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Research paper

Individual differences in social cognition as predictors of secondary school performance

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ABSTRACT

Understanding social-cognitive factors that determine school performance could contribute to educational innovations. Social interaction, collaboration and the motivation to learn are important aspects of present-day education. Social-cognitive development can therefore be expected to impact school performance. This was evaluated in the present longitudinal study. The social-cognitive variables mindreading, social value orientation, empathizing and systemizing were measured for three consecutive years in 89 secondary school students (52% girls, Mage at T1=12.9 years). These measures were then related to their school grades for the courses Dutch (native language), English (foreign language) and mathematics in the following year. The results showed that mindreading was a significant predictor for Dutch and English grades. Empathizing was a significant predictor for English grades. Mindreading remained a significant predictor for Dutch grade when controlling for Dutch grade at the time of measurement. These findings underscore the notion that social-cognitive development is important for school performance.

1. Introduction

A student's school performance depends on a wide variety of factors, including student's intelligence [1], student's motivation [2], student's self-discipline [3], parent's support [4] and the school environment [5]. Factors that are not directly school-related, such as personality [6] and sleep patterns [7], have also been found to be related to school performance. Understanding the role of these factors is crucial in establishing education that allows students to flourish. In recent decades, the concept of cooperative learning, with a focus on interdependence between students, has become widespread in educational practices in many industrialized countries [8]. It is therefore of importance to evaluate whether factors related to social development are related to – by preference: predictive of – school performance. If so, this would indicate that educational programs and procedures which target the psychological development of the student have an important side-effect on academic and scholastic performance and will thus be of value for educational innovation.

Earlier research into the role of social factors in education has been done in a wide range of different methods and designs. A large number of these studies has focused on the effects of social skill training programs on school performance [9–12]. For example, a meta-analysis by Durlak et al. showed that programs for social and emotional learning lead to better school performance in elementary school, middle school and high school [9]. Many of these studies have also focused on social skills training programs for children and adolescents with psychological problems, such as aggressive behavior [11] and ADHD [12]. Other studies have examined the relation between school performance and social variables such as social competence [13], social skills [14] and social support [15]. The majority of these studies has focused on social training programs and/or directly school-related factors, primarily in samples of primary school students. The predictive value of individual differences in social cognition on adolescent school performance has been underrepresented.

Social cognition is an essential aspect of adolescent development [16]. Adolescence can be seen as a period of social reorientation [17]. Adolescents no longer spend most of their time with their parents but now interact more with peers, with whom they form emotional bonds [18]. In order to deal with this reorientation, adolescents need to develop adequate skills to function in complex social groups. Adolescent social-cognitive processes generally are appropriate for the developmental challenges of the adolescent life phase, but in some

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situations these processes can lead to a downward spiral with several negative outcomes [19]. Adequate adolescent social-cognitive development has been related to wellbeing, self-esteem and healthy coping styles [20,21]. On the other hand, adolescents who have poor social skills are more vulnerable for psychosocial problems [22,23] and are more likely to be bullied [24,25].

In school settings, social skills are also of great importance to adolescents. Adolescent social behavior mainly occurs in and around schools where students form friendships and complex social hierarchies and learn from each other in terms of preferences, attitudes and orientation towards school, parents and the outside world. Adolescent social development may impact school performance in several ways. Adolescents have to interact with their teachers during the lessons, especially when they have difficulties understanding a subject. Moreover, they have to cooperate with their classmates on school assignments both in the classroom and for homework. In order to do so, adolescents need to be able to understand the intentions of others, be prepared to cooperate with others and be able to negotiate over work distributions. These elaborate forms of social cognition can be quite challenging for adolescents [26–28].

One of the skills that may help adolescents at school is the ability to read the mental states of others. Recognizing and interpreting the emotional states of others, often referred to as mindreading, is important as it helps to understand the others' intentions and to predict their future actions [29]. The cognitive processes related to this skill are still in development in adolescents [30,31]. In the classroom, mindreading skills may help students to understand their teachers and classmates. Teachers may use humor, irony, sarcasm or emotional expressions in their communication with the class and yet be unaware of the difficulty some students may have in interpreting these kinds of expressions [32,33]. In cooperation with classmates, mindreading skills may help students to be aware of each other's mental states and thereby lead to more efficient cooperation.

