Emotional intelligence throughout secondary school: A longitudinal study comparing performance and self-report measures

Abstract

Emotional intelligence (EI) has emerged as an important factor in an adolescent's school success. This study examines the developmental trajectories of EI in a Portuguese secondary school, comparing an EI performance measure with an EI self-report measure. Within a 3-wave longitudinal design, 395 students (M_{age} = 15.4; *SD* = 0.74) completed both the *Emotional Skills and Competence Questionnaire* (ESCQ) and the *Vocabulary of Emotions Test* (VET)*. Results revealed that EI exhibited different developmental trajectories during late adolescence according to the type of measure used: while students' VET levels evidenced an increase during secondary school, the ESCQ levels kept stable during this period. Moreover, students' verbal ability, gender and type of school (public vs. private) had no significant effect on their rate of EI change, whereas students from lower socio-cultural and professional status backgrounds had higher rates of growth compared to higher status adolescents.

1. Introduction

The transition to adolescence is recognised, both scientifically and tacitly, as a time of considerable biological, psychological and social-cognitive changes, during which individuals expand their social contexts, develop new roles within peer and family contexts and search to define their identity (Lerner & Steinberg, 2009). Adolescence constitutes a challenging developmental period, as well as a very stressful and demanding one (Somerville, Jones, & Casey, 2010), requiring overwhelming efforts. Researchers recently have become eager to explore the factors that allow adolescents to adapt and to cope effectively with their demanding new tasks, and move forward successfully in the developmental process (Lerner, Almerigi, Theokas, & Lerner, 2005).

Emotional intelligence (EI) as a new influential field has gained relevance in the explanation of adolescents' well-being and adaptation (Van der Zee, Thijs, & Schakel, 2002). A large number of studies have recognised the importance of EI in several

individual's outcomes and achievement results (Brackett, Rivers, & Salovey, 2011). Emotional intelligence can play a crucial role in mental and physical health (Schutte, Malouff, Thorsteinsson, Bhullar, & Rooke, 2007); work and academic performance (Van Rooy & Viswesvaran, 2004); and quality of social relationships (Kotsou, Nelis, Grégoire, & Mikolajczak, 2011). Particularly in the academic context, the development of emotional competencies contributes to students' social and academic adjustment (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Greenberg et al., 2003), since emotions can either block or potentiate students' learning and consequently affect their academic success (Pekrun, Goetz, Titz, & Perry, 2002). Emotional learning supports the development of students' interpersonal and cognitive skills that are required to achieve appropriate social and developmental goals (Zins, Weissberg, Wang, & Walberg, 2001): the reinforcement of students' self consciousness, self-control, social awareness, interpersonal skills and responsible decision making (CASEL, 2005) will have an impact on academic adjustment mirrored by more positive conduct, fewer behavioural issues, less distress and better results in evaluations (Greenberg et al., 2003). In the long run, emotional learning will provide students with the ability to become more responsible and informed, and more empathetic, productive and active in society and citizenship (Zins et al., 2001).

Recently, several social and emotional learning school-based programmes have been described in the literature and have reported positive effects on the development of students' social and emotional skills (Durlak et al. 2011). Promising results have emerged in this field supporting the theoretical development of these competencies in children (Denham, Wyatt, Bassett, Echeverria, & Knox, 2009), adolescents (Ruini et al., 2009), and even college students (Nelis, Quoidbach, Mikolajczak, & Hansenne, 2009).

Currently, more attention has been directed towards EI's conceptualisation and assessment; however, the developmental trajectories of EI still lack proper exploration in the literature (Denham, 1998; Saarni, 1999). Therefore, assuming that school stands out as one of the most important contexts in which to learn and acquire emotional skills

and competencies (Mayer & Salovey, 1997), this study aims to explore the developmental trajectories of EI throughout secondary school by conducting latent growth curve (LGC) analyses.

1.1. Emotional intelligence: through concept to assessment

Emotional Intelligence is usually considered as an ability "…*to monitor one's own and others emotions, to discriminate among them and to use the information to guide one's thinking and actions*" (Salovey & Mayer, 1990, p. 189). However, besides the more commonly accepted ability-based perspective, EI has alternatively been conceptualised as a trait (Petrides & Furnham, 2000), or as an integration of mixed models that include both ability and personality aspects (Bar-On, Tranel, Denburg, & Bechara, 2003).

Over the last decade, significant efforts have been made to address the assessment of EI and several measures have been developed (Ciarrochi, Chan, Caputi, & Roberts, 2001), grounded in diverse theoretical conceptualisations of EI which have reflected various inconsistencies in the field of EI measurement (Zeidner, Roberts, & Matthews, 2002). Several authors have suggested that EI's assessment by self-report measures should not be based upon mixed models of EI (Boyatzis, Goleman, & Rhee, 2000) since self-report measures only appraise individuals' own beliefs about their capacities (Ciarrochi et al., 2001). However, if assessing EI conceptualised as an ability model (Mayer, Caruso, & Salovey, 1999), the ability testing should be applied with objective performance measures (Ciarrochi, et al., 2001) in order to evaluate the individual's actual capacity to perform, similarly to any other measure of intelligence. Nonetheless, the fact that frequently both performance and self-report measures are grounded in the ability-based perspective of EI should support the development of more studies comparing both types of measures.

