Emotional understanding as a predictor of socio-emotional functioning and school achievement in adolescence

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The main goal of our research was to investigate whether the ability of emotional understanding can predict students' school achievement over and above fluid intelligence and the Big Five personality factors. A sample of 493 pupils (45% girls) participated in this study (M_{age} = 12.61, SD = 1.12). According to our results, girls were slightly better than boys in understanding emotions. Girls also had a slightly higher GPA than boys, and reported engaging in more altruistic and prosocial behavior than boys. As expected, boys reported more aggressive behaviors than girls. Understanding emotions had a weak but significant effect on the prediction of aggressive behavior. It also accounted for an additional 5% (for boys) and 9% (for girls) of the variance of GPA, after controlling for fluid intelligence and personality factors. A better understanding of emotions is important for academic achievement, as well as for well-being and adjustment in the educational environment.

Keywords: emotional understanding, school achievement, prosocial behavior, aggressive behavior, early adolescence

What promotes academic achievement? What are the factors that are most relevant for success at school? How can we best explain why some students achieve well while others don't? These and similar questions are still relevant, and after almost a century of research are in the focus of many studies (Asakawa & Csikszentmihalyi, 1998; Hansen, Trujillo, Boland, & MaCkinnon, 2014).

Throughout the past century, general cognitive ability (g) has taken a central role in explanations of human performance in various settings. Numerous studies have examined the relations between g and academic, training, and occupational performance (Kranzler, Benson, & Floyd, 2015; Rohde & Thompson, 2007). According to the results of these studies, g is the best single predictor of performance. Recently, however, the research focus has shifted to the idea that

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academic achievement is also related to social and emotional adjustment to the
school environment (Rolland, 2012). Besides cognitive abilities, self-regulated
learning practices, sustained effort, managing time demands and academic
stress, are also relevant factors for academic success, as well as successfully
navigating the social landscape (Arsenio & Loria, 2012). In their meta-analysis
of psychological correlates of students' academic performance, Richardson,
Abraham, and Bond (2012) found that high school GPA, SAT, ACT, and A level
scores had medium-sized correlations with college GPA. However, three other,
non-intellective constructs also showed medium-sized correlations with GPA:
academic self-efficacy, grade goal, and effort regulation, and a large correlation
was observed for performance self-efficacy.

Another non-intellective construct that seems to be important for academic
achievement is emotional intelligence (EI) (MacCann & Roberts, 2008). EI
can be defined as an *ability* (Mayer & Salovey, 1997), or as a *personality trait*
(Petrides, Pita, & Kokkinaki, 2007). In the first case, EI is seen as a set of
cognitive abilities pertaining to the processing of emotional information (Mayer
& Salovey, 1997), while in the second EI is defined as a compound personality
construct, a constellation of emotional self-perceptions located at the lower
levels of personality hierarchies (Petrides et al., 2007).

Ability EI is most commonly conceptualized according to Mayer and
Salovey's model (1997), and more recently to Joseph and Newman's (2010)
cascading model of EI. The Mayer and Salovey model is a four-component
hierarchical model that proposes the following branches: (a) emotion perception;
(b) emotional facilitation of thought; (c) emotional understanding; and (d)
emotion management. The branches are organized in a hierarchical manner, and
the abilities involved in the higher branches (understanding and management)
are dependent on the abilities in the lower branches (perception and facilitation).
According to Joseph and Newman's model, which is based on theories of emotion,
emotion regulation, and self-regulation, three of the four above listed EI sub
dimensions are important and related to job performance in a sequential fashion
(perception of emotion, emotional understanding, and emotional regulation).
The emotional facilitation branch is excluded from this model, due to lack of
empirical and theoretical support. Within this model, the ability to understand
emotions mediates the relationship between the other two abilities, perceiving
and regulating emotions, and represents a necessary intermediate step.