Related to mindreading is the ability to empathize with others. Empathy refers to the ability to understand and experience what others feel and is therefore characterized by an 'emotional component' [34]. Empathizing with someone goes thus one step further than just reading their mind. It helps us to emotionally feel the experiences of others and thereby understand their deeper mental processes, their judgments and intentions. One way to measure empathy is the use of questionnaires [35,36]. Although reporter biases may influence self-report, questionnaires have the advantage of measuring empathy as experienced in daily life [37]. Like mindreading, empathizing is likely to be useful to children in the classroom. The ability to empathize with others facilitates social interactions [38]. Students with high levels of empathy may thus have an advantage in understanding and cooperating with teachers and peers.

A third factor that is likely to benefit social interactions in the classroom is prosocial orientation. Social value orientation refers to the preferences for certain outcomes in situations of cooperation. Some people (referred to as prosocials) value both their own outcomes and the outcomes of others in interactions. Others (known as proselfs) try only to maximize their own outcomes in situations of cooperation [39]. Empirical research has found that prosocials feel more social responsibility for group interests [40], are more likely to donate to noble causes [41] and show greater concern for environmental causes [42]. A prosocial orientation is central for cooperative learning in which positive interdependence between students is promoted [43,44].

The present study focuses on the role of social-cognitive development in school performance. The design of the study is longitudinal, investigating a group of secondary school students for three consecutive years. At three time points, mindreading, empathizing and social value orientation were measured. These factors were then related to their school grades for the subjects Dutch (native language), English (foreign language) and mathematics. We hypothesized that (1) levels of these social-cognitive measures are positively correlated to school grades; and (2) social cognition can predict change in school grades over time, controlling for concurrent school grades.

2. Methods

2.1. Participants

The students who participated in this study were enrolled in a secondary school in the Netherlands. Testing took place in the first, second and third year of secondary school (Grade 7–9; T1, T2 and T3). School grades were collected at the end of these school years and at the end of the fourth school year (Grade 10; T4). The Dutch secondary education system is divided into three different levels: preparatory middle-level vocational education (VMBO), higher general continued education (HAVO) and pre-university education (VWO). In the first year, some schools offer classes that combine these levels. At T1, all students were enrolled in VMBO-HAVO, HAVO-VWO or VWO levels. At T2, the students who continued their education at the HAVO and VWO levels were included (N=124). At T3, 96 of these students were tested again. Reasons for attrition (N=28) were being absent at the day of testing or no longer being part of the participating classes. The grades of 7 of these students could not be collected at T4, thus leaving a final sample of 89 students (46 girls (52%), Mage (at T1) =12.9 years, range 12.2–13.7 years). At T1, 11 of these students (12%) were at the VMBO-HAVO level, 40 (45%) were at the HAVO-VWO level and 38 (43%) were at the VWO level. At T2, 22 students (25%) were at the HAVO level and 67 (75%) were at the VWO level. At T3, 23 students (26%) were at the HAVO level and 66 (74%) were at the VWO level. At T4, 26 students (29%) were at the HAVO level and 63 (71%) at the VWO level.

2.2. Materials

2.2.1. Mindreading

To measure mindreading, the child version of the Reading the Mind in the Eyes Task was used [29]. In this task, participants are presented with a photo of a pair of eyes and four descriptions of emotional states. The goal for the participants is to indicate the right description for the emotion portrayed on the photo. There was no time limit and reaction times were not measured. The descriptions were translated into Dutch. The task was shortened down from 28 items to 15 items due to time restrictions. In selecting these 15 items, we took into account the number of male and female faces and the number of clearly positive and negative emotions.

2.2.2. Empathizing

The Empathy Quotient (EQ) was used to measure empathizing [35,37]. The EQ is a self-report questionnaire that measures affective and cognitive empathy in real-life situations. Both the adult version and the child version were deemed unsuitable for the adolescent population. Therefore, an adolescent version of the task was created by modifying the child version in two ways. First, the phrasing of the items was changed from parent-report to self-report. Secondly, a number of questions were modified to better suit the adolescent population. For example, the item 'When playing with other children, my child spontaneously takes turns and shares toys.' was rephrased as 'When I cooperate with others, I make sure everybody takes turns'. Furthermore, six questions were removed altogether because it was unfeasible to rephrase them for the adolescent domain of interests and actions. The final questionnaire included a total of 50 questions. As in the original, half of these questions tested the EQ and half of them tested the Systemizing Quotient (SQ). Systemizing refers to the drive to analyze and construct systems based on their underlying lawful regularities [35]. Systemizing is used as a control variable in the analyses. All questions were scored on a 4-point Likert scale. As being the standard procedure [35], participants scored two points for

answering “definitely agree”, one point for “slightly agree” and no points for “slightly disagree” or “definitely disagree” (and vice versa for reversed items). The questionnaire was translated to Dutch based on the version by De Corte et al. [45].