Regardless of this discussion, the literature has been questioning whether the two types of measures are assessing different aspects of the EI construct (Sternberg, 1988).

Convergent validity studies, using EI self-report and performance measures based on different theoretical backgrounds, have reported weak correlations (Brackett & Mayer, 2003). Nevertheless, even when supported by the same EI theoretical model, results tend to confirm the lack of correlation between some factors (Lopes, Salovey, & Straus, 2003). These findings seem to be consistent with those in the general intelligence field, whereas weak correlations between different types of measures were found (Furnham & Rawles, 1999).

1.2. Emotional intelligence developmental trajectories in secondary schools

Over the last decade, along with the increasing interest in the introduction of social and emotional abilities teaching in schools, questions related to EI's development have been raised. While recent results tend to confirm the development and plasticity of emotional competencies as outcomes of specific programmes, the developmental trajectory of emotional skills still requires investigation. Although there is evidence that EI seems to be mostly nurtured and that emotional knowledge can be developed through a process of maturation (Cooper, 1997), including learning and training as part of an individual's growth process (e.g., Denham, 1998; Mayer et al., 1999; Saarni, 1999) EI's developmental phases throughout the life span have never been documented. In search of a similar cognitive development pattern associated with age, Mayer, Caruso, and Salovey (1999), using the ability-based measure MEIS, noted that adults scored higher in EI skills than adolescents. However, those findings arose from a study with a cross-sectional design that limited the conclusions able to be drawn related to EI's development criterion. Furthermore, research with EI's trait measures (TEI; Keefer, Holden, & Parker, 2013) indicated that, compared to ability-based measures, EI can have different developmental trajectories with a possible decrease in EI competencies over time. The authors argued that, in adolescence, students can be more demanding and rigorous

when assessing their own and their peers' competencies, which can lead to a decrease in their self-perceptions (Harter, 2012). However, although some studies found a decrease in particular EI skills (Sallquist et al., 2009), inter and intrapersonal studies exploring the development of EI in the academic context tend to be scarce or inconsistent.

Most studies have referred to the socialisation of particular emotional competencies, such as emotion perception, and understanding or self-regulation (Denham, 1998; Saarni, 1999). In light of the lack of a supportive body of EI's developmental research, this present 3-wave longitudinal study intends to study EI developmental trajectories throughout the secondary school period. Moreover, by using and comparing two types of ability-based measures (performance vs. self-report) it is expected that different features of EI developmental paths may be demonstrated throughout the secondary school period.

Given the association of EI with other forms of intelligence, in particular the crystalised intelligence domain, this study will explore the impact that students' verbal abilities have upon the evolution of an EI's performance measure throughout secondary school.

The effects on the development of EI of particular socio-demographic and type of school variables needs further consideration. For example, gender, although repeatedly documented as having an impact on EI levels (mostly favouring girls e.g., Costa, Faria, & Takšić, 2011; Goldenberg, Matheson, & Mantler, 2006), may result in different development EI skills paths. Higher socio-economic status is often related to higher EI skills (Côté, Gyurak, & Levenson, 2010), but less is known about its influence on EI trajectories over time. Moreover, research exploring differences in students of public and private school systems has shown that differences in the levels of achievement of private over public school students remain small after controlling for achievement gains (Witte, 1992) and school environment (Cherchye, Witte, Ooghe, & Nicaise 2010); in some cases there are no differences between the two groups (Center on Education Policy,

2007). Therefore, students attending different types of schools can be exposed to different cognitive or social-emotional learning strategies and follow different EI developmental paths.

Consequently, the present study will explore the effects on EI development at secondary school level of socio-demographic variables, such as students' gender and socio-cultural and professional status (SCS; SPS), as well as the type of school.

This research aims to (1) explore EI's developmental trajectories in a secondary school, (2) use and compare two EI types of measures, self-report and performance, and (3) explore the moderator effect of specific sociodemographic and type of school variables on the development of EI.

2. Method

2.1. Participants

A total of 395 Portuguese secondary school students (213 female and 182 male) took part in a longitudinal study throughout the 3 years of secondary school (10th to 12th grade). At the 10th grade participants ranged from 14 to 17 years-old (*M* = 15.4; *SD* = .74) and the majority were included in the high sociocultural (51.6%) and high professional status (51.9%), attending public schools (60.5%) and scientific and technological courses (48.4%).

