligence marked the first studies of Carol Dweck, which were the first to debut implicit theories research (Dweck 1999). Two types of beliefs shape students' responses to tasks, challenges, setbacks, successes, failures, and, ultimately, learning and progress. Incremental theorists focus more on the learning process (Dweck and Leggett 1988), exhibit more confidence about their potential success and use mastery-oriented strategies to attain learning goals (Henderson and Dweck 1990; Robins and Pals 2002). Entity theorist students frequently present helpless-oriented strategies to achieve goals, avoid challenging tasks and are less confident in their potential success (Nussbaum and Dweck 2008; Thompson and Musket 2005). Moreover, the recent literature has shown that having an incremental theory of intelligence is associated with higher academic achievement (see reviews Burnette et al. 2013; Costa and Faria 2018; Sisk et al. 2018).

In the realm of implicit theories of emotion-related attributes, the literature has found that incremental theorists tend to report more positive emotions and social support, and to more frequently endorse mastery-oriented strategies (De Castella et al. 2013; Kappes and Schikowski 2013; Romero et al. 2014; Tamir et al. 2007). In a recent piece of research on implicit theories of emotional intelligence, Cabello and Fernández-Berrocal (2015) found that individuals with a dynamic theory of EI, meaning that they believe that this attribute can be improved, were more disposed to live emotional experiences and to learn about and use functional emotional strategies, which resulted in better EI performance.

Although related, implicit theories of different attributes act like distinct constructs and manifest domain specificity (Cabello and Fernández-Berrocal 2015; Dweck 1996, 1999; Dweck et al. 1995a; Romero et al. 2014). In a study comparing the effect of implicit theories of intelligence and emotion, the results indicated that individuals' academic outcomes were predicted by their IT of intelligence, whereas the emotional aspects (such as well-being and depressive symptoms) were predicted by their IT of emotions (Romero et al. 2014).

The literature has also investigated whether the impact of IT on different outcomes is affected by different moderators. In particular, gender has evidenced inconsistent results in the field of IT of intelligence: Recent meta-analyses have not found any moderation effect based on gender in the relationship between IT of intelligence and academic achievement (Costa and Faria 2018) or presented inconclusive results in the IT of intelligence's prediction of goal achievement (Burnette et al. 2013). However, in the literature, it is possible to find different studies providing evidence that females are more likely to have fixed IT of intelligence, than their male peers are (Dweck 1999; Pepi et al. 2006). In the emotional domain, the findings indicated that women tend to adopt more incremental theories of emotion and emotional intelligence (Cabello and Fernández-Berrocal 2015) than their male counterparts.

Moreover, the moderator effect of socioeconomic status on IT of intelligence has also been addressed in the literature. Research has highlighted that students from higher (and sometimes from medium) socioeconomic status evidence more dynamic theories of intelligence (Faria 1996). More recently, in a cross-national study in Chile, it was found that low-income students tended to have more entity beliefs about intelligence (Claro et al. 2016), and similar results were found for a national sample in the US (Destin et al. 2019). Nonetheless, the effect of socioeconomic status on IT of emotion-related attributes has not been addressed in the literature.

## Emotional outcomes in school

Students experience a variety of emotions in school, whether they are in class, taking tests or on the school playground with their peers (Goetz and Bieg 2016). Recent research has shown that emotions can affect several cognitive processes that contribute to students' learning and development: perception, attention, social judgement, cognitive problem-solving, decision-making, and memory processes (Clore and Huntsinger 2009; Loewenstein and Lerner 2003; Parrott and Spackman 2000). Moreover, emotions can influence students' engagement, which can, in turn, have an effect on learning and accomplishments (Linnenbrink 2007).

The studies of Pekrun and colleagues have contributed to clarifying the path between academic emotions, e.g., emotions that are related to achievement and learning, and achievement itself (Pekrun et al. 2011). In general, positive emotions usually improve the motivation to learn and the use of self-regulated learning, while negative emotions, at least in the long run, reduce motivation to learn and lead students to rely more on external guidance, and have more rigid learning strategies (Frenzel and Stephens 2013).

The progressive understanding of the impact of emotions in academic learning and achievement reinforces the idea that, not only are cognitive abilities important but also emotional, motivational and contextual factors are of substantial relevance, in promoting students'

adaptation and success. In this sense, the ability to control and regulate emotions in a beneficial way to improve learning and achievement is an increasingly important skill in the academic context (Goetz and Bieg 2016).

Within this framework, emotional intelligence (EI), as a multidimensional construct that is referred to when reporting the expression, recognition, use, understanding and management of either one's own emotions or those of others (Salovey and Mayer 1990), has gained prominence, based on the evidence that it supports students' cognitive and emotional development (Mavroveli and Sánchez-Ruiz 2011; Mestre et al. 2006). The most common theoretical perspectives consider EI an ability or set of skills (Mayer and Salovey 1997), that can be accessed via performance tests (Mayer et al. 2008), while others consider it a trait (Petrides et al. 2011), through which individuals' self-perceptions can be conveyed via self-report measures (Petrides and Furnham 2001). In the academic context, there is extensive research evidence that being emotionally intelligent is positively associated with students' motivation, stress regulation, self-discipline, higher academic goals, achievement and performance (Duckworth and Seligman 2005; Elliot and Dweck 2005), and positive social school relations (Brackett et al. 2011).

