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DOI

[10.1016/j.appdev.2021.101277](https://doi.org/10.1016/j.appdev.2021.101277)

Publication date

2021

Document Version

Final published version

Published in

Journal of Applied Developmental Psychology

License

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Citation for published version (APA):

Roorda, D. L., Zee, M., Bosman, R. J., & Koomen, H. M. Y. (2021). Student–teacher relationships and school engagement: Comparing boys from special education for autism spectrum disorders and regular education. *Journal of Applied Developmental Psychology*, 74, [101277]. <https://doi.org/10.1016/j.appdev.2021.101277>

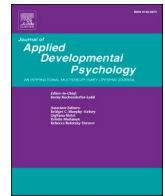
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Student–teacher relationships and school engagement: Comparing boys from special education for autism spectrum disorders and regular education

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ARTICLE INFO

Keywords:

Affective student-teacher relationships
Engagement
Autism spectrum disorders
Special education
Student reports

ABSTRACT

The present study examined differences in student–teacher relationship quality and engagement with schoolwork between boys from regular education and boys from special education for students with autism spectrum disorders (ASD). We also investigated whether the strength of associations between student–teacher relationship quality and engagement differed across boys from regular and special education. Third-to-sixth grade boys from regular education ($N = 182$) and special education for ASD ($N = 113$) reported about the relationship with their teachers (closeness, conflict) and their school engagement. Multilevel modeling showed that boys from special education for ASD reported more conflict and less engagement than boys from regular education. Furthermore, the association between conflict and engagement was stronger for boys from special education than from regular education. Future research may aim to investigate conflict in relationships with boys from special education for ASD as a potential target for teacher interventions.

Introduction

Previous research has found strong evidence that the affective quality of dyadic student–teacher relationships is associated with students' school functioning, such as their engagement with schoolwork (e.g., Archambault, Pagani, & Fitzpatrick, 2013; Hughes, 2011; Roorda, Jak, Zee, Oort, & Koomen, 2017). More specifically, close relationships with teachers are associated with higher levels of engagement with learning tasks, whereas conflictual relationships with teachers seem to limit students' engagement with schoolwork (Archambault et al., 2013; Hughes, 2011; Roorda et al., 2017). Furthermore, student-teacher relationships are more strongly associated with the school engagement of at-risk students than for their typically developing peers (Hamre & Pianta, 2001; Roorda, Koomen, Spilt, & Oort, 2011). At-risk students usually also share more disadvantageous relationships with their teachers than their typically developing peers (McGrath & van Bergen, 2015; Nurmi, 2012), placing them further at risk for school maladjustment (Archambault et al., 2013; Hughes, 2011; Roorda et al., 2017).

One group of students that might be especially at risk for developing disadvantageous relationships with teachers are students with autism

spectrum disorders (ASD; Eisenhower, Blacher, & Bush, 2015). Research into relationships between teachers and students with ASD, however, has mostly focused on teachers' relationship perceptions (Eisenhower, Blacher, & Bush, 2015). In studies focusing on typically developing students, agreement between teachers' and students' relationship perceptions is usually moderate at best (Hughes, 2011; Koomen & Jellesma, 2015). Therefore, it seems to be important to take the relationship perceptions of students' with ASD into account as well and to investigate how relationship perceptions of students with ASD are associated with their school engagement.

The present study therefore examined whether there are differences between boys from special education for ASD and boys from regular education in (a) their perceptions of the relationship with their teacher, (b) their self-reported school engagement, and (c) the strength of the association between student–teacher relationships and students' engagement.¹ The present study focused on boys only, because the small amount of girls ($N = 6$) in the special education sample limited generalization to girls from special education for ASD. As previous studies focusing on students with ASD included mainly boys as well (usually around 82%; e.g., Caplan et al., 2016; Robertson et al., 2003), we believe

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¹ Information about ASD diagnoses at the student level was not available for the present study. However, 90% of the students from the two special education schools had a formal diagnosis of ASD, whereas only 4% of the total population of boys in Dutch regular education is diagnosed with ASD. Therefore, in the present study, we distinguished between the two school types instead of referring to students with and without ASD.

that these previous studies could provide adequate input for forming hypotheses for our all boys sample. Furthermore, we focused specifically on students from upper elementary school (grades 3 to 6), as both student–teacher relationship quality and students' engagement tends to decline toward the end of elementary education (Jerome et al., 2009; Pianta & Stuhman, 2004; Skinner et al., 2008). Moreover, student–teacher relationship quality also seems to be more strongly associated with the school engagement of students in the higher elementary grades compared to younger students (Roorda et al., 2011).

