



# Trait emotional intelligence and its links to university performance: An examination

Maria-Jose Sanchez-Ruiz<sup>a,\*</sup>, Stella Mavroveli<sup>b</sup>, Joseph Poullis<sup>c</sup>

<sup>a</sup> *Lebanese American University, Byblos, Lebanon*

<sup>b</sup> *Imperial College London, UK*

<sup>c</sup> *City University London, UK*

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## ABSTRACT

This study aimed at investigating the relationships between academic performance (AP) and cognitive ability, personality traits, and trait emotional intelligence (trait EI or trait emotional self-efficacy) in a sample of 323 (113 female) university students in Cyprus. The study also explored differences across university majors (i.e., computer sciences, business and management, electrical engineering, tourism and marketing, law and accounting, and psychology) in trait EI profiles. Trait EI predicted AP over and above cognitive ability and established personality traits. In addition, there were differences across university majors in trait EI scores; psychology students scored higher on trait EI than computer science, electrical engineering, and business and management students. Implications for studying trait EI in the context of higher education are discussed.

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## 1. Introduction

Key literature in the field of emotional intelligence (EI) highlights the crucial distinction between two conceptualizations: Trait EI (or ‘*trait emotional self-efficacy*’) and ability EI (or ‘*cognitive-emotional ability*’). Trait EI refers to emotion-related behavioral dispositions and self-perceived abilities (Petrides, 2011). The operationalization of the construct through self-reports is consistent with the subjectivity of emotions and the nature of trait EI as part of the personality domain. In contrast, ability EI refers to emotion-related abilities (Salovey & Mayer, 1990), it is directly linked to the intelligence domain, and is measured through maximum-performance tests. Many studies have found low correlations between these two constructs, thus supporting the conceptual and methodological distinction between them (Warwick & Nettelbeck, 2004).

The present study builds on the conceptualization of trait EI, which has demonstrated strong associations with the established personality traits (e.g., Petrides, Weinstein, Chou, Furnham, & Swami, 2010), as well as incremental validity over and above these traits (e.g. Van Der Zee & Wabeke, 2004). The construct of trait EI has been studied in relation to a wide range of domains including

relationship satisfaction (e.g., Smith, Ciarrochi, & Heaven, 2008), psychopathology (e.g., Mikolajczak, Roy, Luminet, Fillee, & de Timary, 2007b), behavioral genetics (Vernon, Villani, Schermer, & Petrides, 2008), life satisfaction, via its relationship to social support and self-esteem (Kong, Zhao, & You, 2012), and creativity (Sanchez-Ruiz, Hernández-Torrano, Pérez-González, Batey, & Petrides, 2011), among many others.

The present paper aims to examine trait EI as a predictor of academic performance (AP) in university settings and explore trait EI profiles of undergraduates across different university majors. Trait EI may be relevant to the prediction of AP due to the emotion-related capabilities that it facilitates which are fundamental to coping with the stress and demands of educational environments (e.g., Mikolajczak, Menil, & Luminet, 2007a). Findings from this study can point out the benefits of assessing, taking into account, and fostering, when appropriate, EI among students as an investment in their academic success. Also, exploring how trait EI profiles differ by university major is the first step to ascertain how these differences might relate to patterns of adjustment to education and academic engagement. This evidence may ultimately support decisions, which have an impact on a person’s job and life satisfaction.

### 1.1. Trait EI and academic performance

The difficulty of general mental ability to account for substantial variance in academic success in organizational and educational

\* Corresponding author. Address: Lebanese American University, P.O. Box 36, Byblos, Lebanon. Tel.: +961 9 547 262x2449; fax: +961 9 541 030.

E-mail addresses: [maria-jose.sanchez-ruiz@lau.edu.lb](mailto:maria-jose.sanchez-ruiz@lau.edu.lb), [mj.sanchezruiz@gmail.com](mailto:mj.sanchezruiz@gmail.com) (M.-J. Sanchez-Ruiz), [s.mavroveli@imperial.ac.uk](mailto:s.mavroveli@imperial.ac.uk) (S. Mavroveli), [poullis@yahoo.com](mailto:poullis@yahoo.com) (J. Poullis).

contexts has opened new research avenues looking at complementary non-cognitive predictors. Within the educational settings, there is a growing interest in studying the role of personality and emotion-related variables in AP. Overall, Openness to experience and Conscientiousness have been more often related to AP, followed by Extraversion and Neuroticism (e.g., Chamorro-Premuzic & Arteché, 2008). However, the magnitude and direction of these associations seem to vary depending on the specific variables measured and the study sample.