2.2. Measures

2.2.1. The ***Vocabulary of Emotions Test (VET)*** is a performance measure based in the third branch of EI's ability model, Understand Emotion, and assesses the Emotional knowledge. Developed by Takšić,

Herambašić and Velemir (2003) in the Croatian academic context with secondary school students, VET comprises 35 items, corresponding to emotional saturated target-words, and follows the same format of any other classic vocabulary test. The task presented request the subject to choose one adjective (from 6 available) which has the closest meaning to the target word (emotion). For example, considering the target word "touching" the subject has to choose the adjective with the closest meaning of the target word from the following: "gentle"; "moving"; "proud"; "sensitive"; "bashful"; "ruthless". This test has a correct answer, based on a solution from a Croatian dictionary. The original version of VET revealed good psychometric properties: moderate correlations with other Intelligence tests (California Tests of Mental Maturity – Vocabulary Test – $r = .67$, $p = .00$ and Logical Thinking – $r = .33$, $p = .00$), and other EI tests (Analysis of Emotions Test – $r = .46$, $p = .00$), and 44% of specific predictive power over classic intelligence tests. Also, results have shown that VET has proper reliability ($\alpha = .90$) (Takšić & Mohorić, 2008). The Portuguese adaptation of the instrument (Costa et al., 2011) has demonstrated good psychometrics properties: appropriate VET's item difficulty ($M = .55$; $SD = .22$), satisfactory internal consistency (.71) and differential validity (presenting both gender and cultural differences – favoring Portuguese students over Croatian ones and, in overall, girls).

 2.2.2. The ***Emotional Skills and Competence Questionnaire (ESCQ)*** is a 42-item self-report measure, based on Mayer and Salovey's (1997) EI model, that comprises 3 subscales: Perceive and Understand Emotion (PUE; 14 items - "*I am able to tell the difference if my friend is sad or disappointed*"), Express and Label Emotion (EE; 14 items - "*I can easily name most of my feelings*"), and Manage and Regulate Emotion (MRE; 14

items – *"I can maintain a good mood, even when the people around me are in a bad mood"*). The instrument was originally developed by Takšić, Mohorić and Duran (2009) in the Croatian context but has been adapted and validated to several cultural contexts (Faria et al., 2006; Takšić et al., 2009). In fact, across different studies, ESCQ has repeatedly revealed good psychometric properties: confirming the three-factor structure underlying ESCQ dimensions, revealing good reliability (between .72 and .92), positive correlations between the dimensions (between .49 and .54) (Faria et al., 2006; Takšić et al., 2009) and presenting absolute and relative satisfactory fit indices (NNFI=.93; CFI=.94; RMR=.04; RMSEA=.04; Stocker & Faria, 2012).

2.3. Procedure

After schools and their head teachers formally accepted this research, informed consents were acquired from students' parents for their personal assurance. All participants filled out the TVE and the ESCQ individually in their classrooms, with the presence of the researcher and students' teacher, after brief group instructions on the answer formats. The purpose of the study as well as the confidentiality and anonymity guaranties were explained to the participants. The administration lasted on average 25 minutes. Student's verbal-ability indicator was based in their final Portuguese grade in the end of the first secondary school year (10th grade).

2.4. Data analysis

Ideal for exploring longitudinal change in behavior, since it is based in the study of individual differences in developmental functions, latent growth curve modeling (LGM; Duncan, Duncan, & Strycker, 2006) was used to predict trajectories of changes in EI

throughout the secondary school. The individual growth for EI is a function of a latent intercept and a latent slop. The latent *intercept* corresponds to the initial status of student's EI at 10th grade (time 1; baseline). The latent intercept reflects the average initial value at the start of the longitudinal change process. The second factor, the latent *slope*, represents the rate of change (increase or decrease) in EI over the period of study (Duncan et al., 2006).

Moreover, with LGC models it is possible to explore if supposed predictors are able to explain the variance in the growth process. In this study it was explored the impact that student's gender, sociocultural and professional status, and type of school have in EI changes throughout secondary school level.

The LGC models analyses included two steps and were tested with AMOS 22.0 program using maximum likelihood estimation. Firstly, it was explored the individual change in EI (both self-report and performance measures) throughout the 3-years period - the unconditional growth curve model, that focused on the factor loadings' intercept and slope. Next, the model was improved by adding a predictor variable (the conditional model). In order to reduce the possibility of Error Type I, only if the level of significance confirmed the differences between the new conditional model and the unconditional one, it would be taken the following step: the analysis of the individual trajectories with the influence of the selected predictors. The goodness of fit of the LGC models were evaluated considering the following indices (Hu & Bentler, 1999): Chi-square statistics, root-mean-square error of approximation (RMSEA) of .06 or less, comparative fit index (CFI) and the Tucker-Lewis Index (TLI, or Non-Normed Fit Index: NNFI): best if above .95.

3. Results

3.1. Descriptive results

To assess the global change in EI's levels between the three-years of secondary school, descriptive statistics were performed in each year (Table 1). The EI levels of the performance measure, VET, increased continuously from 10th to 12th grade, reaching at the 12th grade the higher average level of VET.