As a matter of fact, both models reserve a particular place for the ability
to *understand emotions,* which includes understanding transitions from one
emotion to another, understanding the complexion of emotions, linguistically
encoding information about emotions (Mayer, Salovey, Caruso, & Sitarenios,
2003), and identifying the causes and correlates of one's emotional states
(Harris, 1983). In the Mayer-Salovey model, this branch is defined as the
central locus of abstract processing and reasoning about emotions and emotional
information (Mayer, Salovey, Caruso, & Sitenarios, 2001). According to Mayer
and Salovey (1997), developing emotional understanding is about learning the
relationship between situations and the emotions that accompany them (e.g., loss
produces sadness; threat produces fear). Mayer et al. (2003) regard emotional

understanding as transferring information about relationships between people and objects. The basis of emotional understanding represents knowledge about what types of situations are connected to which emotions, and also the ability of a person to verbally transfer this knowledge. Within appraisal theories of emotions, knowing which type of situation elicits which emotion is the basis for developing objective tests of emotional understanding.

At elementary-school age, children become capable of verbally commenting on emotion-related situations, and can provide self-reports of thoughts and emotions (Harris, 1993). Although research shows that both ability and trait measures of EI are related to academic success (Barchard, 2003; MacCann & Roberts, 2008; Petrides, Fredrickson, & Furnham, 2004), the strongest relationship has been found for emotional understanding (O'Connor & Little, 2003; Rode et al., 2008), while the perception and use of emotions show little relation to academic success.

As a child develops, his ability not only to identify but also to understand the causes and correlates of emotion in oneself and other, also develops (Carroll & Steward, 1984; Wintre & Vallance, 1994). At first, at the beginning of their schooling, children focus their attention on visible, i.e., situational and behavioral elements of emotions. As they mature, they become more capable of linking these with cognitions, mental representations, and inner states, thus using complex cues when explaining different emotions (Carroll & Steward, 1984). According to Casey (1996), school-age children with higher levels of externalizing symptoms relied more often on single, concrete cues to understand emotions (than on multiple cues). This means that they have an underdeveloped emotional understanding in comparison to those children who exhibited lower levels of symptoms. Also, a child who has problems in recognizing the causes of specific emotions may behave in a more aggressive way. As a consequence, that child will not able to contemplate on or learn from his experience, which can result in problems within an academic setting.

Children's ability to identify the causes and correlates of emotions within the context of an emotionally arousing situation has not been thoroughly investigated. In our study, we primarily focused on children's ability to understand emotions in various situations and we used two different approaches to measuring emotional understanding – a vocabulary test and a situational judgement test. We wanted to examine if this ability differs for girls and boys, and if it is related to other important outcomes, like social functioning (prosocial and aggressive behavior) and school achievement. Since emotional understanding is a part of emotional intelligence, and according to the previous research results, girls are better in EI than boys (Mayer, Caruso, & Salovey, 1999; Van Rooy, Alonso, & Viswesvaran, 2005), it was hypothesized that girls would be better in emotional understanding and that emotional understanding would be positively associated with prosocial and aggressive behavior, and school achievement. Since emotional understanding is here defined as an ability, we wanted to test if it can predict GPA, prosocial and aggressive behavior over and above nonverbal intelligence and personality factors. Based on previous research findings (MacCann & Roberts, 2008; O'Connor & Little, 2003) it was hypothesized that emotional understanding would be a reliable

predictor of all three criteria, even after controlling for nonverbal intelligence and the Big Five personality factors. More and more literature (Richardson et al., 2012) emphasizes the role of non-cognitive factors in academic success, and we focused on emotional understanding, because of its central role in both the Mayer-Salovey and the cascading model of EI.

Method

Participants

A sample of 493 pupils from six elementary schools participated in this study (220 girls and 236 boys, 37 pupils (7 %) did not indicate their gender). Their mean age was 12.61, with a *SD* of 1.12 (age range 10 – 15). Five schools are located in the Kvarner region of Croatia (two city schools from Rijeka, two schools from the suburban region of Rijeka, and two schools from the island Krk), and one is situated in the city of Dubrovnik.

Measures

Participants filled out several tests and questionnaires for measuring emotional understanding, fluid intelligence, the Big Five personality traits, and altruistic and aggressive behavior.

Test of Emotional Understanding (TEU; Mohorić, 2012). TEU is an ability measure of emotional understanding, a branch of the Mayer-Salovey model of emotional intelligence. It is an objective maximum-performance multiple-choice test, with theoretically defined correct answers, based on Roseman's (1991) structural model of emotions.

The TEU consists of a description of 42 situations (three situations for each of the 14 different emotions). Each situation represents the specific combination of appraisal dimensions from Roseman's structural model. The task of the subject is to recognize which emotion would arise from each of these situations. What distinguishes this test from most other measures of emotional understanding is that there is an a priori correct answer according to an empirically supported theory. A test based on the same rationale has been developed by MacCann and Roberts (2008). Example items from the TEU can be found in the Appendix.