Trait EI has successfully predicted academic socio-emotional adjustment (Mavroveli, Petrides, Rieffe, & Bakker, 2007; Mavroveli, Petrides, Sangareau, & Furnham, 2009; Mavroveli, Petrides, Shove, & Whitehead, 2008) and prosocial and antisocial school behavior (Mavroveli & Sanchez-Ruiz, 2011). However, the relationship between trait EI and AP has been less straightforward and results have pointed to contradictory findings (e.g., Waterhouse, 2006).

Richardson, Abraham, and Bond (2012) have systematically reviewed evidence linking university GPA to a number of correlates and showed that amongst other factors, academic self-efficacy and effort regulation maintained medium-sized correlations with GPA. Mavroveli and Sanchez-Ruiz (2011) presented a comprehensive review of the extant evidence examining the relationship between trait EI and AP. Studies looking at higher education GPA as a proxy of AP have reported low positive correlations with trait EI in Chinese (Song et al., 2009) and Italian (Di Fabio & Palazzeschi, 2009) samples. Similar research, mainly using USA or UK samples, have yielded inconclusive findings. Some studies have found a positive correlation between AP and global trait EI (O'Connor & Little, 2003) or only some aspects of trait EI (Parker, Summerfeldt, Hogan, & Majeski, 2004), whilst others have found non-significant correlations (Newsome, Day, & Catano, 2000). Agnoli et al. (2012) found that trait EI interacts with cognitive ability in predicting AP, with low or average cognitive ability children doing better in language performance. In the same study, trait EI also predicted math performance.

### 1.2. Trait EI across university majors

There is a paucity of research studying the differences between students across university majors on emotion-related aspects. However, empirical evidence supports the idea that students personality profiles vary according to the major of enrollment. This finding has been demonstrated using a number of personality questionnaires (e.g., NEO PI; Costa & McCrae, 1985; 16PF; Cattell, Eber, & Tatsuoka, 1970). For example, social science students have reported higher scores on Agreeableness than technical sciences students (e.g., Larson, Wei, Wu, Borgen, & Bailey, 2007). Social science students also tend to score high on empathy and cooperation (e.g., Beauchamp & McKelvie, 2006). Research in the field of vocational preferences has shown that extraversion is related to social and enterprising interests (e.g., Barrick, Mount, & Gupta, 2003; Costa, McCrae, & Holland, 1984).

Among the few studies focusing on trait EI profiles of undergraduates is the research conducted by Castejón, Cantero, and Pérez (2008), whereby social science students scored higher than education and technical science students (among other groups) on both the *intrapersonal* and the *interpersonal* factors of trait EI.

The present study further explores this line of research by looking at how trait EI varies across university majors using a comprehensive instrument that captures all of the facets of the construct; the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2009). This measure has already been shown to efficiently discriminate among UK students across majors in a study conducted by Sanchez-Ruiz, Pérez-González, and Petrides (2010), who found that social science students scored higher on the Emotionality factor of

trait EI than technical students, and lower on the Self-control factor than natural science students.

Research on personality profiles of undergraduates tend to include archetypically contrasting domains such as sciences and arts, but not so often other important domains such as business. The present study aims to explore trait EI profiles across a wide range of university majors, which can assist in the detection of more domain-specific differences.

### 1.3. The present study

The main objective of the present study was to examine the role of trait EI in AP, controlling for cognitive ability and traditional personality dimensions. As described above, in line with the conceptualization of trait EI belonging to the lower personality hierarchies, it is expected to be distinct from cognitive ability and its proxies. Our second objective was to explore differences in trait EI profiles in students across a diverse range of university majors. This objective was, by and large, exploratory, as there is still little research conducted in this area. We were also interested in investigating the relationships between trait EI and both personality and cognitive ability. In light of the preceding literature, we tested the following hypotheses:

- H1: Trait EI scores will relate to all Big Five personality dimensions.
- H2: Trait EI scores will show low to zero correlations with cognitive ability.
- H3: Trait EI will predict AP over and above cognitive ability and the Big Five personality traits.
- H4: Trait EI scores will vary across university majors.