Although literature in the educational field has addressed the importance of students' implicit theories in the academic context, most of the previous research focused on the effect of implicit theories of intelligence and ability on motivational (self-regulation, achievement goals; Burnette et al. 2013; Henderson and Dweck 1990; Robins and Pals 2002) and achievement indicators (academic performance; Burnette et al. 2013; Costa and Faria 2018; Sisk et al. 2018).

Also to date limited research has analysed and compared the impact of different implicit theories. In fact, few studies have conducted comparative analysis focused in deepening the predictive validity of IT: Spinath et al. (2003) analysed the effect of IT of intelligence, personality and specific abilities (sports and maths) on actual personality and intelligence; Tamir et al. (2007) compared the IT of emotion and intelligence on social outcomes; Cabello and Fernández-Berrocal (2015), more recently, explored the effect of IT of EI and emotions on individuals' EI performance.

Furthermore, except for the studies of Tamir et al. (2007) and Cabello and Fernández-Berrocal (2015) on emotion regulation self-efficacy, emotional intensity and EI performance, less is known about the influence of implicit theories on emotional outcomes.

Therefore, this study intends to extend work on the field by examining: What is the impact of Implicit theories of intelligence and of emotional intelligence on students' emotional outcomes?

### The current study

The present study joined together two sets of implicit theories, relevant to the academic context, contributing to exploring their discriminant and predictive validity on different students' emotional outcomes. Due to implicit theories' domain-specificity on different outcomes, and considering that the secondary school cycle represents an important transitional stage for students both academically and emotionally, the present study will explore the impact of students' implicit theories of intelligence (ITI) and of emotional intelligence (ITEI), in the first year of this cycle, on their different emotional outcomes, in the following year.

Bearing in mind that students' emotional experiences are of particular relevance in the attainment of positive academic endeavours and developmental outcomes, in this study, different emotional indicators, such as self-perception (trait EI and positive and negative emotions towards school) and objective performance (ability EI), were included based on their relevance for students' well-being, adaptation and achievement. To attain this goal, specific objectives were outlined (cf. Figure 1): a) to explore whether and how ITEI and ITI on the first year of secondary school predict students' emotional self-perceptions (trait EI and emotions towards school) and performance (ability EI), in the following year; b) to examine the possible domain-specificity effect of ITEI on trait and ability EI; c) to explore whereas students' gender and socioprofessional status act as moderators on the impact of ITEI and ITI on students' emotional outcomes in the following year (second year).

## Method

### Participants

A total of 343 students from the Portuguese secondary school cycle participated in the two phases of data collection. Students were surveyed, across two time points, 1 year apart. In the first round of data collection, the participants were between 14 and 18 years old ($M_{age}$ = 15.4; SD = .63), and the majority of the sample were female students (58.0%). The students attended different academic courses (71.4% in science and technology, 19.2% in languages and humanities and 9.3% in other courses) and the largest group had a high socioprofessional status[1] (35.8% high, 32.2% middle, and 31.9% low status).

[1] Students' socioprofessional status was determined using the highest level of their parents or legal guardians' professional occupations, ranging from 1 (low) to 3 (high socioprofessional status).

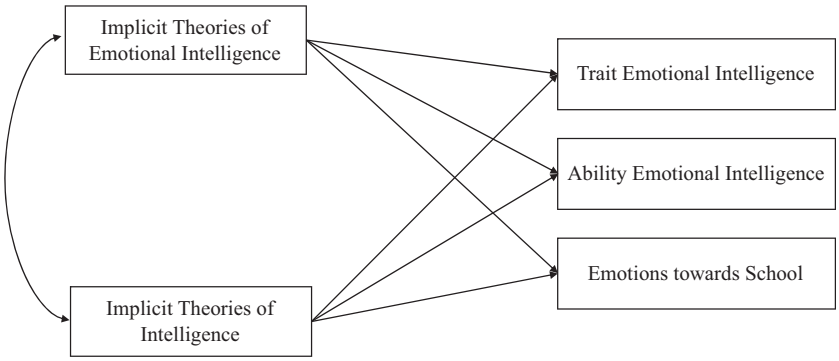


**Fig. 1** The model representing the interrelationship of the variables in the study

## Measures

### Implicit theories measures

The *Implicit Theories of Intelligence Scale* (ITIS) was based on an adaptation of the Personal Conceptions of Intelligence Scale developed by Faria (2006) to the Portuguese context; the ITIS assesses students' implicit theories or beliefs about the malleability of intelligence. ITIS comprises 12 items: six incremental (e.g., *"Whenever I learn new things my intelligence increases"*) and six entity (e.g., *"Personally I don't think I can do much to increase my intelligence"*), rated on a 6-point Likert-type scale, from 1 (*strongly agree*) to 6 (*strongly disagree*). Dynamic items were reverse-scored so that the total score of the scale indicated a measure of students' dynamic perceptions. In this study, ITIS presented very good internal consistency (total scale, $\alpha = .88$; incremental ($\alpha = .82$) and entity dimensions ($\alpha = .84$)).