Vocabulary of Emotions Test (VET; Takšić, Harambašić, & Velemir, 2004). This test was developed in accordance with Mayer and Salovey's conceptualization of emotional intelligence, and also represents a measure of the third branch, *understanding emotions*. In the original, the test consists of 102 adjectives describing various emotional states and moods. The first adjective is the target word, followed by six adjectives with similar meanings. The respondent has to choose one alternative which is closest in meaning to the target word. It is important to emphasize that this test also has a priori defined correct answers, based on definitions given in a dictionary of Croatian language (Anić, 1998). The test has been used in various research projects and has shown good psychometric properties, with a reliability coefficient of $\alpha = .91$ (Takšić et al., 2004). A shorter version with 35 items was used in this research.

Nonverbal Interrupted Series (Hadžiselimović & Ambrosi-Randić, 2006). This is a measure of fluid intelligence, where participants need to determine the relationship between a series of abstract figures and to find out the rule according to which the figures are sorted. The test has 20 tasks. The average item difficulty index for these 20 items is .49. According to authors, test has reliability coefficient of .84, and item-total correlations .35 to .51 (mean correlation is .43).

Adjective measure of the Big Five Personality Traits (Hudek-Knežević, Kardum, & Kalebić-Maglica, 2005). This questionnaire consists of 25 adjectives which describe

personality traits from the Five Factor Model. Participants have to indicate how well a particular adjective describes them (1 = I never behave like that, 5 = I am always like that). Each of the Big Five personality traits is represented with 5 adjectives. A confirmatory factor analysis confirmed a 5-factor structure (Hudek-Knežević et al., 2005), with satisfactory reliability coefficients and correlations between factors.

Scale for assessment of altruistic behavior (Raboteg-Šarić, 2002). The scale has 17 items which measure altruistic and prosocial behavior in everyday situations. Subjects have to answer how often they engage in these type of behaviors. The average score for this scale is 38.74 (total range 1 to 68, *SD* = 12.89). According to our results, the scale has good internal reliability of .89.

Aggressive behavior scale is a measure developed for the purpose of this research. It has 15 items which assess aggressive behaviors (e.g., verbal aggression, physical aggression). The average score for this scale is 13.24 (total range 0 to 60, *SD* = 10.44). The scale has good internal reliability of .89.

Academic success. We also asked students about their school achievement (grade point average at the end of the last school year; grades from half-term of the current school year in the Croatian language, Mathematics, and English language, number of negative grades, and number of unauthorized absences from school).

Procedure

Data collection was conducted in classrooms during school hours. Each participant received the above described battery of tests along with detailed instructions on how to complete them. A researcher was present during the testing to answer any potential questions. Participants were debriefed upon completing the testing. Before data collection, the schools' principals and the parents of the pupils were informed about the research and gave their consent.

Results

All analyses were performed in IBM's SPSS v.20. Descriptive statistics for all applied measures are shown in Table 1.

Table 1
Descriptive statistics and internal consistencies

Scale name	Number of items	M	SD	Range	Cronbach Alpha
Test of Emotional Understanding	42	26.91	5.56	4 – 40	.76
Vocabulary of Emotions Test	35	15.07	6.96	1 – 32	.86
Nonverbal Interrupted Series	20	12.24	3.79	1 – 20	.79
Adjective measures of the Big Five personality traits:					
Extraversion	5	20.43	3.29	5 – 25	.59
Agreeableness	5	20.57	3.05	5 – 25	.70
Consciousness	5	19.34	3.53	5 – 25	.72
Neuroticism	5	14.13	3.63	5 – 25	.67
Openness	5	19.34	3.19	5 – 25	.63
Altruistic behavior scale	17	38.74	12.89	1 – 68	.89
Aggressive behavior scale	15	13.24	10.44	0 – 60	.89

Testing for Group Differences

We first tested for gender differences and found that boys and girls differed significantly on both measures of emotional intelligence, the Agreeableness trait from the Five Factor Model, and measures of prosocial and aggressive behavior. The respective results are shown in Table 2.