2.2.3. Social value orientation

To measure social value orientation, the Triple Dominance Measure was used [46]. For each of nine items in this task, participants have to choose between three ways to distribute points between themselves and a hypothetical partner. The three options are cooperative (same number of points for both: e.g. 500 - 500), individualistic (maximum amount of points for self, regardless of the points of the other: e.g. 550 - 300) or competitive (maximize amount of points for self, relative to the other: e.g. 500 - 100). Since we considered distributing points too abstract for adolescents, the points were replaced by small amounts of money. To maintain equivalence to the original measure, participants were told that they would not actually receive this money but that they should play as if they would.

The standard procedure is to classify those who make six or more congruent choices as either cooperators (prosocials), individualists or competitors, and then to merge the latter two into one group called proselfs [40,47]. The disadvantage of this method is that those who do not make at least six congruent choices will be left out of the data analyses. Since our sample was relatively small, we decided to split up all the participants into two groups (prosocials and proselfs) and thus removing no participants from the sample. This was done by classifying those who made six or more cooperative choices as prosocials and all others as proselfs. Using this method, there were 65 prosocials (73%) at T1, 62 (70%) at T2 and 68 (76%) at T3. Other researchers have used similar methods to avoid removing unclassified participants from their sample [48,49].

2.2.4. School performance

In order to measure school performance, school grades of all the participants were obtained for the four school years. School grades were obtained for the courses Dutch (native language), English (foreign language) and mathematics. The grades for these three courses are seen as a valid estimation of Dutch secondary school performance [50]. Dutch school grades range from 1 (poor) to 10 (excellent) and are further subdivided with intervals of one decimal. A grade of 5.5 or higher is needed to pass an exam. The grades obtained were the final grades at the end of the school year (May/June) whereas testing took place in the months of March and April.

2.3. Procedure

Before testing took place all students and their parents were informed of the study and asked for passive consent in a letter that also explained that the students could withdraw from participation at any time. Only a small number of students opted not to participate in the study.

The testing was performed in the classroom on school computers in the presence of a supervisor. Participants performed the testing separately and were not allowed to communicate with other students. The questionnaires and tasks were programmed and presented through the internet. Skipping items or going back in the menu was impossible. The testing differed only slightly for the three time points. At T2, the EQ/SQ was not included due to time constraints. Social value orientation and mindreading were tested at all three times. A number of other questionnaires were included, but those are not relevant for the present study.

2.4. Statistical analysis

First, relations between the four social-cognitive measures (mindreading, social value orientation, empathizing and systemizing) and the school grades for the subjects Dutch, English and mathematics at the different time points were explored using Pearson correlations. For the relation between social value orientation and school grades *t*-tests for independent samples were used. Moreover, repeated-measures general linear models were used to investigate sex differences in school grades and the social-cognitive measures. The aim of this paper is to examine the relation between social-cognitive variables and school performance. The analyses of the developmental effects and relations among the social-cognitive variables are therefore reported elsewhere [51].

Multilevel linear models were used to examine the relation between the social-cognitive variables and school grades. In these models, the social-cognitive variables at T1, T2 and T3 were used as predictors of school grades in the following year. This resulted in one model detailing the extent to which the social-cognitive variables can predict school grades in the next year. Thus, mindreading, social value orientation (0= prosocial, 1= proself), empathizing and systemizing at T1 were used to predict school grades at T2 and so on. Since empathizing and systemizing were not measured at T2, the scores on these measures at T1 were entered in the analyses. In the analyses, time point was used as repeated effect and sex (0= boy, 1= girl), age and school level (0= HAVO, 1= VWO) were used as control variables. The repeated covariance type was unstructured and the model used a maximum likelihood estimation. The analyses were performed separately for the three different school subjects (Dutch, English and mathematics). Furthermore, the analyses were repeated with school grade at the time of measurement as control variable to explore whether the social-cognitive variables can predict changes in school performance. P-values of $< .05$ were considered significant.