The *Implicit Theories of Emotional Intelligence Scale* (ITEIS) assesses students' implicit theories about the malleability of emotional intelligence and was developed and adapted to the Portuguese context by Costa and Faria (2020), based on Dweck's conceptualization of implicit theories of intelligence (Dweck 1999). In the original study, the instrument provided very good psychometric validity, confirming a two-factor structure (Costa and Faria 2020). The ITEIS comprises 12 items: six incremental (e.g., *"Every time I learn with new experiences my emotional intelligence increases"*) and six entity (e.g., *"My emotional intelligence is something about me that I personally can't change very much"*) rated on a 6-point Likert-type scale, ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). The incremental items were reverse-scored so that the average score indicated a measure of students' incremental perceptions. In this study, the ITEIS total scale ($\alpha = .89$), incremental ($\alpha = .81$) and entity ($\alpha = .86$) dimensions presented very good internal consistency.

### Emotional intelligence measures

The *Emotional Skills and Competence Questionnaire* (ESCQ) is a 42-item self-report measure of EI, based on Mayer and Salovey's (1997) framework, which has three dimensions: Perceive and Understand Emotion (14 items—*"When I see how someone feels, I usually know what has happened to him")*, Express and Label Emotion (14 items—*"I am able to express my emotions well"*), and Manage and Regulate Emotion (14 items—*"When I am in a good mood, every problem seems soluble"*). This scale was originally developed in the Croatian setting by Takšić et al. (2009), yet it has been rapidly adapted to different cultural contexts (Faria et al. 2006; Takšić et al. 2009), providing good psychometric properties: confirming the three-factor underlying structure, indicating adequate reliability (from .72 to .92) and moderate correlations among the subscales (from .49 and .54; Faria et al. 2006; Takšić et al. 2009), and presenting good fit indices (Stocker and Faria 2012).

The *Vocabulary of Emotions Test* (VET) is a 35-item performance measure of EI, based on the third dimension of EI's ability model - Understand Emotion. The test assesses students' emotional knowledge, through a vocabulary of emotions test. Developed by Takšic et al. (2003) for the secondary school cycle in Croatia, this test has the same format as any other classic vocabulary test, yet the items refer to emotionally saturated target words. The task proposed in the test requests that the subjects choose an adjective (from six options presented; e.g., sad, lonely, angry, merry, satisfied, or nothing listed) that has the closest meaning to the target word (emotion; e.g., Happy). The test has a correct answer based on the dictionary. The study of adaptation presented sound psychometric properties: strong associations with other intelligence tests and 44% of the specific predictive power over intelligence tests (Takšic and Mohoric 2008); strong correlations with other EI tests (analysis of emotions test); and good reliability ($\alpha = .90$; Takšic and Mohoric 2008). In the study of its adaptation to the Portuguese context, the VET provided adequate psychometric properties: item difficulty ($M = .55$;

*SD* = .22), a reliability above .71, and differential validity for gender and the cultural context (Costa et al. 2011).

### Student's emotions towards school

*Student's Emotions towards School* is a self-report measure based on the Pekrun and colleagues' Academic Emotions Questionnaire (Pekrun et al. 2011). The scale assesses students' emotions towards school, and comprises two dimensions based on the valence of the emotions: positive emotions towards school (PE; 4 items; e.g., "*I feel happy"; "I feel proud"*) and negative emotions towards school (NE; 5 items; e.g., *"I feel bored"; "I feel ashamed"*), assessed by a 6-point frequency response scale (from 1 = *never* to 6 = *always*). In this study, the scales had a satisfactory internal consistency ($\alpha$ from .65(NE) to .73(PE)).

## Procedure

Participants, individually, filled out the measures in rounds of collective administration in the classrooms, in the presence of the researcher and the class teacher. The participants were informed about the nature of the study and that the participation was entirely voluntary and confidential. They were also informed that the non-participation did not entail any type of consequence. The majority of the participants were underage, so only students with the informed consent of their parents or legal guardians were integrated in the study. This study was approved by the Portuguese National Data Protection Commission, Directorate-General for Education and Faculty's Ethics Committee.

## Data analyses

Path analysis was used to explore whether IT of intelligence and emotional intelligence predicted students' EI self-perceptions of competence and performance and emotions towards school. The path analysis model was conducted using AMOS 25.0 software and tested using maximum likelihood estimation, given the method's robustness to normality deviations. To assess goodness-of-fit indices, chi-square ($\chi 2$) statistics, confirmatory factor index (CFI), goodness of fit (GFI), a Tucker-Lewis Index (TLI) of .95 or more, and a root mean square error of approximation (RMSEA; and 90% confidence interval) of 0.08 or less were considered (Hu and Bentler 1999).

To confirm the existence of a moderator effect of students' gender and socioprofessional status (low, medium and high) on the variables' interrelationship, multigroup moderation analyses were conducted. If the chi-square differences obtained between the model comparison of free structural paths and the model with structural paths (structural paths constrained to be equal across groups) were significant, then the model differed across the evaluated groups. Subsequently, to check for the specific differences among the parameters and reduce the probability of error type I, critical ratios of differences (CRD) were considered (Arbuckle 2007).

# Results

## Descriptive analyses

Table 1 displays the descriptive statistics (means, standard deviations) and correlation matrix of the variables in this study. The implicit theories (ITEI and ITI) presented positive significant correlations with trait EI but not with ability EI variable. The students' self-perceptions were positively correlated with each other, with the exception of the negative emotions towards school, with which the self-perceptions displayed negative correlations. The performance measure of EI, the VET, was not associated with any other variable.