Table 2
Mean values for girls and boys and results of t-tests

Scale		N	M	SD	t-test	Cohen's d
Test of Emotional Understanding	*Girls*	217	28.29	5.15	5.23**	0.49
	Boys	226	25.60	5.64		
Vocabulary of Emotions Test	*Girls*	217	16.20	6.82	3.57**	0.34
	Boys	226	13.89	6.81		
Nonverbal Interrupted Series	*Girls*	217	12.36	3.42	0.67	0.06
	Boys	226	12.12	4.08		
Agreeableness	*Girls*	211	21.17	2.58	4.19**	0.40
	Boys	216	19.99	3.26		
Altruistic behavior scale	Girls	187	40.72	11.93	3.57**	0.37
	Boys	188	35.99	13.63		
Aggressive behavior scale	*Girls*	216	10.87	8.13	4.43**	0.42
	Boys	223	15.14	11.69		
GPA	*Girls*	205	4.46	0.60	3.52**	0.32
	Boys	206	4.24	0.73		

*Note. * p <.05; ** p <.01*

Girls scored higher than boys on the Test of Emotional Understanding, which is in accordance with our expectations and findings in previous research (Mayer et al., 1999; Van Rooy et al., 2005). Also, girls were better than boys on the second measure of emotional intelligence, i.e., the Vocabulary of Emotions Test. As expected, no significant difference was observed with regard to fluid intelligence. As for the Big Five, the only statistically significant difference between girls and boys appeared in the domain of Agreeableness, with girls scoring higher on this trait. Girls also reported more altruistic and prosocial behavior than boys. In addition, girls had a higher grade point average than boys. As expected, boys reported more aggressive behaviors than girls.

We used a two-way ANOVA (age *x* gender) to test for age differences between students in their ability to understand emotions in different situations. According to the results, there is a significant age difference between students ($F_{(7,436)}$ = 4.04; *p* <.01, η^2 = 0.027). Post-hoc analyses using Scheffe's test revealed that students in the 7th and 8th grades were more successful on the Test of Emotional Understanding than students in the 5th grade. There was no significant interaction between gender and grade level.

Correlations

Emotional understanding is a branch of emotional intelligence that is defined as an ability, and therefore should exhibit moderate positive associations with other aspects of intelligence. Also, it should have low correlations with personality traits. The correlation coefficients between these and other study variables are shown in the Table 3.

Table 3
Correlation coefficients between study variables

	2	3	4	5	6	7	8	9	10	11
(1) TEU	.54**	.34**	.04	.19**	.13**	-.03	.14**	.14**	-.18**	.17**
(2) VET		.34**	-.06	.07	.08	-.08	.14**	.08	-.01	.25**
(3) NIS			-.03	.01	.03	-.03	.07	.02	-.01	.02
(4) Extraversion				.41**	.39**	-.01	.49**	.19**	.02	.12*
(5) Agreeableness					.61**	.08	.41**	.32**	-.40**	.16**
(6) Consciousness						.11*	.55**	.22**	-.30**	.28**
(7) Neuroticism							.10*	.08	.12*	-.03
(8) Openness								.22**	-.12**	.22**
(9) PB									-.19**	.09
(10) AB										-.05
(11) GPA										1

Note. $* p < .05$; $** p < .01$; TEU = Test of Emotional Understanding, VET = Vocabulary of Emotions Test, NIS = nonverbal interrupted series, PB = Prosocial behavior, AB = Aggressive behavior, GPA = grade point average

As can be seen from Table 3, the Test of Emotional Understanding is most strongly related to the other measure of emotional intelligence, the Vocabulary of Emotions Test ($r = .54$), followed by the measure of nonverbal fluid intelligence ($r = .34$). The correlations coefficients with the Big Five personality traits are significant for Agreeableness, Conscientiousness and Openness, but small-sized.

There is also a significant, although small correlation between prosocial behavior and emotional understanding, measured by the TEU test. Students who have a better understanding of which emotions are expected in a certain situation, report greater engagement in prosocial and altruistic behavior. As expected, there is also a low but significant correlation between emotional understanding measured by the TEU test and aggressive behavior: Adolescents who have lesser emotional understanding report more aggressive behaviors. Also as expected, prosocial and aggressive behavior correlated with some personality traits. There is no significant correlation between prosocial and aggressive behavior and the Vocabulary of Emotions Test or nonverbal intelligence.