The self-report measure, ESCQ, registered a slight increase from 10th to 11th grade (Table 1), reaching at 11th grade the highest level and kept stable through the final period of secondary school. While the Perceive and Understand Emotion (PUE) and Manage and Regulate Emotion (MRE) dimensions of ESCQ revealed a significant increase from 10th to 11th grade, the Express and Label Emotion (EE) dimension did not prove to change over time. These results substantiated further LGC analyses to estimate whether these patterns of changes could be confirmed in longitudinal models.

(Insert Table about 1 here)

3.2. Individual trajectories

The LGC model identifies the trajectories of changes of EI's evolution during the three-year measurement points of secondary school (10th, 11th and 12th grade).

An unconditional linear growth model, with the factor loadings of the intercept constrained to 1 and the factor loadings of the slope constrained to 0, 1 and 2, was estimated to both EI's variables (VET, ESCQ and ESCQ dimensions; Figure 1).

(Insert Figure about 1 here)

3.2.1. VET: EI's performance measure.

The three-year unconditional model of VET was analyzed (Figure 1). The linear growth model revealed a good fit to the data (X^2=5.445, *df*= 2; X^2/*df*=2.722, CFI=.99, RMSEA=.066; cf. Table 2). The significant and positive mean slope indicated student's growth in VET levels throughout the secondary school (1.86, *p* < .001). Student's had a higher development of EI's skills from 10th to 11th grade (32%), although they had continued to increase until 12th grade (12%). Moreover, the variances of the latent intercept and slope were significant (*p* < .001) indicating variability around the average intercept and inter-individual differences in the change trajectories, respectively (Byrne, 2012). This fact justifies the exploration of conditional models with the addition of variables that could explain the variation in the individual trajectories. Those students with lower levels of EI experienced a higher growth throughout the secondary school period (- 3.21, *p* = .002).

(Insert Table 2 about here)

3.2.2. ESCQ: EI's self-report measure.

The viability of the linear development model of ESCQ was calculated through the unconditional model and displayed good results (X^2=5.650, *df*= 2, X^2/*df*=2.825, CFI=.99, TLI=.99, RMSEA=.074; cf. Table 2). The non-significant mean slope indicated that

student's ESCQ levels were stable throughout the secondary school (-.162, p = .101). The fact that the variances of the intercept and slope of ESCQ were significant, indicating inter-individual differences in the development of EI, lead to further analyses with ESCQ LGC conditional models. Moreover, the non-significant covariance between the intercept and slope (-12.79, p = .535) demonstrated that there is no relation between the student's initial level of ESCQ and EI's development throughout the assessed school period.

Moreover, the unconditional model estimated separately for the three ESCQ dimensions revealed good fit to the data: EE (X^2=1.581, df=2, CFI=.99, TLI=.99, RMSEA=.038; cf. Table 2); PUE (X^2=5.099, df =2 , CFI=.99; cf. Table 2); MRE (X^2=7.323, df =2 , CFI=.99, TLI=.98, RMSEA=.082; cf. Table 2). The non-significant mean slope in the three dimensions indicated that students, similarly to ESCQ total scale, did not increase these competencies during secondary school (cf. Table 2). The variances of the latent intercept were significant (p < .001) indicating variability around the average intercept for the three dimensions and the variance of the slope was significant for the MRE dimensions exposing the inter-individual differences in the change trajectories. Inter-individual variability was found in the unconditional models which lead to exploratory analyses of the effect of some socio-demographic and type of school's variable predictors.

3.3. Predictors of EI's individual trajectories

In order to identify the predictors of the individual differences in the evolution of EI during the secondary school period, socio-demographic and type of school variables were added to the linear growth model. Several conditional linear growth models were estimated to both EI's variables (VET and ESCQ and dimensions; cf. Figure 2).

(Insert Figure 2 about here)

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3.3.1. Predictors of VET's individual trajectories.

First-of-all in order to explore the influence that students' verbal abilities could have in the explanation of VET levels' evolution, a conditional model with the verbal ability indicator as a predictor of EI's individual trajectories was estimated (Figure 2). The introduction of the verbal ability indicator improved VET's conditional model ($p < .001$, cf. Table 3). These results lead to the analyses of inter-individual differences in VET's development throughout the explored period. The verbal-ability indicator's conditional model revealed that students with better language skills had higher initial levels in VET ($\beta_{\text{Intercept.Verbal ability indicator}} = .51$, $p < .001$), but there were no evidence however, that both groups had different rates of growth during the secondary school period ($\beta_{\text{Slope.Verbal Ability indicator}} = -.25$, $p = .057$).