3. Results

3.1. Descriptive statistics

Table 1 shows the descriptive statistics for mindreading, social value orientation, empathizing, systemizing, executive functions and the school grades for the courses Dutch, English and mathematics at T1, T2, T3 and T4. The relations between the social-cognitive variables at T1, T2 and T3 and the school grades at T1, T2, T3 and T4 are displayed in Table 2.

Repeated measures general linear models revealed that girls had significantly higher Dutch ($F(1, 87) = 39.76$, $p < .001$) and English grades ($F(1, 87) = 7.33$, $p = .008$) compared to boys, but there were no gender differences for math grades ($F(1, 87) = .34$, $p = .56$). Moreover, girls scored significantly higher on mindreading ($F(1, 87) = 18.95$, $p < .001$) and empathizing ($F(1, 87) = 23.02$, $p < .001$), whereas boys scored significantly higher on systemizing ($F(1, 87) = 11.27$, $p = .001$). Girls were more likely to have a prosocial value orientation, but this differences was only nearly significant ($F(1, 87) = 3.54$, $p = .06$).

3.2. Multilevel linear models

Table 3 shows the results of the multilevel linear analyses with Dutch grade as dependent variable. The results of model 1 showed that mindreading ($F(1, 224.13) = 10.76$, $p = .001$) and empathizing ($F(1, 151.10) = 4.00$, $p = .047$) were significant predictors for Dutch school grade in the following year. In model 2, Dutch school grade at the time of measurement was added as a predictor. In this model, mindreading remained a significant predictor ($F(1, 224.24) = 5.32$, $p = .022$), but the associations with empathizing ($F(1, 129{,}94) = 3.33$, $p = .070$) and social value orientation ($F(1, 225.23) = 3.09$, $p = .080$) just fell short of the conventional significance levels. Contrary to our hypotheses, a prosocial value orientation was negatively related to Dutch grade. A likelihood ratio test confirmed that model 2 has a significantly better fit than model 1 ($\chi^2_{change} = 33.75$, $df_{change} = 1$, $p < .01$).

In Table 4 the multilevel linear models with English grade as a dependent variable are shown. In model 1, mindreading was a

Table 1
Descriptive statistics for mindreading, social value orientation, empathizing, systemizing and the school grades for Dutch, English and Mathematics at the four different time points (T1, T2, T3 and T4).

	T1		T2		T3		T4	
Variable	M	Sd	M	Sd	M	Sd	M	Sd
Mindreading	9.85[a]	1.73[a]	8.62	2.00	9.13	1.35	–	–
SVO	73% prosocial		70% prosocial		76% prosocials		–	–
Empathizing	26.05	7.91	–	–	26.74	7.59	–	–
Systemizing	19.81	5.92	–	–	19.69	6.10	–	–
Dutch	7.23	.80	6.88	.62	6.53	.68	6.67	.69
English	7.41	.94	6.92	.87	6.84	.87	6.76	.98
Mathematics	6.91	.82	6.87	.89	6.51	.97	6.41	.78

[a] Please note that this score cannot be directly compared to the T2 and T3 scores because different items were used to measure mindreading at T1.

significant predictor for English grade in the following year (F(1, 167.27) =4.32, p=.039). Model 2 showed that mindreading fell short of the conventional significance levels (F(1, 106.62) =3.29, p=.072) when adding English grade at the time of measurement as a control variable. A likelihood ratio test pointed out that model 2 has a significantly better fit than model 1 (χ^2_{change} =29.35, df_{change} =1, p < .01).

Table 5 shows the results of the last multilevel linear analyses in which mathematics grade is the dependent variable. None of the social-cognitive variables was a significant predictor in model 1 and in model 2 in which mathematics grade at the time of measurement is entered as a control variable. Again, a likelihood ratio test confirmed that model 2 has a significantly better fit than model 1 (χ^2_{change} =61.20, df_{change} =1, p < .01).

Table 3
Summary of the multilevel analysis using the variables at the previous year to predict Dutch Grades excluding Dutch Grade in the previous year (model 1) and including Dutch Grade in the previous year (model 2).