Hierarchical Regression Analyses

To check if emotional understanding has a unique contribution in explaining aggressive and prosocial behavior, over and above grade level, fluid intelligence, and the Big Five personality traits, we performed two separate

hierarchical regression analyses, one with prosocial and one with aggressive behavior as the criterion. These analyses were conducted separately for girls and boys since early adolescence is a period of major social and emotional development, and adolescent girls and boys very much differ in their level of maturity. The predictors were entered in the following manner: grade level in step 1, nonverbal intelligence and the Big Five in step 2, and the two measures of emotional understanding (TEU and VET) in step 3. The results are shown in Tables 4 and 5.

Table 4
*Hierarchical regression analysis for **prosocial behavior** as criterion*

Predictors	β	R	R²	ΔR²	ΔF	df	F	df
GIRLS (*N*=164)								
1st step		.02	.006				0.06	1,163
grade level	-.02							
2nd step		.42	.173	.173	5.43**	6, 156	4.67**	7, 163
NIS	.05							
Extraversion	.05							
Agreeableness	.26*							
Consciousness	.08							
Neuroticism	.12							
Openness	.10							
3rd step		.42	.176	.003	0.25	2, 154	3.65**	9, 163
TEU	.03							
VET	-.06							
BOYS (*N*=159)								
Predictors	β	R	R²	ΔR²	ΔF	df	F	df
1st step		.21	.045				7.45**	1, 158
grade level	-.21*							
2nd step		.34	.119	.074	2.44	6, 151	2.29**	7, 158
NIS	.04							
Extraversion	.14							
Agreeableness	.17							
Consciousness	-.05							
Neuroticism	-.02							
Openness	.04							
3rd step		.37	.141	.022	1.91	2, 149	2.72**	9, 158
TEU	.14							
VET	.03							

Note. * p <.05; ** p <.01; NIS = Nonverbal Interrupted Series, TEU = Test of Emotional Understanding, VET = Vocabulary of Emotions Test

Table 5
*Hierarchical regression analysis for **aggressive behavior** as criterion*

GIRLS (*N*=187)								
Predictors	β	*R*	*R²*	Δ*R²*	Δ*F*	*df*	*F*	*df*
1st step		.19	.037				7.09*	1, 186
grade level	.19**							
2nd step		.54	.293	.256	10.81**	6, 179	10.60**	7, 186
NIS	-.03							
Extraversion	.50**							
Agreeableness	-.26**							
Consciousness	-.20**							
Neuroticism	.24**							
Openness	-.07							
3rd step		.56	.312	.019	2.45	2, 177	8.92**	9, 186
TUE	-.10							
VET	.18*							
BOYS (*N*=188)								
Predictors	**β**	**_R_**	**_R²_**	**Δ_R²_**	**Δ_F_**	**_df_**	**_F_**	**_df_**
1st step		.27	.072				14.47**	1, 187
grade level	.27**							
2nd step		.54	.293	.221	9.39**	6, 180	10.68**	7, 187
NIS	-.01							
Extraversion	.10							
Agreeableness	-.39**							
Consciousness	-.10							
Neuroticism	.28**							
Openness	-.04							
3rd step		.57	.331	.038	5.00**	2, 178	9.79**	9, 187
TUE	-.23**							
VET	.09							

Note. * *p* <.05; ** *p* <.01; NIS = Nonverbal Interrupted Series, TEU = Test of Emotional Understanding, VET = Vocabulary of Emotions Test

As shown in Table 4, the full set of predictors explained 17.6% of variance in prosocial behavior for girls, and 14.1% for boys. For girls, the only significant predictor was Agreeableness, while for boys it was grade level. Older children (approximately 13–14 years) engaged in less prosocial and altruistic behavior than younger children (approximately 10–11 years).

For aggressive behavior, the chosen predictors explained altogether 31.2% of variance for girls, and 33.1% for boys. In the female subsample, significant predictors were grade level, Extraversion, Agreeableness, Conscientiousness, Neuroticism, and the Vocabulary of Emotions Test. In boys, significant predictors were grade level, Agreeableness, Neuroticism, and the Test of Emotional Understanding. Measures of emotional understanding had a small, but significant effect on the prediction of aggressive behavior, after controlling for nonverbal intelligence and personality traits for both girls and boys.