Separately conditional models with gender, SCS, SPS, and type of school as predictors of EI's individual trajectories were used to estimate whether different groups influenced changes on EI over time (Figure 2). Every model fitted the data very well (cf. Table 3). In general, all the model comparisons proved that the new conditional models with the proposed predictors were better explaining EI's development throughout the secondary school ($p < .05$, with the exception of Medium-Low SPS model, cf. Table 3), which allowed the pursuit of the inter-individual differences in VET's changes over time. The gender conditional model revealed that boys and girls did not differ in their initial levels of VET ($\beta_{\text{Intercept.Gender}} = -.10$, $p = .10$) and in their changes over time ($\beta_{\text{Slope.Gender}} = -.10$, $p = .381$). The SCS and SPS conditional models of VET indicated that in general, student's with higher status had better levels of VET in 10$^{\text{th}}$ grade ($\beta_{\text{Intercept.SPS \& SCS}} = p < .05$, cf. Table 3) and those students from lower SCS had a higher rate of growth during the secondary school when compared to medium and higher status and lower SPS when compared to higher status ($\beta_{\text{Slope.NSP \& NCS}} = p < .05$, cf. Table 3). Also, concerning the type of school students attend to, students from private schools have higher levels of VET in 10$^{\text{th}}$ grade when compared to students from public schools. There were no evidence however, that both groups had different rates of growth during the secondary

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school period. Moreover, all the conditional models analyzed acknowledged other sources of variability both in average intercept and in inter-individual changes over time (V (*Intercept*) and V (*Slope*) = *p* <.05).

(Insert Table 3 about here)

3.3.2. Predictors of ESCQ individual trajectories.

3.3.2.1. ESCQ individual trajectories.

The previous conditional models were reproduced to explore which of the proposed predictors exerted influence in ESCQ individual trajectories throughout secondary school (Figure 2). Although every model proved a good fit to the data (cf. Table 4), only the type of school model comparison evidenced that the addiction of this predictor actually improved the explanation of EI's development over time (*p* < .001, cf. Table 4). In fact, further analyses of the type of school conditional model demonstrated that students from private schools had higher levels of ESCQ in 10th grade when compared to the students of public school (β $_{Intercept.Type\ of\ school}$ = *p* <.01, cf. Table 4), but that the type of school students attended to did not have impact on the change of their ESCQ level during the secondary school (β $_{Slope.type\ of\ school)}$ = *p* >.05, cf. Table 4). Also, other sources of variability both in intercept and slope were recognized by the conditional model (V (*Intercept*) and V (Slope) = *p* < .05).

(Insert Table 4 about here)

3.3.2.2. ESCQ dimensions: EE, PUE, MRE individual trajectories.

The conditional models of gender, SCS, SPS, and type of school as predictors of EE, PUE and MRE individual trajectories were estimated (Figure 2). Similarly to the total ESCQ conditional models, every model fitted the data well, however, only the type of school conditional model in the three dimensions, the SPS high-low model in the PUE and MRE and also the SPS high-medium model for the PUE conditional model ($p < .05$) met the assumption of explanation improvement over the initial unconditional model. The following analysis proved that students from higher SPS had higher levels of PUE ($\beta_{Intercept.SPS\ High-Low} = .20$, $p < .01$), and MRE ($\beta_{Intercept.SPS\ High-Low} = .19$, $p < .01$) in 10th grade than the students from the lower status and even than the students from medium status in PUE ($\beta_{Intercept.SPS\ High-Medium} = .13$, $p < .01$). Also, the type of school conditional model demonstrated that students from private schools had higher levels of EE ($\beta_{Intercept.Type\ of\ school} = .20$, $p < .00$), PUE ($\beta_{Intercept.Type\ of\ school} = .23$, $p < .00$) and MRE ($\beta_{Intercept.Type\ of\ school} = .15$, $p < .01$), in the initial measurement point, but then again did not have impact on the way these dimensions evolved during the secondary school ($\beta_{Slope.Type\ of\ school} = p > .05$). In general, all the conditional models highlighted that other sources, not considered in these models, have impact on the intercept and slope variability (V (*Intercept*) and V (*Slope*) = $p < .05$).

4. Discussion

Considered by many as the "missing piece" in a student's education, the promotion of a positive socio-emotional development in a school context has been emerging as a crucial factor in a student's personal and academic success. The present study attempted to extend the understanding of emotional development in schools by analysing the evolution of EI in late adolescence throughout the secondary school period, using and comparing two types of measures (self-report vs. performance).

The findings revealed that EI can follow different developmental trajectories during late adolescence. Consistent with previous studies (Keefer et al., 2013), the two

types of measures failed to overlap in the evolution of EI in the secondary school period. An increase in EI skill, assessed by the performance measure, was achieved throughout the secondary school for all students. These results are consistent with the supposed development and maturation of EI over time and life experiences (e.g., Denham, 1998; Keefer et al., 2013; Mayer, et al., 1999; Saarni, 1999). The school, and particularly the secondary school context, may provide opportunities to expose students to challenging emotional experiences that can have a positive impact upon adolescents' EI maturation and development.