## Path analysis

The present study hypothesized that students' IT (of emotional intelligence and of intelligence) have an impact on students' emotional outcomes (EI self-perceptions and performance, and emotions towards school). Therefore, a model in which the ITEI and ITI predicted the ability (VET) and trait EI components (emotional expression (EE), perceive and understand emotion (PUE) and manage and regulate emotion (MRE)), and the emotions towards school (positive emotions (PE) and negative emotions (NE)) was estimated using a path analysis procedure.

The first path model, although revealing not very unsatisfactory fit indices ($X^2$ (9, $N$ = 343) = 28.349, $p$ < .001; CFI = .943, NFI = .923, GFI = .980, RMSEA = .079), had several non-significant paths. The second model excluded the non-significant paths between the students' ITI and trait EI and emotions towards school. The subsequent model provided an improvement in the model fit indices ($X^2$ (11, N = 343) = 16.765, $p$ = .115; CFI = .983, NFI = .954, GFI = .988, RMSEA = .039).

In this study, the ITEI positively predicted students' EI perceptions of competence (PUE, EE, MRE; cf. Figure 2), performance (VET), and positive emotions towards school (PE) and, negatively, predicted the negative emotions (NE) students displayed towards school, in the second phase of the study. Students' ITI had their predictive power for students' emotional performance (VET), with a negative and lower magnitude ($\beta$ = −.13, $p$ = .02).

**Table 1** Descriptive statistics and correlation coefficients for the studied variables

| Variables | *M(SD)* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1. ITEI | 55.34 (9.19) | 1 | | | | | | | |
| 2. ITI | 57.70 (8.60) | .30** | 1 | | | | | | |
| 3. EE (trait EI) | 57.68 (11.42) | .20** | .15** | 1 | | | | | |
| 4. PUE (trait EI) | 62.74 (8.58) | .14** | .14* | .23** | 1 | | | | |
| 5. MRE (trait EI) | 63.84 (8.19) | .21** | .20** | .44** | .38** | 1 | | | |
| 6. VET (ability EI) | 23.14 (4.02) | .08 | −.10 | .02 | .01 | .07 | 1 | | |
| 7. PE | 14.69 (3.28) | .14* | .16** | .13* | .01 | .29** | .01 | 1 | |
| 8. NE | 17.37 (3.92) | −.22** | −.14** | −.28** | .02 | −36** | −.09 | −.44** | 1 |

Note. ITEI=Implicit Theories of Emotional Intelligence; ITI=Implicit Theories of Intelligence; EE = Emotional Expression; PUE = Perceive and Understand Emotion; MRE = Manage and Regulate Emotion; VET = Vocabulary of Emotions Test; PE = Positive Emotions towards School; NE = Negative Emotions towards School; $N = 343$

**$p < .001$; *$p < .05$

## Multigroup moderation analysis

### Gender

To explore whether the previously defined model differed across students' gender, multigroup moderation analyses were conducted. First, the defined model (cf. Figure 2) was established for gender groups (CFI = .985, NFI = .930, GFI = .981, RMSEA = .026, $X^2$ (22, $N$ = 199) = 27.098, $p$ = .208) and achieved adequate fit indices. Afterwards, the multigroup gender moderation analysis suggested that the model did not differ across gender, since the chi-square differences between the unconstrained and the constrained model were non-significant ($\Delta X^2$ (7, N = 199) = 10.810, $p$ = .147).

### Socioprofessional status

The previously defined model of implicit theories and EI (cf. Figure 2) estimated through the socioprofessional status groups (low, medium and high) obtained satisfactory fit (CFI = .977, NFI = .912, GFI = .970, RMSEA = .029, $X^2$ (33, $N$ = 106) = 42.053, $p$ = .134). The significant chi-square differences across the models (unconstrained vs. constrained), $\Delta X^2$ (14, N = 106) = 28.473, $p$ = .012, indicated that the model diverged when considering students' socioprofessional status.

Subsequently, CRD analysis was conducted, and the structural paths from the ITEI to students' emotions towards school were identified to be significantly different across socioprofessional status groups. Although for students with a low socioprofessional status, their ITEI influenced their positive

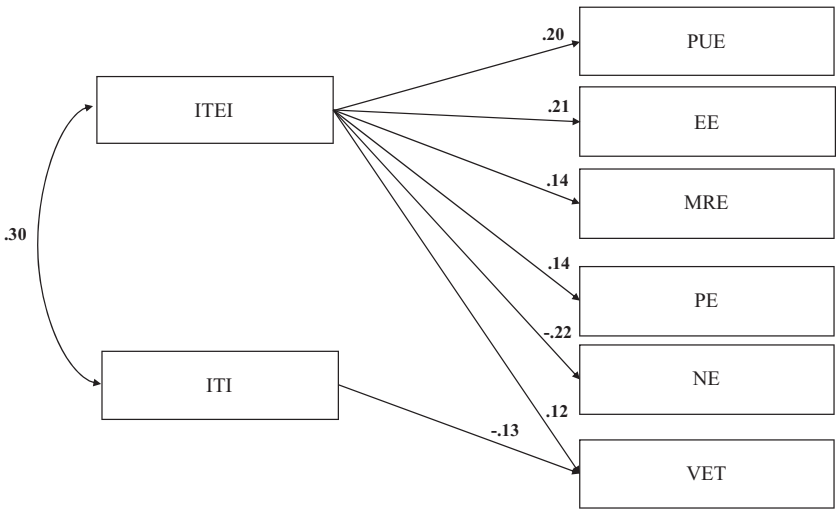


**Fig. 2** Path model depicting the prediction of the ITEI and ITI on students' EI (trait and ability) and emotions (positive and negative) towards school. Note. ITEI=Implicit Theories of Emotional Intelligence; ITI=Implicit Theories of Intelligence; PUE = Perceive and Understand Emotion; EE = Emotional Expression; MRE = Manage and Regulate Emotion; PE = Positive Emotions towards School; NE = Negative Emotions towards School; VET = Vocabulary of Emotions Test