We also wanted to see if emotional understanding was related to school achievement, indicated by grade point average for the last school year. Again, we performed a hierarchical regression analysis to investigate the effect of different predictors on GPA. In this case, a four-step analysis was performed, with predictors entered as follows: grade level in step 1, nonverbal fluid intelligence in step 2 (since intelligence tests are usually the best single predictors of GPA; Kranzler et al., 2015), the Big Five personality traits in step 3, and measures of emotional understanding in step 4, to see if they show any incremental value over academic intelligence and personality factors. The results are shown in Table 6.

Table 6
*Hierarchical regression analysis for **grade point average** as criterion*

Predictors	β	R	R²	ΔR²	ΔF	df	F	df
GIRLS (N=178)								
1. step		.22	.048				8.78**	1, 177
grade level	-.22**							
2. step		.22	.048	.00	0.01	1, 175	4.37*	2, 177
NIS	.00							
3. step		.42	.176	.128	5.30**	5, 170	5.19**	7, 177
Extraversion	.01							
Agreeableness	-.13							
Consciousness	.32**							
Neuroticism	-.14							
Openness	.14							
4. step		.52	.268	.092	10.60**	2, 168	6.85**	9, 177
TEU	.-.04							
VET	.36**							
BOYS (N=179)								
Predictors	β	R	R²	ΔR²	ΔF	df	F	df
1. step		.27	.074				14.24**	1, 178
grade level	-.27**							
2. step		.34	.114	.039	7.84*	1, 176	11.32**	2, 178
NIS	.20*							
3. step		.42	.175	.061	2.54*	5, 171	5.19**	7, 178
Extraversion	-.04							
Agreeableness	.01							
Consciousness	.19							
Neuroticism	-.08							
Openness	.09							
4. step		.48	.233	.058	6.34**	2, 169	5.69**	9, 178
TEU	.11							
VET	.18*							

Note. * $p < .05$; ** $p < .01$; NIS = Nonverbal Interrupted Series, TEU = Test of Emotional Understanding, VET = Vocabulary of Emotions Test

The selected predictors explained 26.8% of variance in grade point average for girls, and 23.3% for boys. Grade level was a significant predictor for both boys and girls, with younger students reporting higher GPAs. The nonverbal measure of fluid intelligence was a significant predictor for boys, but not girls. This is an interesting finding because as shown in Table 3, there is no significant correlation between these two study variables (results in Table 3 pertain to the entire sample, but the same was observed in separate analyses for girls and boys). One possible explanation may lie in the relationships between GPA, grade level, and nonverbal intelligence. Grade level and nonverbal intelligence have opposite relationships with GPA – older students have better results on the nonverbal intelligence test (r_{ageNIS} = .31**), but report lower GPA (r_{ageGPA} = –.28**). Taken together, these correlations suppress each other, resulting in a nonsignificant correlation. When we controlled for the effect of grade level in the hierarchical regression analysis, the remaining effect of nonverbal intelligence on GPA became significant (but only for boys). Another reason for the non-significant correlation between nonverbal intelligence and GPA could be the small variability of GPA (mean value of GPA is 4.35, with SD = 0.68) because a vast majority of students (83%) had GPAs of 4 or 5.

Understanding emotions (measured via the Vocabulary of Emotions Test) accounted for an additional 9.2% (5.8% for boys) of the variance in GPA, after controlling for grade level, nonverbal intelligence, and personality traits.

Discussion

The present study examined the relations between emotional understanding (assessed via two measures developed in Croatia), nonverbal intelligence and the Big Five personality factors, on one side, and adolescents' prosocial and aggressive behavior and academic achievement, on the other. We used two conceptually different tests of emotional understanding – one being an example of a vocabulary test (VET), and the other an example of situational judgement test (TEU). We were interested to see if they have different relationships with the criterion variables.

The results emphasize the role of emotional understanding in adolescents' prosocial and aggressive behavior and school achievement. Girls have better emotional understanding than boys, they report engaging in more prosocial and less aggressive behavior, and they have a slightly higher average GPA. Significant predictors of GPA were grade level, non-verbal fluid intelligence (in boys), Conscientiousness (in girls), and understanding of emotions (measured by the Vocabulary of Emotions Test) in both boys and girls.