The components of the EI self-report measure tended to remain stable throughout the secondary school period. The developmental path that the self-perceptions of emotional competence followed may reflect a different aspect of EI. Besides the possibility of no significant maturation over the explored period, the observation that EI skills (measured by the VET) have shown positive development suggests the presence of different development trajectories of students' perceptions of EI competence. These results may indicate that students do mature, but also reveal students' lack of confidence in their emotional abilities when facing a particularly challenging and emotionally loaded situation (Somerville et al., 2010). Also, students can become cognitively and socially more experienced and self-critical in this period (Harter, 2012) and therefore do not report that they have developed emotional skills or, when responding to self-report measures, tend to implicitly compare themselves to their peers and undervalue their competence. The lack of consistency in the development of the two EI components over time may be because performance and the self-report measures, being related to a more objective and subjective approach to students' emotional competencies, can capture different aspects of the EI domain (Sternberg, 1988).

The observation that in every model sources of inter and intrapersonal variability were highlighted by the results, led to exploration of the effect that students' verbal abilities, gender, SCS, SPS and type of school could exert upon the developmental trajectories of EI.

The VET performance measure requires a verbal-based task to assess emotional comprehension, and VET evolution scores may reflect the influence of students' actual verbal and language abilities; therefore, a verbal-ability indicator was used within the EI developmental path assessment. The results confirmed that students with better verbal and language skills at the beginning of secondary school had higher scores in the VET, which was expected because of EI's association with other intelligence domains (Mayer et al., 2008; Roberts et al., 2008). However, the level of student's language proficiency did not have an impact upon performance on VET over time. Moreover, students' gender improved the EI developmental model for the performance measure. Nonetheless, gender did not differentiate boys' and girls' EI evolution throughout the secondary school; and, particularly in the initial period of this academic stage, neither gender outperformed the other. The observation that gender did not have an impact upon VET's development reflects the similar development trajectories of EI in late adolescence in both genders. Although differences between the genders regarding emotional responses and skills can be found in earlier academic stages, their exposure to increasingly challenging personal and scholarly tasks in the secondary school period may produce a similar development of EI skills in both groups, balancing possible differences in their emotional competencies.

In general, students with higher levels of SCS and SPS had higher levels of emotional skills (VET and VET, PUE and MRE dimensions, respectively) in the first secondary school grade, as expected according to the literature (Côté et al., 2010). Students' SPS and SCS had a significant effect on EI development; students of lower socioeconomic status had a higher rate of EI growth in the secondary school period. These results reflect the importance of these socio-demographic variables in the differential development of students' emotional domains. As an important context for promoting and nurturing students' social and emotional skills, the schools provide formal and informal strategies that enhance emotional competence for all students; particularly for students of lower socio-economic status, schools can constitute a particularly

valuable resource, maximising their potential growth. Although the type of school that students attend did not have an impact on the way EI components evolved during secondary school, this variable was a systematic predictor of interpersonal differences. Recent research has challenged the idea of that students may achieve more in private compared to the public institutions (Cherchye et al., 2010; Witte, 1992). In this study, although students from both academic contexts had similar EI developmental patterns, at the start of secondary school students attending private schools had higher levels of EI (in both performance and self-report measures). These results may perhaps reflect private schools' more positive investment in social and emotional strategies, and the school climate in the final academic stages. Nonetheless, private schools have, in general, a more selective socioeconomic context which can amplify the differences between the two types of schools.

This research has some limitations. In particular, within this longitudinal study there were only three measurement points, one for each year of secondary school, which is the minimum required to conduct LGC analyses. The use of more measurement points within the period of study would have allowed more precise and reliable trajectory results (Byrne, 2012). Moreover, consistent with multiyear longitudinal studies (Denham et al., 2009), the rate of nonresponse is by far one of the greatest limitations in these studies. In this particular case, the longitudinal final sample included only 60% of the original participants; the numbers had continuously decreased through the analysed period. Consequently, students who had been retained, dropped out or transferred to other schools were excluded from the final sample. Moreover, the use of more performance indicators of other EI ability-based dimensions (particularly regarding managing and regulating emotion) could have broadened the perspective of the EI developmental path throughout this period.

The current findings indicate that students' levels of the EI performance measure can evolve as a result of school and social experiences during adolescence, while the same period is considered stable when assessed by the EI self-report measure.

Consequently, it is important that future studies continue to scrutinise the probably different aspects assessed by each type of measure, and the bridges established between them. Furthermore, it is also crucial to investigate the formation of EI in the early educational stages, and its evolution at younger ages. Moreover, other socio-demographic and academic predictors should be explored and recognised as consistently important factors, both in EI's group differentiation and in EI's developmental trajectories.

While the literature on adolescents' objective EI abilities has increased, much remains unknown about the developmental dynamics of adolescents' EI subjective self-perceptions and objective skills (Keefer et al., 2013). Research addressing the developmental trajectories of emotional skills can shed light upon how these abilities evolve and are influenced throughout students' cognitive and academic stages, substantiating the adaptive role of emotions in students' adaptation and success. Research in this area should support the developmental features of EI and reinforce the valorisation and integration of social and emotional learning in school.

