



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 proselves) 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

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