	Model 1			Model 2		
Variable	B	SE B	p-value	B	SE B	p-value
Sex	−.541	.103	.000	−.348	.078	.000
Age	−.184	.147	.215	−.172	.104	.103
School level	−.289	.094	.002	−.170	.073	.022
Mindreading	.055	.017	.001	.038	.016	.022
SVO	−.116	.071	.107	−.117	.067	.080
Empathizing	.010	.005	.047	.008	.004	.070
Systemizing	−.003	.006	.602	−.002	.005	.733
Dutch grade				.346	.041	.000
−2 Log Likelihood		362.732 (Df =14)			328.978 (Df = 15)	

4. Discussion

The results of this three-year study show a positive correlation between social-cognitive variables and school grades in the first years of secondary school in students aged 13 at the start. Mindreading and empathizing were predictive of native language (Dutch) school grade in the following year. Moreover, mindreading remained significant when controlling for the grade in the concurrent year, whereas empathizing just fell short of the conventional significance levels. Mindreading was also a significant predictor of foreign language (English) grade in the following year and just fell short of the conventional significance levels when controlling for the grade in the previous year. None of the social-cognitive measures were able to predict mathematics grades. These findings show that mindreading and empathizing are predictors of school performance and that mindreading is even able to predict changes in school performance. Thus, mindreading is not only a predictor of school performance but better mindreading skills are also associated with improvement of school performance over time.

The relation between mindreading skills and school grades highlights the importance of being able to understand others, especially in school settings. Mindreading skills allow us to understand each other's mental states and thereby serve as a corner stone for social interactions. Students with good mindreading skills may have an advantage in understanding the deeper intentions of teacher's instructions.

Table 2
Relations between mindreading (MR), social value orientation (SVO), empathizing (EQ), and systemizing (SQ) measured at T1, T2 and T3 and the school grades for the subjects Dutch (DU), English (EN) and Mathematics (MA) at T1, T2, T3 and T4. The reported values are Pearson's coefficients (r) for all measures except for the binary variable social value orientation for which t-values are reported.

		T1				T2		T3			
Value		MR r	SVO T	EQ r	SQ r	MR r	SVO t	MR R	SVO T	EQ r	SQ R
T1	DU	.148	−.065	.355**	−.089	.054	.744	.185	.525	.252*	−.144
	EN	.050	−1.150	.150	.032	.041	−.658	.074	−1.927	.060	−.066
	MA	−.020	.586	.130	.137	−.082	1.257	.086	.967	.144	.262
T2	DU	.256*	−.656	.341**	−.230*	.272*	.873	.223*	.906	.242*	−.239*
	EN	.308*	−1.245	.271*	−.123	.205	.036	.120	−.657	.129	−.195
	MA	.050	.983	.217*	.216*	−.026	1.529	.149	2.287*	−.195	.182
T3	DU	.178	.013	.434**	−.080	.234*	.419	.234*	1.228	.359**	−.136
	EN	251*	−.670	.252*	−.043	.188	.675	.137	.749	.177	−.148
	MA	.127	.106	.067	.117	.082	1.297	.146	2.125*	.146	.233*
T4	DU	.094	−.191	.269*	.007	.213*	.884	.219*	1.064	.237*	−.005
	EN	.163	−.996	.274**	.044	.208	−.239	.195	.209	.154	−.068
	MA	−.107	.310	.153	.151	.023	.106	−.084	.949	.091	.076

Table 4
Summary of the multilevel analysis using the variables at the previous year to predict english grade excluding english grade in the previous year (model 1) and including english grade in the previous year (model 2).

	Model 1			Model 2		
Variable	B	SE B	p-value	B	SE B	p-value
Sex	−.539	.175	.003	−.212	.112	.089
Age	.228	.260	.323	.070	.156	.666
School level	−.156	.142	.272	−.032	.105	.764
Mindreading	.038	.018	.039	.037	.021	.072
SVO	.004	.082	.964	−.067	.087	.440
Empathizing	.003	.007	.691	.007	.006	.260
Systemizing	−.004	.008	.614	−.004	.007	.574
English grade				.491	.045	.000
−2 Log Likelihood		486.169 (Df = 14)			456.817 (Df = 15)	

Table 5
Summary of the multilevel analysis using the variables at the previous year to predict mathematics grade excluding mathematics grade in the previous year (model 1) and including mathematic grade in the previous year (model 2).