Affective relationships between teachers and students with ASD

Empirical studies on the role of student characteristics, such as ASD, in the quality of student–teacher relationships have been largely motivated by attachment theory and developmental systems theories (Pianta, 1999; Pianta et al., 2003). These frameworks are based on the notion that student–teacher relationships are complex systems within which students may experience different levels of responsiveness to their basic emotional needs, depending on the degree of closeness and conflict in the relationship (Pianta, 1999; Verschueren & Koomen, 2012). Generally, relationships high on closeness, which are characterized by warmth, trust, and open communication, are believed to provide students with a secure support system that enables them to explore the classroom environment and seek help when needed. In contrast, if students experience high levels of conflict in the relationship with their teacher, they may feel emotionally insecure and therefore be less inclined to use the teacher as a resource. Conflictual relationships are characterized by high levels of negativity, tension, and hostility (Pianta, 1999; Verschueren & Koomen, 2012).

Students with ASD may be at risk for developing relationships that are marked by both low levels of closeness and high levels of conflict, due to the problems with social interactions that seem to be inherent to this disorder (Caplan et al., 2016; Robertson et al., 2003; Santos, Sardinha, & Reis, 2016). More specifically, students with ASD tend to have deficits regarding social communication and interactions (e.g., understanding social cues and behaviors), could give the impression that they are not interested in interacting with other people, and often communicate in ways that are not appropriate in a given context (Robertson et al., 2003; Santos et al., 2016). Furthermore, students with ASD tend to display restrictive and repetitive behaviors and interests (Eisenhower, Bush, & Blacher, 2015), which may lead to irritation in teachers. Finally, teachers tend to perceive students with ASD more often as displaying behavioral and emotional difficulties and as academically underachieving compared to their typically developing classmates (Ashburner, Ziviani, & Rodger, 2010; Caplan et al., 2016), which may place them further at risk for developing disadvantageous relationships with teachers (Caplan et al., 2016; Nurmi, 2012).

Supporting this assumption, studies based on teacher reports generally found that teachers experienced less closeness and more conflict in their dyadic relationships with students with ASD in regular education compared to typically developing students (Longobardi et al., 2012; Prino, Pasta, Gastaldi, & Longobardi, 2014; Santos et al., 2016). In a study comparing students in non-public special schools for ASD with students in regular education, Blacher et al. (2014) also revealed that teachers experienced less closeness and more conflict in relationships with students from special education for ASD than with students from regular education. Moreover, research suggests that teachers experience more disadvantageous relationships (i.e., less closeness, more conflict) with students with ASD compared to students with other special educational needs, such as Down's syndrome (Prino et al., 2014) and intellectual disabilities (Blacher et al., 2014). Based on teachers' relationship perceptions, we would thus assume that boys from special education for ASD are indeed at risk for developing less close and more conflictual relationships with their teachers.

Whether students with ASD themselves also experience less closeness and more conflict in their relationships with teachers remains relatively

unknown. Previous studies, not focusing on ASD, revealed that for boys and girls in regular education agreement in teachers' and students' relationship perceptions was usually only weak to moderate (e.g., Hughes, 2011; Koomen & Jellesma, 2015). This may be due to teachers and students having their own histories with regard to relationships with important others (e.g., their own parents, other teachers/students), which may color their views and interpretations of each other's interactive behaviors (Pianta et al., 2003). Furthermore, student-reported relationship quality has been found to be differently associated with typically developing students' school adjustment than teacher-reported relationship quality (e.g., Hughes, 2011; Skinner & Belmont, 1993). As students from regular upper elementary schools have been found to provide reliable and valid reports about their relationships with teachers (e.g., Hughes, 2011; Koomen & Jellesma, 2015; Zee & Koomen, 2017), it seems important and possible to take the relationship perceptions of students with ASD into account as well.