## 2. Method

### 2.1. Participants

The sample comprised 323 university students (113 female;  $M_{(\text{age})} = 23$ ,  $SD = 1.65$ ) attending two English-speaking universities in Cyprus. The students were enrolled in one of the six following majors: Computer sciences ( $N = 89$ ; 23 female;  $M_{(\text{age})} = 23.35$ ,  $SD = 1.56$ ), business and management ( $N = 72$ ; 30 female;  $M_{(\text{age})} = 23.00$ ,  $SD = 1.51$ ), electrical engineering ( $N = 59$ ; 10 female;  $M_{(\text{age})} = 23.10$ ,  $SD = 1.89$ ), tourism and marketing ( $N = 41$ ; 22 female;  $M_{(\text{age})} = 22.72$ ,  $SD = 1.65$ ), law and accounting ( $N = 30$ ; 11 female;  $M_{(\text{age})} = 22.73$ ,  $SD = 1.70$ ), and psychology ( $N = 32$ ; 22 female;  $M_{(\text{age})} = 22.63$ ,  $SD = 1.58$ ).

### 2.2. Instruments

*Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF; Petrides, 2009)*. The TEIQue-SF consists of 30 items designed to measure global trait EI (e.g., "I usually find it difficult to regulate my emotions"; "I'm usually able to influence the way other people feel"). The TEIQue-SF is derived from the full form of the TEIQue, which covers 15 distinct facets grouped in four main factors (i.e., well-being, emotionality, sociability, and self-control). Responses range from 1 ("Strongly disagree") to 7 ("Strongly agree"). This measure has been studied through Item Response Theory and has shown adequate psychometric properties (Cooper & Petrides, 2010). The Cronbach's Alpha on our sample was .80.

*Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003)*. The TIPI is a ten-item questionnaire developed as a short measure of the Big Five personality dimensions. Each item consists of two descriptors, separated by a comma, rated on a 7-point Likert scale ranging from 1 ("Disagree strongly") to 7 ("Agree strongly").

On our sample, the Cronbach's Alpha of the TIPI were moderate to low (.50 to .11).

**Baddeley Reasoning Test (BRT; Baddeley, 1968).** The BRT is a widely used measure assessing fluid intelligence (Gf) through logical reasoning. This 3-min test consists of 60 items, each one being a grammatically transformed description of the ordering of a pair of items. The participant judges each description as true or false of an actual pair of items shown alongside. On the present sample, the internal Cronbach's Alpha of this test was .91.

### 2.3. Academic performance

Students gave the researcher permission to obtain their grade point average (GPA) in order to assess AP. The GPA at University 1 was reported from 0 to 4, and at University 2 was reported out of 100%. The data was transformed to z scores in order to have a homogeneous comparison.

### 2.4. Procedure

Data were collected in a session of 35 min held within scheduled lecture periods of the universities, after receiving the approval of the institutions and instructors. Students gave their permission for their official GPA to be provided. The trait EI questionnaire was applied first, followed by the cognitive ability and personality measures. In order to include the final exams grades, the students' GPAs were collected one month after the administration of the measures.

## 3. Results

The descriptive statistics and internal consistencies of the measures, together with the intercorrelations among the study variables are presented in Table 1.

### 3.1. Intercorrelations among variables

Bivariate correlations showed that trait EI did not correlate significantly with cognitive ability, but correlated positively with all personality traits. The highest of these correlations was with Openness ( $r = .53, p < .001$ ) and the lowest with Agreeableness ( $r = .30, p < .001$ ).

Positive and significant correlations were also found between trait EI and GPA ( $r = .35, p < .001$ ), and GPA also correlated with four of the five personality factors; the highest of these correlations was with Openness ( $r = .26, p < .001$ ) and the lowest with Extraversion ( $r = .13, p < .05$ ).

In addition, Gf was marginally correlated with GPA ( $r = .10, p < .07$ ). Specific correlation analyses were performed between Gf and AP across the six university majors (i.e., computer sciences,

business and management, electrical engineering, tourism and marketing, law and accounting, and psychology). The only significant correlations between the two constructs were found within electrical engineering ( $r = .38, p < .01$ ) and law and accounting ( $r = .42, p < .05$ ). As for electrical engineering, the correlation was significantly higher than within computer sciences ( $r = .10, Z = 1.75, p < .05$ ), and business and management ( $r = .01, Z = 2.17, p < .01$ ), and for law and accounting, the correlation was higher than within computer sciences ( $r = .10, Z = 1.58, p < .05$ ), business and management ( $r = .10, Z = 1.93, p < .05$ ).

### 3.2. Trait EI and academic performance

A three-step hierarchical regression analysis was carried out with AP (average GPA score) as the criterion (see Table 2). At step 1, with Gf as the only predictor, the model was non-significant. At step 2, the Big Five personality traits were added to the equation, ( $F_{(6,297)} = 6.8, p < .001, \text{Adj } R^2 = .10$ ); Emotional stability ( $\beta = .14, p < .05$ ), Openness ( $\beta = .20, p < .01$ ), and Conscientiousness ( $\beta = .13, p < .05$ ) were individually significant predictors and the model gained additional explanatory power ( $\Delta F_{(6,297)} = 7.64, \Delta R^2 = .11, p < .001$ ). At step 3, with trait EI added to the model, ( $F_{(7,302)} = 7.3, p < .001, \text{Adj } R^2 = .13$ ); whereby trait EI was a significant predictor ( $\beta = 0.24, p < .001$ ). At this stage, the model explained significantly more variance in the outcome measure than at step 2 ( $\Delta F_{(7,296)} = 9.43, \Delta R^2 = .03, p < .01$ ).