In ability emotional intelligence theory (Joseph & Newman, 2010; Mayer & Salovey, 1997) emotional understanding plays a significant role, building a bridge between emotion perception and emotion regulation. In order to develop emotional understanding, a person needs to have good emotion perception, and based on emotional understanding one can develop emotion regulation skills. It

also has an important role in our functioning and allows us to govern our social network by better understanding the emotion-laden actions of others. Our results conform to previous findings (Ciarrochi, Chan, & Caputi, 2000; Leedy & Smith, 2012; Mayer & Geher, 1996) that girls are better than boys in this ability. Also, students who can better understand which emotion will be elicited in certain situations report engaging in more prosocial and less aggressive behavior, and have a slightly higher GPA. Similar results were found in other studies (Bonhert, Crnic, & Lim, 2003; Loveland, Lounsbury, Wesh, & Buboltz, 2007).

Emotional understanding had significant (although low) correlations with Agreeableness, Conscientiousness, and Openness to experience. Although adjectives used to describe *conscientious* individuals (e.g., thorough, organized, cautious; Costa & McCrae, 1992) primarily describe this trait as behaviorally oriented, Conscientiousness can also be described as an emotionally oriented trait. It has been proposed that conscientious individuals may have intensified perceptions of self-conscious emotions in order to maintain control over their behavior (Tracy & Robins, 2004). A conscientious person is likely to develop the ability to understand emotions, so he or she can use emotional cues from others to fulfill the need for controlled behavior and to better determine when a behavior is or is not appropriate.

Better emotional understanding was a significant (negative) predictor of aggressive behavior in our sample, both for girls and boys. Aggressive adolescents interpret other people's intentions in a hostile way, adopt behavioral goals aimed at aggressiveness, produce aggressive response alternatives and morally approve of aggression more often than their nonaggressive counterparts (Huesmann & Guerra, 1997; Lochman & Dodge, 1994; Slaby & Guerra, 1988). The Test of Emotional Understanding was a significant (negative) predictor of aggressive behavior for boys, even after controlling for nonverbal intelligence and personality traits. These results suggest that boys who have problems in interpreting various situations and who poorly appraise situations and other people's emotions are more likely to engage in aggressive behavior. This result is very important in school settings, because it suggests that the prevention of aggressive behaviors should focus on the development of emotional understanding skills in boys. This is especially important for older boys (7th, 8th grade) since they show more aggressive behaviors than younger ones. Also, Agreeableness and Neuroticism were significant predictors of aggressive behavior suggesting that boys with certain personality types would benefit most directly from this intervention.

For girls, the Vocabulary of Emotions Test was also a significant predictor of aggressive behavior, after controlling for nonverbal intelligence and personality traits. Girls who have a better emotion vocabulary also show more aggressive behavior. Since aggressive behavior typical for girls usually involves indirect verbal aggression (Björkqvist, Lagerspetz, & Kaukiainen, 1992), it may be argued that girls with better vocabulary skills have grater means for aggression. In our research we did not assesse direct and indirect aggression

separately, and it would be interesting to see if better vocabulary emotions skills are related to specific kinds of aggression.

Prosocial behavior was relatively poorly explained with the chosen predictors (although the model was statistically significant), and only Agreeableness for girls and grade level for boys were significant predictors. Emotional understanding was not a significant predictor of prosocial behavior in our study. Additional research of the relationship between these two constructs is needed, with previous studies pointing to a positive correlation between prosocial behaviors and constructs like empathy or emotional expressiveness (Roberts & Strayer, 1996). Izard and colleagues (2001) found that the ability to detect and label emotion facilitates positive social interactions and that a deficit in this ability contributes to behavioral and learning problems. In a study by Mavroveli and Sanchez-Ruiz (2011) higher trait EI scores were related to more nominations from peers for prosocial behavior and fewer nominations for antisocial behavior.

Beside aggressive and prosocial behavior, we were interested in academic achievement as indicated by GPA. Although GPA has its limitations (e.g., negative skew in the distribution of grades, incomparability of different schools, different grading criteria), it is still the most used measure of academic achievement. High-school GPA is also the strongest predictor of undergraduate GPA, even after controlling for relevant factors, like personality traits and intelligence (Richardson et al., 2012). We obtained the highest correlations with GPA for Conscientiousness and Openness, and Extraversion and Agreeableness were also significantly associated with it. The only non-significant correlation was for Neuroticism. In the meta-analysis of Richardson et al. (2012) Conscientiousness was also the strongest correlate of GPA. The main characteristics of *conscientious* students are self-discipline and achievement orientation so it is not surprising that this trait has the largest correlations with GPA. Students high in O*penness* are expected to be more imaginative and willing to consider new ideas. These students may be better able to manage new learning, which is essential to academic achievement (Zeidner & Matthews, 2000). Also, students high in O*penness* and in A*greeableness* may be more likely to attend classes consistently (Lounsbury, Sundstrom, Loveland, & Gibson, 2003).