The study of Zee, de Bree, Hakvoort, and Koomen (2020), including boys and girls from third to sixth grade, further supports the notion that students' relationship perceptions may provide a unique view on similarities and differences in relationships between teachers and students with and without ASD. More specifically, Zee et al. (2020) found that teachers perceived less closeness and more conflict in their relationships with students with ASD, whereas students with ASD themselves did not report differences in relationship quality compared to typically developing students. As far as we know, this is the only study in elementary school that included relationship perceptions of students with ASD. However, this study was performed in a regular education context, indicating that students with ASD were likely to have sufficient behavioral, adaptive and/or intellectual functioning to enable this general education placement.

Student–teacher relationship quality and students' school engagement

Previous studies with students with ASD have focused on associations between student–teacher relationships and several aspects of their school adjustment, such as social inclusion (Robertson et al., 2003), loneliness (Zeedyk et al., 2016), and externalizing problems (Eisenhower, Bush, & Blacher, 2015). As far as we know, there are no studies that have focused on the school engagement of students with ASD. As school engagement is an important predictor of students' academic achievement and school dropout (e.g., Finn & Zimmer, 2012; Hughes et al., 2008), attention for this aspect of the school adjustment of students with ASD seems to be warranted.

School engagement is a broad construct, which has been defined and operationalized in different ways. According to Skinner et al. (2009; p. 494) engagement refers to '...the quality of a student's connection or involvement with the endeavor of schooling...'. As such, engagement includes both behavioral aspects (i.e., participation in academics, such as effort, persistence, and concentration) and emotional aspects (i.e., students positive and negative feelings and emotions toward schoolwork, such as enjoyment, satisfaction, boredom, and frustration; Skinner et al., 2009). In the present study, we followed the approach from the meta-analyses of Roorda et al. (2011, 2017) and investigated engagement as an unidimensional construct, including both students' engaged behaviors and emotions. We chose this approach because most empirical studies did not clearly distinguish between different aspects of engagement (Roorda et al., 2011, 2017) or found comparable associations between student–teacher relationships and both behavioral and emotional engagement (e.g., Zee & Koomen, 2019). Therefore, we did not have enough reason to formulate separate hypotheses for behavioral and emotional engagement, especially not in the context of students with ASD.

For students in regular elementary education, student–teacher relationship quality appears to be associated with students' engagement, with most studies measuring relationship quality from the teachers' perspective (e.g., Archambault et al., 2013). Some studies also found

evidence that student-reported relationship quality predicts their school engagement (e.g., Hughes, 2011; Zee & Koomen, 2019). With respect to differences in engagement levels, the restricted and limited interests of children with ASD (Eisenhower, Bush, & Blacher, 2015) may lead to lower engagement with schoolwork for students with ASD compared to typically developing students. In line with this idea, it has often been assumed that students with ASD are less engaged with schoolwork than typically developing students and students with other kinds of disabilities and, hence, interventions have been developed to stimulate the school engagement of students with ASD (Keen, 2009).

Previous research suggests that relationships with teachers are more influential for some groups of students than for others (e.g., Hamre & Pianta, 2001; Roorda et al., 2011). More specifically, the academic risk hypothesis states that relationships with teachers are more influential for the school adjustment of at-risk students, as they have more to gain or to lose from the relationship with their teacher (Hamre & Pianta, 2001). High levels of closeness and low levels of conflict would therefore be more beneficial for at-risk students' school adjustment, whereas low levels of closeness and high levels of conflict would hamper them more than typically developing students. Previous research found support for the academic risk hypothesis for other groups of at-risk students (see Roorda et al., 2011 for a meta-analytic overview).