A potential concern was that the AP and trait EI might have differed systematically in the population in a similar way across different majors. In order to examine this, an additional stage was incorporated to the regression model in which controls (in the form of six dummy variables) for the seven majors were added to the three-step specification, thus allowing AP to vary across groups. These controls allowed the model to explain some additional variance ( $F_{(13,290)} = 7.37, p < .001, \text{Adj } R^2 = .21$ ), but the coefficients for trait EI remained positive and significant ( $\beta = .13, p < .05$ ).

### 3.3. Trait EI across university majors

We performed a univariate factorial ANOVA with trait EI as the dependent variable, and university major as the independent variable. Results showed trait EI differences across university majors,  $F_{(5,315)} = 2.93, p < .01, \text{partial } \eta^2 = .05$ . Follow-up Games-Howell post hoc tests (which account for unequal group sizes) showed that psychology students ( $M = 5.17, SD = .65$ ) scored significantly higher in trait EI than students enrolled in computer sciences ( $M = 4.67, SD = .70, p < .01$ ), electrical engineering ( $M = 4.70, SD = .76, p < .01$ ), and business and management ( $M = 4.76, SD = .58, p < .05$ ).

**Table 1**  
Descriptive statistics, internal consistencies, and intercorrelations between the study variables in the total sample ( $N = 323$ ).

	M (SD), range	$\alpha$	2	3	4	5	6	7	8
1. TEIQue	4.78 (.67), 78–207	.80	.14	.42***	.33***	.53***	.30***	.31***	.35***
2. Baddeley	25.69 (11.35), 0–57	.91		.03	.09	.04	.01	-.03	.10†
3. Emotion stability	8.87 (2.76), 2–14	.35			.04	.17**	.29***	.19**	.19**
4. Extraversion	8.93 (2.39), 2–14	.50				.35***	.01	.11*	.13*
5. Openness	10.33 (2.39), 2–14	.45					.18**	.20***	.26***
6. Agreeableness	9.40 (2.10), 5–14	.11						.13*	.12
7. Conscientiousness	9.75 (2.40), 4–14	.20							.19**
8. GPA	7.51 (15.64), .42–4								

†  $p < .07$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

**Table 2**  
Hierarchical regression of academic performance on fluid intelligence, the Big Five, and trait emotional intelligence (trait EI).

		SE	$\beta$	t
Step 1	Fluid intelligence	.01	.08	1.45
	F (1,302)	2.11		
	Adj-R <sup>2</sup>	.004		
Step 2	Fluid intelligence	.01	.07	1.29
	Emotional stability	.02	.14	2.37*
	Extraversion	.02	.02	.42
	Openness	.02	.20	3.37**
	Agreeableness	.03	.02	.42
	Conscientiousness	.02	.13	2.24*
	F (6,297)/Adj-R <sup>2</sup>	6.8***/.10		
	$\Delta F$ (6,297)/ $\Delta R^2$	7.64/.11***		
Step 3	Fluid intelligence	.01	.05	.92
	Emotional stability	.02	.07	1.19
	Extraversion	.02	-.01	.17
	Openness	.03	.12	1.87*
	Agreeableness	.03	-.01	.14
	Conscientiousness	.02	.09	1.57
	Trait EI	.10	.24	3.07**
	F (7,296)/Adj-R <sup>2</sup>	7.3***/.13		
	$\Delta F$ (7,296)/ $\Delta R^2$	9.43/.03**		

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

#### 4. Discussion

This study examined the influence of trait EI in AP while controlling for the effect of Gf and the Big Five personality traits. It also explored differences in students' trait EI profiles across university majors.

Results supported our first hypothesis (H1); there were positive associations between trait EI and all Big Five personality traits, in line with previous studies (e.g., Saklofske, Austin, & Minski, 2003). Trait EI was strongly related to Openness, followed by Emotional stability, which suggests that emotionally-skilled students are better able to regulate their emotions, and show wide interests and intellectual curiosity, and are able to regulate their negative emotions. In previous studies, Neuroticism was the personality dimension showing the highest correlation with trait EI (see Petrides et al., 2010). Even though these results are in line with current research, they should be interpreted with caution, considering the personality scale's brevity and the low internal consistencies of its factor scores.