5. References

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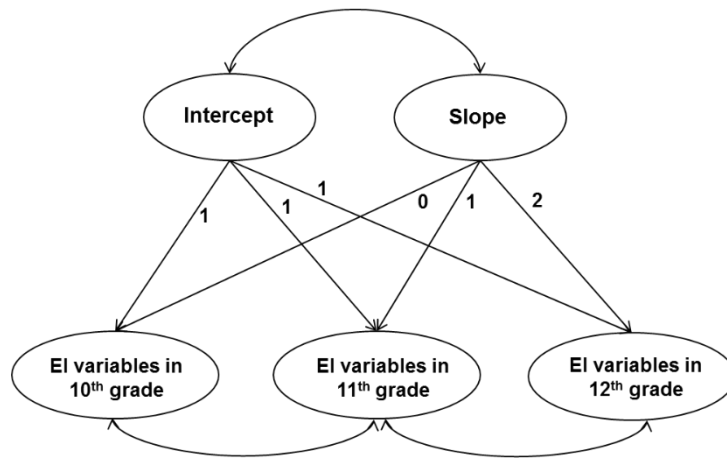
Figure 1. Unconditional Latent Growth Curve Model for intraindividual variability of EI variables (VET, ESCQ, EE, PUE, MRE). Intercept loadings constrained to 1 and slope loadings constrained to 0, 1 and 2.
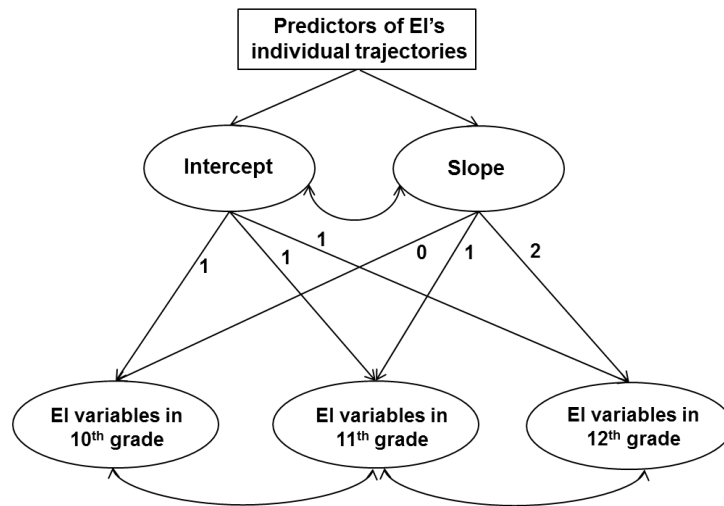
Figure 2. Conditional Latent Growth Curve Model for intraindividual variability of EI's variables explained by the predictors (Verbal ability indicator, Gender, SCS, SPS, type of school). Intercept loadings constrained to 1 and slope loadings constrained to 0, 1 and 2.

Table 1. *Descriptive statistics of EI variables (VET, ESCQ) for adolescents by secondary school grade and t-test results.*

	10th grade			11th grade			12th grade			t-tests(df)		
	M	(SD)	N	M	(SD)	N	M	(SD)	N	10th-11th grade	11th-12th grade	10th-12th grade
VET	23.1	4.30	395	24.4	4.11	395	25.0	3.76	395	-6.978 (394)***	-3.193 (394)***	-9.838 (394)***
ESCQ	195.7	18.34	335	197.4	18.86	335	195.8	19.37	335	-2.003 (334)*	1.747 (334)	-.169 (334)
EE	64.6	8.60	398	65.1	8.97	398	64.8	9.46	398	-1.205 (397)	.904 (397)	-.323 (397)
PUE	63.7	7.69	398	64.4	7.56	398	7.47	64.0	398	-2.235 (397)*	1.394 (397)	-.745 (397)
MRE	65.7	7.35	398	66.6	7.60	398	66.2	7.50	398	-2.590 (397)*	1.158 (397)	-1.298 (397)

Note: M = mean; SD = standard deviation; t-tests - Paired Samples t-test score; Significance for t-tests: *** $p < .001$, ** $p < .01$, *$p < .05$.

Table 2. *Estimates of EI variables in LGM (unconditional models).*

	Mean intercept	Variance of intercept	Mean slope	Variance of slope	Model fitness index
VET	23.08***	12.81***	1.86***	3.02**	X^2=5.445, df=2, CFI=.99, TLI=.99, RMSEA=.066
ESCQ	196.39***	221.31***	-.16	59.71*	X^2=5.650, df=2, CFI=.99, TLI=.99, RMSEA=.074
EE	64.78***	45.09***	0.05	4.55	X^2=1.581, df=2, CFI=.99, TLI=.99, RMSEA=.038
PUE	63.97***	35.50***	0.01	0.06	X^2=5.099, df=2 , CFI=.99, TLI=.99, RMSEA=.062
MRE	65.87***	34.04***	0.60	13.01**	X^2=7.323, df=2 , CFI=.99, TLI=.98, RMSEA=.082

Note: *** $p < .001$, ** $p < .01$, * $p < .05$.