The present study

In the present study, we focused on boys from grade 3 to 6, who either attended regular education or special education for students with ASD. We focused especially on boys, as previous studies in regular education frequently found that both boys and teachers experience their mutual relationship as being less close and more conflictual than teachers and girls (Koepke & Harkins, 2008; Koomen et al., 2012; Koomen & Jellesma, 2015; McGrath & van Bergen, 2015). Furthermore, boys in regular education also tend to be less engaged with schoolwork than girls (e.g., Furrer & Skinner, 2003; Ladd & Burgess, 2001; Verkuyten & Thijs, 2002). It still remains unknown, however, whether these gender differences also apply to students with ASD. As girls were underrepresented in the special education sample ($N = 6$), we therefore refrained from drawing conclusions about girls with ASD and focused exclusively on boys.

In the present study, we thus compared boys from regular education and special education for ASD and investigated whether there were differences in (a) boys' perceptions of the quality of their relationship with their teachers, (b) boys' self-reported school engagement, and (c) the strength of associations between student-teacher relationships and school engagement. Based on theory and previous research using teachers' relationship perceptions (Blacher et al., 2014; Longobardi et al., 2012; Prino et al., 2014; Santos et al., 2016), we expected that boys from special education for ASD would perceive less closeness and more conflict in their relationships with teachers than boys from regular education (research aim a). Although less well founded in empirical research, we also hypothesized that boys from special education for ASD would report less engagement with schoolwork than boys from regular education (research aim b; Eisenhower, Blacher, & Bush, 2015; Keen, 2009). Finally, we expected that associations between student-teacher relationship quality and engagement would be stronger for boys from special education for ASD than for boys from regular education (research aim c; Hamre & Pianta, 2001; Roorda et al., 2011).

Methods

Participants

Our sample included 295 third-to-sixth grade boys, 113 of whom attended special education for children with ASD and 182 attended regular education. The boys in special education came from 11 classrooms from two special education schools specialized in ASD problems,

situated in the center area of the Netherlands (Utrecht province). In the special education schools, only 10% of the student population was female. Although we did not intend to exclude these girls beforehand, our original sample included an even lower percentage of girls ($N = 6$, 5.0%) and, hence, girls were underrepresented. As boys tend to share less favorable relationships with teachers and tend to be less engaged with schoolwork than girls (e.g., Furrer & Skinner, 2003), we refrained from drawing conclusions about girls with ASD and included only the boys in our analyses. The comparison group came from 16 classrooms from two regular elementary schools, situated in the same area as the special schools. Originally, the regular education sample included 51.8% girls, however, these girls were not included in the present study to match the special education sample.

The mean age of the students in the total sample was 10.28 years ($SD = 1.23$; range = 8–13 years). The boys from special education for ASD were on average 10.64 years old ($SD = 1.25$; range 8–13 years); the boys from regular education had a mean age of 10.06 years ($SD = 1.17$; range = 8–12 years). An independent samples t -test indicated that boys from special education for ASD were somewhat older than boys from regular education, $t(293) = -4.04$, $p < .001$. Most boys (80.3% total sample; 84.1% special education for ASD; 78.0% regular education) identified themselves as being ethnic Dutch. Previous studies have also used self-reports of students from third grade and older to determine students' ethnicity (e.g., Zee & Roorda, 2018). Ethnic distribution did not differ across boys from regular and special education, $\chi^2(1) = 2.05$, $p = .173$. Information about other sample characteristics (e.g., socio-economic status) was not available.

The boys from special education for ASD reported about their relationship with 11 teachers in total (81.8% female; 18.2% male). The boys from regular education rated their relationship with 16 teachers in total (81.2% female, 18.8% male). The regular education teachers had 7.22 years of teaching experience on average ($SD = 4.39$; range 1–13 years). For special education teachers, information about teaching experience was not available.

The special education setting

Since the start of inclusive education in 2014, Dutch schools are obligated to keep as many students in regular education as possible and to provide additional help and support for students who need this due to cognitive disabilities and/or behavioral problems (Inspectie van het Onderwijs, 2020; Rijksoverheid, 2020a). If students in regular education receive such additional help and support, it is usually for only a couple of hours a week and this additional help and support is usually not provided by the classroom teacher. Only when regular schools are not able to provide enough additional support and help for a specific student, referral to a special education school is considered.