emotions towards school in the next year ($\beta = .13$, $p < .001$), the same path was not significant for those with a medium socioprofessional status. Additionally, the ITEI of students with a high socioprofessional status had a negative impact on their future negative emotions towards school ($\beta = -.14$, $p < .001$), and again, this trajectory was not confirmed for the students with a medium socioprofessional status.

## Discussion

The goals of the present study were to address the lack of comparative studies on the field of IT and to add evidence to their predictive validity in the secondary school context. Specifically, this study examined whether IT of intelligence and IT of EI predicted students' positive emotional outcomes.

In general, the present study found that students' IT of intelligence and emotional intelligence had an impact on their future emotional experiences in the academic context, e.g., their emotions, perceptions of emotional competence or actual performance. In particular, the results highlighted that IT presented a weak to moderate effect on students' emotional outcomes. The literature has supported the importance of IT, since self-beliefs can both directly and indirectly affect different outcomes (Burnette et al. 2013; Cabello and Fernández-Berrocal 2015; De Castella et al. 2013).

Moreover, the two types of IT independently predicted the different outcomes explored in this study, which argues for the discriminant validity of the constructs. Consistent with the literature (Cabello and Fernández-Berrocal 2015; Romero et al. 2014), although related at a moderate level ($r = .30$), the IT of intelligence and the IT of emotional intelligence had distinct contributions to students' emotional self-perceptions and performance indicators.

Furthermore, the prediction results also evidenced the domain-specificity of the IT constructs (Cabello and Fernández-Berrocal 2015; Dweck 1996, 1999; Dweck et al. 1995a; Romero et al. 2014). In fact, the IT of emotional intelligence predicted more emotional outcomes than the IT of intelligence, in terms of both quantity and magnitude. The students' self-beliefs about the possibility of developing their emotional intelligence positively predicted their perceptions of emotional competence in what concerns the expression, perception, understanding and management of emotions, as well as their positive emotions towards school in the future and their understanding of emotions' objective performance.

Students' emotional expression, perception and understanding of emotion in themselves and others can also be particularly affected by a more dynamic perspective of emotional intelligence, perhaps due to students' beliefs that engaging in different emotional experiences supports their process of learning in this domain. Over time, these students are likely to adopt functional emotional strategies and evolve, even in demanding conditions, which will increase their sense of competence or self-efficacy in emotion-related domains (Cabello and Fernández-Berrocal 2015).

Additionally, the IT of emotional intelligence established a higher prediction ability for negative emotions towards school ($\beta = -.22$). This result can underline the tendency that believing that we can learn from the emotional experiences and that our emotional competence changes over time can minimize the negative emotions that arise in the academic context in the future, because those negative emotional states are perceived as being neither definitive nor static, and as being susceptible to being overcome through functional emotional strategies. Additionally, this result can highlight that incremental implicit theories of EI are perhaps more important in minimizing future negative emotions towards school than in promoting positive emotions.

In general, the students' IT of emotional intelligence influenced their self-perceptions outcomes more than their ability to understand emotion. It was expected that under the realm of subjective indicators, influenced by trait features, IT would be more associated with and would predict, at a higher magnitude, other self-perceptions such as emotions or self-perceptions of emotional competence. Although existent, the lower magnitude of the effect of IT of emotional intelligence on the ability measure may be related to the fact that students' objective performance is influenced, especially during an important academic cycle, by many other motivational, emotional and cognitive factors.

The students' IT of intelligence presented a distinct effect in the analysed emotional outcomes. In fact, the IT of intelligence only predicted students' understanding of emotion ability in the following year. On the one hand, the students' beliefs about the possibility of increasing their level of intelligence did not affect their emotional self-perceptions, perhaps because students tend to interpret intelligence as a specific domain comprising cognitive functions, independent of their emotional experiences. On the other hand, the fact that IT of intelligence was revealed to have an influence on the actual EI performance might be explained by the measure used to assess understanding of emotion, which resembles academic tasks and tests, whether by the type of exercise proposed or by the vocabulary content, and which are commonly developed in the academic context.

Another result that should be highlighted is that the IT of intelligence negatively affected students' emotional performance; that is to say, having a less-dynamic perspective about intelligence favours students' ability to understand emotion. In the literature, some evidence has been found that the entity perspective of intelligence can also be positively related with better achievement (Costa and Faria 2018). In the present study, a similar tendency indicates that endorsing more fixed perspectives about intelligence, valuing performance goals and presenting strategies accordingly to achieve them can lead

to positive outcomes. Complex and competitive contexts like secondary school, where the demands to present objective indicators and performance are promoted and prioritized, could perhaps drive students' specific self-beliefs more towards entity perspectives of intelligence.