	Model 1			Model 2		
Variable	B	SE B	p-value	B	SE B	p-value
Sex	−.048	.170	.777	−.027	.083	.745
Age	−.502	.239	.038	−.179	.110	.110
School level	−.031	.151	.836	.080	.078	.307
Mindreading	.036	.024	.143	.021	.022	.358
SVO	.110	.107	.306	−.008	.089	.930
Empathizing	−.002	.009	.863	−.001	.006	.791
Systemizing	.006	.011	.583	.003	.007	.599
Maths grade				.734	.040	.000
−2 Log Likelihood		592.494 (Df = 14)			531.291 (Df = 15)	

Moreover, a study by Woolley et al. found that mindreading skills serve as a predictor for what they call collective intelligence, which is group performances on a wide range of tasks [52]. This shows that a group of people with good mindreading skills has an advantage in solving several types of tasks even when these tasks are not related to understanding emotions. The findings of the present study suggest that mindreading also helps students at school. For example, this skill may help students in group assignments such as homework projects.

Empathizing was a significant predictor for Dutch grade in the following year. Empathizing allows students to understand and experience the emotions and perspectives of their teachers and peers. Moreover, empathizing will motivate students to share their school experiences and thereby reinforce what they have learned. There is some evidence for the effect of empathy training on school performance [53]. However, most studies have focused on the role of emotional or social intelligence in relation to education. Empathy is often regarded a key aspect of emotional intelligence [54]. Emotional intelligence has been found to relate to school performance in primary [55], secondary [56,57] and university education [58].

In none of the analyses social value orientation turned out to be a significant predictor of school performance. However, surprisingly a proself value orientation was a nearly significant predictor of Dutch grade when controlling for Dutch grade in the previous year. Since no significant differences between prosocials and proselfs on Dutch grades at any of the time points were found in the simple *t*-tests, it is possible that this association is an artifact of the use of a multilevel linear model. The *t*-tests did reveal that prosocials obtained better mathematics grades at T3, however these effects did not show up in the multilevel linear models. Overall, these results do not provide evidence for a clear relation between social value orientation and school performance. Possibly, both a prosocial and proself value orientation may have some advantages and disadvantages in school depending on specific situations.

In the current study, relations between social-cognitive variables and school grades for the native and foreign language were found. However, the social-cognitive variables were no significant predictors for mathematics. A possible explanation is that social factors play a smaller role in technical school subjects, like mathematics. In language courses communication plays a decisive role, because in the end language is a tool for communication. Technical courses may also use more straightforward teaching methods in which cooperation and interaction play a less prominent role [59]. Further research is necessary to find out whether there is a relation between social-cognitive variables and the grades for other technical subjects, such as physics and chemistry, and grades for other non-language subjects, such as biology and history.

It is possible that the predictive value of social-cognitive measures on school performance is influenced by other factors. Sex differences may play a role in understanding the relation between social cognition and school grades since we found significant sex differences on school grades (for Dutch and English). However, sex was controlled for in our analyses, ruling out sex differences as an explanation for our results. Another possibility is that the effect was partially driven by other factors that we did not control for, such as intelligence and executive functioning. However, although intelligence and executive functions may influence social cognition, the role of these factors in social-cognitive processes is not considered crucial [60–62]. Moreover, the finding that social-cognitive variables are predictive of performance for both language subjects and not mathematics, hints that the effect of social cognition on school performance is due to specific social processing in the classroom and not due to other factors.

Some limitations of this study have to be mentioned. First, the sample of 89 students used in this study is relatively small. However, the small sample size was the consequence of our decision to exclude participants who left school or changed educational level. This decision allowed us to study the same students for a three year period. Secondly, the sample consisted of students in the higher levels of Dutch secondary education possibly limiting the findings to lower levels. However, using only higher level students also has provided a relatively homogenous sample. Further studies need to be conducted to see if our results can be replicated in lower level students.

The results of the present study show a relation between mindreading and school performance, and to a lesser extent between empathizing and school performance in a group of secondary school students. This adds to the growing literature establishing the relationship between social development and school performance [10,13,15,57,63]. The present study extends these findings by using a longitudinal sample of secondary school students, by measuring social-cognitive variables not directly related to school functioning and by differentiating between school subjects.

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