Different from most English-speaking countries, special education schools in the Netherlands are government-founded, segregated schools, that are only visited by students receiving specialized care and education during the entire school day. These special education schools are specialized in offering education and care to a specific group of students, organized in four broad categories: (1) schools for blind or partially-sighted students, (2) schools for deaf or hearing-impaired students and students with language disorders, (3) students with physical and/or intellectual disabilities, and (4) students with psychological disorders and/or behavior problems. The two special schools included in the present sample fall in the fourth category, but are further specialized in education for students with ASD. More specifically, these schools target children with an autism spectrum disorder whose behavioral and/or social-emotional needs are not adequately met by regular education schools. Further admission criteria are: (1) the school can provide a suitable learning environment for the student, (2) the student is able to (learn to) function in a group of maximally 15 students, and (3) the student does not have an intellectual disability as indicated by an IQ of 70 or lower on a standardized intelligence test. After placement, most

students will remain in the same special school during their elementary school career.

Classrooms in the special schools for ASD are smaller than in regular education (maximally 15 students per classroom; average classroom size in regular education is 24 students but can easily be around 30 students; [Rijksoverheid, 2020b](#)), allowing for more time and attention to individual students. Furthermore, during instruction it is taken into account that a majority of students have difficulties with information processing and planning. Compared to regular education, more time and attention is paid to students' social-emotional development. A secure learning environment, predictability, structure, and clarity are important elements in the pedagogical approach of the two special schools. The physical environment is adapted to students with ASD (e.g., time-out rooms are available). All teachers in the special education schools have obtained the basic teaching qualification that is required for elementary school teachers (bachelor-level) and some teachers also obtained a master-level degree in special educational needs (SEN). Teachers receive additional, annual training, including study days about competence-oriented teaching and explicit direct instruction (instructional methods used in the school). Teachers also acquire knowledge and skills especially relevant for teaching this specific student population, such as extended knowledge about ASDs, the special educational and pedagogical needs of students with ASD (e.g., strong need for clarity and predictability, help with developing social skills), and how these needs can be supported.

Since the start of inclusive education, decisions about placement in special education are primarily made based on the optimal match between a student's educational and pedagogical needs and the learning environment, which means that formal diagnoses are no longer required. In the present study, we did not diagnose individual students either. Therefore, information about diagnoses for the specific boys included in our sample was not available. At the school level, however, it is known that 90% of the student population of the two special schools has a formal diagnosis of ASD, as determined by a psychiatrist or certified psychologist affiliated with the schools or an institution for mental health care. The other 10% of the students also displayed ASD symptoms. Some boys in regular education may have had some form of ASD as well but information about ASD diagnoses was not available for the present sample. However, as only 4% of Dutch boys under 12 years old is diagnosed with ASD ([CBS, 2014](#)) and these boys are partly referred to special education, this most likely did not have much impact on our results.

With regard to comorbid disorders, 39% of the students from the special schools tends to have a comorbid disorder, among which attention deficit hyperactivity disorder (ADHD) is most common. Still, students for whom externalizing disorders are more pronounced than their ASD-related problems are usually placed in special schools targeting students with externalizing problem behaviors specifically (e.g., students with oppositional defiant disorder are not present in the special schools for ASD). Boys from special education ($M = 2.78$, $SD = 0.89$) and regular education ($M = 2.70$, $SD = 0.89$) also did not differ in self-reported hyperactivity-inattention, $t(293) = -0.80$, $p = .424$. As students with an IQ of 70 or lower are usually referred to category 3 special schools, both boys from special and regular education are assumed to have a total IQ that is at least higher than 70. At the school level, 11% of the students of the special education schools for ASD tend to have a below average IQ (TIQ between 70 and 85) compared to approximately 4% in the entire population of regular education students in the Netherlands ([Woittiez, Eggink, & Ras, 2019](#)). Although no IQ scores were available for the present sample, these numbers indicate that boys from regular and special education are not considered to differ much in their TIQ.