The relationship between Gf and trait EI was non-significant, as predicted (H2), which is a well-established finding in the literature (e.g., Van der Zee, Thijs, & Schakel, 2002). The reason for this zero correlation is that trait EI and Gf belong to different entities, namely personality and intelligence (e.g., Eysenck & Eysenck, 1985), and as such, any associations between them will be weak or inconsistent across studies.

##### 4.1. Trait EI and academic performance

Trait EI explained unique variance of GPA, after controlling for Gf and personality, thus supporting our third hypothesis (H3). Cognitive ability failed to predict AP, which conflicts with most of the previous research (e.g., Petrides, Chamorro-Premuzic, Frederickson, & Furnham, 2005). However, a few studies have found quite weak associations between intelligence and AP in specific samples (e.g., Chamorro-Premuzic, Quiroga, & Colom, 2009), and this seems to be true for this sample from Cyprus. However, it is worth noting that the correlation between Gf and GPA was not null and varied across majors in the present sample. In some majors the associa-

tion was non-significant, thus canceling out (in the whole-sample effect) the positive low-to-moderate associations found for other groups (i.e., electrical engineering, law and accounting). A tentative explanation is that Gf may play a more central role in the performance of core practical studies which require logical reasoning, while it may not be crucial for activities of a more emotional or interpersonal nature (Gottfredson, 2003). Also, GPA may fail to reflect Gf due to grade inflation and institutional differences in grading (e.g., Johnson, 2003).

Trait EI showed additional explanatory power to the regression model and was in fact the variable most strongly correlated with GPA compared to the other study variables. This positive yet moderate correlation is higher than those found in other studies (e.g., O'Connor and Little, 2003; Song et al., 2009) and highlights the importance of emotion regulation, sociability, emotionality and well-being factors in academic achievement in the university context.

##### 4.2. Trait EI across university majors

Trait EI differentiated between students across university majors, thus supporting H4. In particular, psychology students scored higher than those in computer science and electrical engineering and business and management students. Previous research using different measures of the construct have found that people in social science majors tend to score higher on trait EI than other groups of students (Castejón et al., 2008; Sanchez-Ruiz et al., 2010).

The trait EI differences found across university majors can be interpreted in light of the person-environment fit theory (Caplan, 1987) and the theory of vocational choice of Holland (1997). These approaches understand academic/vocational choices as expressions of personality dispositions. Thus, trait EI profiles may have a role in predisposing students to choose a specific academic field in university settings. This evidence may ultimately support academic and vocational decisions, which impact on individuals' professional and personal choices and satisfaction with the selected domain. Furthermore, social sciences students (e.g., psychology) may be developing their emotional tacit knowledge through the university curricula thus having somehow an impact on their trait EI scores.

##### 4.3. Limitations and suggestions for future research

The short measure of personality employed is widely used and has shown convergent and discriminant validity and test-retest reliability in previous research (Gosling, Rentfrow, & Swann, 2003). However, a scale with few items would generally show poorer internal consistencies than one with more items. This has been highlighted by Jonason, Teicher, and Schmitt (2011), who found similar low internal consistencies, but demonstrated the construct validity of the measure, which was related to other variables in the expected direction, as was the case in the present study.

Future studies may benefit from using the long version of the TEIQue and a bigger sample to allow for factor level analyses by university major and other variables such as gender. Also, other measures of cognitive ability could have been used to have a broader picture of the relationships between intelligence and the variables studied. A measure of crystallized intelligence can be used together with Gf measures to compare their consistency as predictors of AP across majors. Future research will benefit from including samples of students enrolled in other majors (e.g., arts) or alternatives to educational pursuit (e.g., vocational training and workforce) to expand on the results found in the present study.



#### 4.4. Conclusions

Findings from this study indicate that personality and trait EI are better predictors of AP than Gf. In particular, trait EI demonstrated incremental validity over and above the Big Five personality traits in predicting AP. This result points toward the idea that emotion-related aspects of personality play a relevant role in AP and it can be beneficial to incorporate a trait EI measure in future research designs. Furthermore, our results demonstrate that the TEIQue is a powerful and sensitive measure to detect differences in the emotional functioning of students enrolled in different academic majors. In educational settings, the assessment and understanding of these differences can be crucial for the development of emotional education (Vandervoort, 2006). Career counseling practitioners may want to consider the role of trait EI in assisting individuals with their career choices and planning, and dealing with problems of academic engagement and satisfaction.

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