Nonetheless, the literature has evidenced that emotion and emotional-related constructs are modulated by social and cultural norms (Matsumoto 1989, 1993). In this study, it also should be acknowledged that the effects verified on the emotional outcomes are grounded in a specific cultural and academic environment, which can potentially have different implications on other cultural contexts.

The possible moderator effect of students' gender on the impact of IT in their emotional experiences was verified and found to be invariant. In the literature, differences in IT have been established according to gender, though inconsistently (Cabello and Fernández-Berrocal 2015; Dweck 1999; Pepi et al. 2006). In the present study with the secondary school population, the boys' and girls' specific self-beliefs about intelligence and emotional intelligence had a similar impact on their emotional indicators.

Nonetheless, when establishing the same model across students' socioprofessional status, differences were found specifically for the impact of IT of emotional intelligence. In particular, it was found that IT of emotional intelligence influenced the positive emotions that students from lower economic backgrounds have. This result highlighted that students from lower socioeconomic levels could benefit more than their counterparts of the belief that emotional intelligence can be improved, especially in terms of the way they will feel when in school. Perhaps their peers from higher economic levels have contextual alternative sources of support, or external motivation, to rely less on their self-beliefs to endorse positive emotions towards school. Additionally, for students from higher economic backgrounds, the fact that they had incremental perspectives of EI protected them from having negative emotions towards school, compared to their peers with lower socioprofessional status.

Some limitations should be acknowledged in this study. First, the impact of implicit theories was explored based on a two-wave design study within a one-year period. Further research should include more time points throughout the secondary academic cycle to better clarify the trajectory of these variables. Second, this study explored only students' emotional indicators, yet the use of academic outcomes (e.g., students' academic achievement, attendance rate, failure records, participation in class and activities) would contribute to exploring the domain-specificity of IT predictive validity. Additionally, since emotion and emotion competencies and perceptions are fairly shaped by cultural mechanisms, future cross-cultural research should contribute to extend the knowledge concerning possible cultural differences in the impact of students' implicit theories on emotional outcomes. Moreover, further research should continue to explore the effect of important moderators (e.g., gender, socioeconomic status, age, parents' IT) on the impact of IT and to extend work in this field.

## Conclusions

In general, this research confirmed that incremental IT of EI and, to a lesser extent, of intelligence, have a significant impact on students' emotional experiences. Moreover, in this study, the IT of EI showed higher predictive validity of the students' emotional perceptions and performance of emotion tasks, confirming the domain specificity of the IT.

These findings suggest important implications for educational settings. Due to their particular relevance to student motivation in the academic context and based on the direct and indirect impact on emotional and academic outcomes, schools should employ all available resources to address and promote students' IT. The exploration of students' self-beliefs about different aspects of school and learning should be considered by all the educational agents and included and promoted in the classroom, curricula, target interventions, and other informal contexts. This study contributed to extending knowledge in the field by examining and comparing the predictive validity of IT of intelligence and of EI, two sets of self-beliefs that are relevant to the secondary academic context, for students' emotional outcomes, which the literature has pointed out as being of crucial importance to students' adaptation, emotional well-being and academic achievement.

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### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

## References

Arbuckle, J. L. (2007). *AMOS 17.0 update to the AMOS user's guide*. Chicago, IL: Smallwaters.

Brackett, M. A., Rivers, S. E., & Salovey, P. (2011). Emotional intelligence: Implications for personal, social, academic, and workplace success. *Social and Personality Psychology Compass, 5*, 88–103. https://doi.org/10.1111/j.1751-9004.2010.00334.x.

Burnette, J. L., Pollack, J. M., & Hoyt, C. L. (2010). Individual differences in implicit theories of leadership ability and expectations: Predicting responses to stereotype threat. *Journal of Leadership Studies, 3*, 46–56. https://doi.org/10.1002/jls.20138.

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit

theories and self-regulation. *Psychological Bulletin, 139*, 655–701. https://doi.org/10.1037/a0029531.

Cabello, R., & Fernández-Berrocal, P. (2015). Implicit theories and ability emotional intelligence. *Frontiers in Psychology, 6*(700), 1–8. https://doi.org/10.3389/fpsyg.2015.00700.

Claro, S., Paunesku, D., & Dweck, C. S. (2016). Growth mindset tempers the effects of poverty on academic achievement. *Proceedings of the National Academy of Sciences of the United States of America, 113*, 8664-8668. https://doi.org/10.1073/pnas.1608207113.

Clore, G. L., & Huntsinger, J. R. (2009). How the object of affect guides its impact. *Emotion Review, 1*, 39–54. https://doi.org/10.1177/1754073908097185.

Cobb, R. A., DeWall, C. N., Lambert, N. M., & Fincham, F. D. (2013). Implicit theories of relationships and close relationship violence: Does believing your relationship can grow relate to lower perpetration of violence? *Personality and Social Psychology Bulletin, 39*, 279–290. https://doi.org/10.1177/0146167212473159.

Costa, A., & Faria, L. (2018). Implicit theories of intelligence and academic achievement: A meta-analytic review. *Frontiers in Psychology, 9*, 829. https://doi.org/10.3389/fpsyg.2018.00829.