Procedure

Approval for the data collection was obtained from the Ethical

Committee of the University of (blinded for review; file number: 2016-CDE-7243). The data were collected by master-level students (clinical child development master), who received instructions to ensure that data collection occurred in a systematic way. Students' parents received an information letter explaining the nature and aims of the study and were given the opportunity to object to their child's participation (passive informed consent). The information letters were sent to the parents of all students in the 27 classrooms (including the parents of girls) through e-mail. Approximately 348 parents received an information letter (202 parents from regular education; 146 parents from special education for ASD). Participation rate was 77% for special education for ASD and 90% for regular education. Non-participation was mainly due to absence at the time of data collection. Most of these absences were caused by illness or other reasons that prevented students from coming to school (both samples). In the special education sample, some students (exact numbers not known) were at school but not present in the classroom during data collection (e.g., because of individual training or instruction, a time-out). In a few cases (not more than ten students per school type), students were present but did not complete the questionnaire because parents objected against their child's participation.

Data collection took place during planned school visits, in the school years 2016–2017 (regular education) and 2017–2018 (special education). The questionnaires were completed in the classroom and teachers were not present during data collection. Students filled out questionnaires about their demographic characteristics, the relationship with their teacher, their engagement with schoolwork, and some other questions that were beyond the scope of the present study. Before starting the completion of the questionnaires, the master-level students provided a short instruction for all students who were present. During this instruction, it was explained that students' answers were confidential and that they would not be shared with the teacher, that there were no good or wrong answers, and that we were interested in their opinion only. These precautions were taken to ensure that students would feel secure enough to fill out the questionnaires in an honest way. To ensure that students were able to complete the questionnaires, we asked the teachers to indicate whether they believed that all students in their classroom would be able to fill out the questionnaires independently. All students from regular education (also the third-graders) were able to complete the questionnaires by themselves. For some students in special education (less than 10 students), the questions were read aloud by the master-level students. All other students in special education filled out the questionnaires independently. The master-level students were available to answer any questions that students might have about the meaning of the items. The total questionnaire took on average 30 min to complete. Students did not receive a reward for their participation.

Measures

Student–teacher relationship quality

Boys reported about the quality of their affective relationship with their teacher on the Closeness and Conflict subscales of the Student Perception of Affective Relationship with Teacher Scale (SPARTS; [Koomen & Jellesma, 2015](#)). Closeness (8 items) reflects students' positive feelings toward the teacher, the degree of openness in the relationship, and students' reliance on the teacher in times of stress (e.g., 'I tell my teacher things that are important to me', 'My teacher understands me'). Conflict (10 items) measures the degree of anger, distrust, and negative exchanges in the relationship (e.g., 'I easily have quarrels with my teacher', 'My teacher treats me unfairly'). Boys rated each item on a 5-point Likert-type scale, varying from 1 (*no, that is not true*) to 5 (*yes, that is true*).

Previous studies indicated that the SPARTS can adequately be used to measure relationship perceptions of students from third to sixth grade ([Chen et al., 2019](#); [Jellesma et al., 2015](#); [Zee et al., 2020](#); [Zee & de Bree, 2017](#)). More specifically, satisfactory internal consistencies were found

for the SPARTS (Cronbach's alphas ranging from 0.74 to 0.87 for Closeness and from 0.79 to 0.89 for Conflict; Chen et al., 2019; Jellesma et al., 2015; Koomen & Jellesma, 2015; Zee et al., 2020) as well as satisfactory six-month stability ($r = 0.61$ for Closeness, $r = 0.45$ for Conflict; de Jong et al., 2018). Furthermore, previous research found support for the factorial structure of the SPARTS (Jellesma et al., 2015; Koomen & Jellesma, 2015; Zee & Koomen, 2017). Further support for the construct validity of the Closeness and Conflict subscales of the SPARTS has been found by significant associations with teacher and peer ratings of relationship quality as well as students' hyperactive, internalizing, and prosocial behaviors and task orientation (Chen et al., 2019; Jellesma et al., 2015; Zee et al., 2020; Koomen & Jellesma, 2015). The SPARTS has also been used to measure the relationship perceptions of students with ASD in regular education (Zee et al., 2020).