The main predictors of GPA for girls were grade level (GPA tends to drop with grade level), Conscientiousness, and emotional understanding measured by the Vocabulary of Emotions Test. For boys, significant predictors were also grade level, nonverbal intelligence, and the result on the Vocabulary of Emotions Test. Personality traits had greater significance for girls, while nonverbal intelligence was more important for boys. Better emotional understanding, that is a better emotional vocabulary, was a significant (although relatively weak) predictor of GPA, even after controlling for nonverbal intelligence and personality traits. Emotional intelligence abilities, especially emotional understanding, could be the mechanism by which cognitive ability and personality traits influence performance. Although Joseph and Newman (2010) in their analysis focused primarily on job performance, similar explanations may be valid for academic

achievement as well. Cognitive ability contributes to academic success (e.g. easier understanding of the subject) but in order to succeed, students' ability has to be accompanied with some personality traits, like conscientiousness or persistence, or a will to put an effort to the completion of a task. According to the results of other meta-analyses, emotional intelligence has a low but significant correlation with academic success (Perera & DiGiacomo, 2013; Richardson et al., 2012). Sanchez-Ruiz, Mavroveli, and Poullis (2013) found that trait EI predicted university performance over and above cognitive ability and established personality traits. In a study by Petrides, Chamorro-Premuzic, Frederickson, and Furnham (2005) verbal ability had a strong effect on academic performance, while extraversion and psychoticism had a negative but weak effect, moderated by gender. Trait emotional intelligence also indirectly predicted achievement via engagement coping and adjustment in a study conducted by Perera and DiGiacomo (2015).

Limitations of the study

There are several limitations of the present study. First, the assessment of personality and prosocial / aggressive behavior was based on self-report data. It may be worthwhile to include an independent method to assess students' personality attributes, such as teacher ratings. Longitudinal data would provide better understanding of causal dynamics among the variables, especially since early adolescence is a period in which emotional understanding is developing and changing. Early adolescence is a time in the life span in which individuals undergo a number of changes at many different levels (due to cognitive development, pubertal development, and social role redefinitions) so it is necessary to replicate results in another sample before making any solid conclusions.

Conclusion

The results of this study show that measures of emotional understanding have incremental validity over and above personality traits and nonverbal intelligence in predicting students' grade point average. They are also significant (although relatively weak) predictors of children's aggressive (but not prosocial) behavior. As expected, girls did better on the emotional understanding test, and students in the 7th and 8th grade were more successful than students in the 5th grade. Boys who poorly appraise situations and other people's emotions are most likely to engage in aggressive behavior. This could be important for the prevention of aggression in school settings, because it suggests that attention should be payed to the development of better emotional understanding skills for boys. Further investigation is needed to better understand the role of emotional understanding in a social and academic functioning in elementary school children.

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Appendix

Sample items from the Test of Emotional Understanding

The following questions describe different situations, related to school or relationships with friends and peers. Read every situation carefully, and choose how the person in the story FEELS, and mark your answer. If you think that a person can feel multiple emotions in that situation, choose the one that is most likely to result from the described situation. Please read the questions carefully.

1. Katarina got invited to the party, even though she was convinced she wouldn't get the invitation. Katarina is most likely to feel?
   a) Surprise   b) Hope   c) Fear   d) Joy   e) Distress
2. Krešo slipped and fell on the cafeteria floor. Everybody laughed. Krešo is most likely to feel?
   a) Guilt   **b) Shame**   c) Anger   d) Pride   e) Frustration
3. A bully from Eva's school has moved to another school. Eva is most likely to feel?
   a) Surprise   b) Hope   c) Joy   d) Anxiety   **e) Relief**
4. Ivan made a bird-house alone completely from scratch, with his own hands. He plans to give that bird-house to a friend, as a gift. Ivan is most likely to feel?
   a) Joy   b) Hope   c) Relief   **d) Pride**   e) Guilt