Costa, A., & Faria, L. (2020). Development and validation of the implicit theories of emotional intelligence scale (ITEI) in academic context. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica, 54*(*1*), 57–68. https://doi.org/10.21865/RIDEP54.1.05.

Costa, A., Faria, L., & Takšic, V. (2011). Vocabulary of emotions test (VET): A cross-cultural validation in Portuguese and Croatian contexts. *Psychological Topics, 21*(3), 413–424.

Crum, A. J., Salovey, P., & Achor, S. (2013). Rethinking stress: The role of mindsets in determining the stress response. *Journal of Personality and Social Psychology, 104*(4), 716–733. https://doi.org/10.1037/a0031201.

De Castella, K., Goldin, P., Jazaieri, H., Ziv, M., Dweck, C. S., & Gross, J. J. (2013). Beliefs about emotion: Links to emotion regulation, well-being, and psychological distress. *Basic and Applied Social Psychology, 35*, 497–505. https://doi.org/10.1080/01973533.2013.840632.

Destin, M., Hanselman, P., Buontempo, J., Tipton, E., & Yeager, D. S. (2019). Do student mindsets differ by socioeconomic status and explain disparities in academic achievement in the United States? *Aera Open, 5*(3), 233285841985770. https://doi.org/10.1177/2332858419857706.

Duckworth, A. L., & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science, 16*(12), 939–944. https://doi.org/10.1111/j.1467-9280.2005.01641.x.

Dweck, C. S. (1996). Implicit theories as organizers of goals and behavior. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 69–90). New York: Guilford Press.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development*. Philadelphia, PA: Psychology Press.

Dweck, C. S. (2012). Implicit theories. In P. Van Lange, A. Kruglanski, & T. Higgins (Eds.), *The handbook of theories of social psychology* (pp. 43–62). London: SAGE Publications Ltd..

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256–273. https://doi.org/10.1037/0033-295X.95.2.256.

Dweck, C. S., Chiu, C. Y., & Hong, Y. Y. (1995a). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry, 6*(4), 267–285. https://doi.org/10.1207/s15327965pli0604_1.

Dweck, C. S., Chiu, C. Y., & Hong, Y. Y. (1995b). Implicit theories: Elaboration and extension of the model. *Psychological Inquiry, 6*(4), 322–333. https://doi.org/10.1207/s15327965pli0604_12.

Elliot, A. J., & Dweck, C. S. (2005). Competence and motivation: Competence as the core of achievement motivation. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 3–12). New York: The Guilford Press.

Faria, L. (1996). Desenvolvimento intra-individual das concepções pessoais de inteligência durante a adolescência [Intraindividual development of personal conceptions of intelligence during adolescence]. *Revista Portuguesa de Pedagogia, XXX*(1), 17–33.

Faria, L. (2006). Escala de Concepções Pessoais de Inteligência (E.C.P.I.) [personal conceptions of intelligence scale]. In M. M. Gonçalves, M. R. Simões, L. S. Almeida, & C. Machado (Eds.), *Avaliação psicológica – Instrumentos validados para a população portuguesa - Volume I*. [psychological assessement - instruments validated to the Portuguese population - volume 1]. Coimbra: Quarteto Editora.

Faria, L., Lima Santos, N., Takšić, V., Raty, H., Molander, B., Holmström, S. ... & Toyota, H. (2006). Cross-cultural validation of the emotional skills and competence questionnaire (ESCQ). Psicologia*, 2,* 95–127.

Frenzel, A. C., & Stephens, E. J. (2013). Emotions. In N. C. Hall & T. Goetz (Eds.), *Emotion, motivation, and self-regulation: A handbook for teachers* (pp. 1–56). Bingley, UK: Emerald.

Goetz T., & Bieg M. (2016) Academic emotions and their regulation via emotional intelligence. In a. Lipnevich, F. Preckel, R. Roberts (Eds), *Psychosocial skills and school systems in the 21st century. The Springer series on human exceptionality.* (pp. 279-298). Switzerland: Springer, Cham.

Henderson, V., & Dweck, C. (1990). Adolescence and achievement. In S. Feldman & G. Elliott (Eds.), *At the threshold: Adolescent development* (pp. 308–329). Cambridge, MA: Harvard University Press.

Howell, A. J. (2016). Implicit theories of personal and social attributes: Fundamental mindsets for a science of wellbeing. *International Journal of Wellbeing, 6*, 113–130. https://doi.org/10.5502/ijw.v6i3.529.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structure Equation Modeling, 6*, 1–55. https://doi.org/10.1080/10705519909540118.

Kappes, A., & Schikowski, A. (2013). Implicit theories of emotion shape regulation of negative affect. *Cognition and Emotion, 27*(3), 1–9. https://doi.org/10.1080/02699931.2012.753415.

Lerner, R. M., & Steinberg, L. (2009). *Handbook of adolescent psychology* (3rd ed.). Hoboken, NJ: Wiley. https://doi.org/10.1002/9780470479193.

Lerner, R. M., Almerigi, J. B., Theokas, C., & Lerner, J. V. (2005). Positive youth development: A view of the issues. *Journal of Early Adolescence, 25*, 10–16. https://doi.org/10.1177/0272431604273211.

Linnenbrink, E. A. (2007). The role of affect in student learning: A multidimensional approach to considering the interaction of affect, motivation, and engagement. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 107–124). San Diego, CA: Academic Press.