Table 3. *Estimates of predictors of VET in LGM (Conditional models).*

VET x predictors		$\beta_{Intercept.Predictor}$	$\beta_{Slope.Predictor}$	V(*Intercept*) (S.E.)	V(*Slope*) (S.E.)	Model Comparison (Unconditional vs. Conditional)	Model fitness index
Verbal Ability Indicator		.51***	-.25	13.63***(2.11)	5.06*(2.07)	$X^2(2)=46.563$ p=.000	X^2= 5.989, df=3, CFI=.99, TLI=.98, RMSEA=.076
Gender		-.10	-.10	12.68*** (1.36)	2.99*(1.26)	$X^2(2)=8.107$ p=.017	X^2= 5.672, df=3, CFI=.99, TLI=.99, RMSEA=.048
SCS	High-Low	.32***	-.38**	11.45***(1.31)	2.59*(1.25)	$X^2(2)=23.724$ p=.000	X^2=5.449, df=2 , CFI=.99, TLI=.98, RMSEA=.046
	High-Medium	.18**	-.08	12.41***(1.35)	2.99*(1.27)	$X^2(2)=6.768$ p=.034	X^2=7.012, df=3 , CFI=.99, TLI=.97, RMSEA=.058
	Medium-Low	.20*	-.42**	12.30***(1.38)	2.50*(1.26)	$X^2(2)=8.134$ p=.017	X^2=6.772, df=3, CFI=.99 TLI=.97, RMSEA=.056
SPS	High-Low	.34***	-.47***	11.33***(1.30)	2.34(1.24)	$X^2(2)=24.009$ p=.000	X^2= 5.555, df=3, CFI=.99, TLI=.97, RMSEA=.053
	High-Medium	.23***	-.21	12.15***(1.34)	2.88*(1.27)	$X^2(2)=10.327$ p=.006	X^2=6.314, df=3 , CFI=.98, TLI=.97, RMSEA=.078
	Medium-Low	.11	-.27	12.65***(1.38)	2.81*(1.26)	$X^2(2)=3.123$ p=.210	X^2=6.577, df=3 , CFI=.99, TLI=.97, RMSEA=.055
Type of school		.173*	-.183	12.42*** (1.35)	2.91** (1.27)	$X^2(2)=8.579$ p=.014	X^2=5.782, df=3 , CFI=.99, TLI=.99, RMSEA=.049

Note: For gender, 0=female and 1=male; For SCS, 0=lower status and 1= higher status; For SPS, 0=lower status and 1= higher status; for type of school, 0=public school and 1=private school; *** p < .001, ** p < .01, * p < .05.

Table 4. *Estimates of predictors of ESCQ and dimensions in LGM (Conditional models).*

ESCQ x predictors		$\beta_{Intercept.}$ Predictor	$\beta_{Slope.}$ Predictor	V(*Intercept*) (S.E.)	V(*Slope*) (S.E.)	Model Comparison (Unconditional vs. Conditional)	Model fitness index
Gender		.02	-.07	221.24***(25.08)	59.34*(29.95)	$X^2(2)$=.303 p=.860	X^2= 5.675, df=3 , CFI=.99, TLI=.99, RMSEA=.052
SCS	High-Low	.00	.20	221.33***(24.93)	56.89*(29.69)	$X^2(2)$=2.188 p=.335	X^2=5.731, df=3, CFI=.99, TLI=.98, RMSEA=.052
	High-Medium	.04	.06	220.91***(25.13)	59.55*(30.00)	$X^2(2)$=.699 p=.705	X^2=5.658, df=3 , CFI=.99, TLI=.98, RMSEA=.052
	Medium-Low	-.05	.19	220.84***(24.96)	57.11*(29.86)	$X^2(2)$=.926 p=0.629	X^2=5.741, df=3, CFI=.99 TLI=.98, RMSEA=.052
SPS	High-Low	.01	.02	221.30***(25.10)	59.62*(29.98)	$X^2(2)$=.036 p=.982	X^2=6.044, df=3, CFI=.99, TLI=.97, RMSEA=.055
	High-Medium	.02	.17	220.04***(26.19)	56.21***(30.37)	$X^2(2)$=1.823 p=.402	X^2=8.942, df=3 , CFI=.98, TLI=.95, RMSEA=.077
	Medium-Low	.00	-.22	219.72***(26.35)	54.26(30.48)	$X^2(2)$=1.019 p=.601	X^2=9.912, df=3 , CFI=.98, TLI=.94, RMSEA=.083
Type of school		.27***	.07	205.52*** (24.02)	59.41* (29.99)	$X^2(2)$=23.695 p=.000	X^2=5.654 , df=3 , CFI=.99, TLI=.99, RMSEA=.051

Note: For gender, 0=female and 1=male; For SCS, 0=lower status and 1=higher status; For SPS, 0=lower status and 1= higher status; for type of school, 0=public school and 1=private school; *** $p < .001$, ** $p < .01$, * $p < .05$.