Loewenstein, G., & Lerner, J. S. (2003). The role of affect in decision making. In R. J. Davidson, K. R. Scherer, & H. Hill Goldsmith (Eds.), *Handbook of affective sciences* (pp. 619–642). Oxford, UK: Oxford University Press.

Matsumoto, D. (1989). Cultural influences on the perception of emotion. *Journal of Cross-Cultural Psychology, 20*, 92–105. https://doi.org/10.1177/0022022189201006.

Matsumoto, D. (1993). Ethnic differences in affect intensity, emotion judgments, display rule attitudes, and self-reported emotional expression in an American sample. *Motivation and Emotion, 17*, 107–123.

Mavroveli, S., & Sánchez-Ruiz, M. J. (2011). Trait emotional intelligence influences on academic achievement and school behaviour. *British Journal of Educational Psychology, 81*(1), 112–134. https://doi.org/10.1348/2044-8279.002009.

Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter (Eds.), *Emotional development and emotional intelligence: Educational applications* (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. https://doi.org/10.1037/0003-055x.63.6.503.

Mestre, J., Guil, R., Lopes, P., Salovey, P., & Gil-Olarte, P. (2006). Emotional intelligence and social and academic adaptation to school. *Psicothema, 18*(1), 112–117.

Nussbaum, A. D., & Dweck, C. S. (2008). Defensiveness versus remediation: Self-theories and modes of self-esteem maintenance. *Personality and Social Psychology Bulletin, 34*, 500–612. https://doi.org/10.1177/0146167207312960.

Parrott, W. G., & Spackman, M. P. (2000). Emotion and memory. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (2nd ed., pp. 476–490). New York: Guilford Press.

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The achievement emotions questionnaire (AEQ). *Contemporary Educational Psychology, 36*, 36–48. https://doi.org/10.1016/j.cedpsych.2010.10.002.

Pepi, A., Faria, L., & Alesi, M. (2006). Personal conceptions of intelligence, self-esteem, and school achievement in Italian and Portuguese students. *Adolescence, 41*, 615–631.

Petrides, K. V., & Furnham, A. (2001). Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. *European Journal of Personality, 15*, 425–448. https://doi.org/10.1002/per.416.

Petrides, K. V., Vernon, P. A., Schermer, J., & Veselka, L. (2011). Trait emotional intelligence and the dark triad traits of personality. *Twin Research and Human Genetics, 14*, 35–41. https://doi.org/10.1375/twin.14.1.35.

Robins, R. W., & Pals, J. L. (2002). Implicit self-theories in the academic domain: Implications for goal orientation, attributions, affect, and self-esteem change. *Self-Identity, 1*, 313–336. https://doi.org/10.1080/15298860290106805.

Romero, C., Master, A., Paunesku, D., Dweck, C. S., & Gross, J. (2014). Academic and emotional functioning in middle school: The role of implicit theories. *Emotion, 14*, 227–234. https://doi.org/10.1037/a0035490.

Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality, 9*, 185–211. https://doi.org/10.2190/DUGG-P24E-52WK-6CDG.

Sisk, V. F., Burgoyne, A. P., Sun, J., Butler, J. L., & Macnamara, B. N. (2018). To what extent and under which circumstances are growth mind-sets important to academic achievement? Two meta-analyses. *Psychological Science, 29*(4), 549–571. https://doi.org/10.1177/0956797617739704.

Somerville, L. H., Jones, R. M., & Casey, B. J. (2010). A time of change: Behavioral and neural correlates of adolescent sensitivity to appetitive and aversive environmental cues. *Brain and Cognition, 72*, 124–133. https://doi.org/10.1016/j.bandc.2009.07.003.

Spinath, B., Spinath, F. M., Riemann, R., & Angleitner, A. (2003). Implicit theories about personality and intelligence and their relationship to actual personality and intelligence. *Personality and Individual Differences, 35*, 939–951. https://doi.org/10.1016/S0191-8869(02)00310-0.

Stocker, J., & Faria, L. (2012). Competência percebida no Ensino Secundário: Do conceito à avaliação através de um questionário compósito. [competence in secondary school: From conceptualization to assessment through a composite questionnaire]. *Psicologia, 21*(2), 113–140.

Takšic, V., & Mohoric, T. (2008). *Vocabulary of Emotion Test (VET): Ability measure of emotional intelligence.* Paper presented at the XXIX international congress of psychology, Berlin/Germany.

Takšic, V., Herambasic, D., & Velemir, B. (2003). *Vocabulary of Emotion Test (VET 35)*. Rijeka: Authors' edition.

Takšić, V., Mohorić, T., & Duran, M. (2009). Emotional skills and competence questionnaire (ESCQ) as a self-report measure of emotional intelligence. *Horizons of Psychology, 18*, 7–21.

Tamir, M., John, O. P., Srivastava, S., & Gross, J. J. (2007). Implicit theories of emotion: Affective and social outcomes across a major life transition. *Journal of Personality and Social Psychology, 92*, 731–744. https://doi.org/10.1037/0022-3514.92.4.731.

Thompson, T., & Musket, S. (2005). Does priming for mastery goals improve the performance of students with an entity view of ability? *British Journal of Educational Psychology, 75*, 391–409. https://doi.org/10.1348/000709904X22700.