To further determine whether the SPARTS could be adequately used with boys with ASD in special education, we evaluated measurement invariance across boys from regular and special education. We found support for strong measurement invariance, with sufficient fit ($\chi^2(290) = 419.532$, CFI = 0.907, RMSEA = 0.055, SRMR = 0.079), indicating that the Closeness and Conflict subscales of the SPARTS can be used to make meaningful comparisons between boys from special and regular education. Cronbach's alphas were 0.81 and 0.84 for Closeness and 0.81 and 0.79 for Conflict, for respectively the regular education sample and the special education for ASD sample. Considering the high internal consistencies for special education as well as the found measurement invariance, we believe that the SPARTS can adequately be used to measure relationship perceptions of boys in special education for ASD in this age range.

Engagement with schoolwork

Boys rated their engagement with schoolwork on a shortened, Dutch version of the Engagement versus Disaffection with Learning Scale (EvDLS; original version Skinner et al., 2008; Dutch translation Zee & Koomen, 2019). The Engagement scale includes 12 items and measures both students' engaged behaviors (e.g., the degree to which they do their best and pay attention) and feelings and emotions (e.g., the degree to which they like school and enjoy learning new things at school) toward their schoolwork. As such, Engagement in the present study can be considered a unidimensional construct. Example items of Engagement are: 'I try hard to do well at school', 'When I'm in class, I just act like I'm working' (reverse coded), 'I enjoy learning new things at school', and 'When we work on something in class, I feel bored' (reverse coded). Boys rated these items on the same 5-point Likert scale as used for the SPARTS.

Previous studies indicated that the EvDLS can adequately be used by upper elementary students (i.e., third-to-sixth graders), with internal consistencies ranging from 0.65 to 0.86 and three-to-six month stability coefficients varying from $r = 0.57$ to 0.67 (Skinner et al., 2008; Skinner et al., 2009; Zee & Koomen, 2019). Furthermore, ample support was found for the construct validity of the EvDLS, as indicated by significant associations with teacher-rated student engagement as well as associations with theoretically related constructs, such as strategy and capacity beliefs, goal orientations, academic achievement, and peer-rated and self-rated interpersonal relationship quality (Furrer & Skinner, 2003; Skinner et al., 2009; Zee & Koomen, 2019). The EvDLS has not yet been used with students with ASD, but previous studies supported the use of this questionnaire in other at-risk samples (e.g., students with poor literacy skills, students from low-income families; Garrett-Peters et al., 2019; Glaman & Chen, 2018). Cronbach's alphas in the present study were 0.75 for regular education and 0.79 for special education for ASD. We also found support for partial strong measurement invariance across the special and regular education samples, with only two items having variant intercepts, $\chi^2(122) = 166.742$, CFI = 0.921, RMSEA = 0.050, SRMR = 0.091. Partial strong invariance is considered to be sufficient to make further group comparisons (Byrne, Shavelson, & Muthén, 1989; Little, 2013).

Analyses

Data were analyzed in SPSS Statistics version 25. One boy was deleted from the analyses because he did not fill out the items about engagement (originally, there were 183 boys in the regular education sample). For all other boys, the data were complete. All variables were normally distributed, as indicated by skewness and kurtosis scores below 1.30. As students were nested within classrooms, we used hierarchical linear modeling with two levels (i.e., student level and classroom level) to analyze the data. First, to examine whether there were differences in relationship quality and engagement between boys from regular and special education, School Type (0 = regular education, 1 = special education for ASD) was included as independent variable. Separate models were built for Closeness, Conflict, and Engagement. Second, we investigated whether the strength of associations between student-teacher relationships and school engagement differed across boys from regular and special education. In this model, Engagement was treated as the outcome variable. The two relationship dimensions (Closeness, Conflict), School Type, and the interaction effects between Closeness and School Type and between Conflict and School Type were included as independent variables. As boys from special education were significantly older than boys from regular education, Age (in years) was included as a covariate in all analyses. To ease interpretation of results, all continuous variables were standardized at the student level (z -scores).

Results

Descriptive statistics and Pearson's correlations between study variables can be found in Table 1. Closeness was positively associated with Engagement, whereas Conflict was negatively correlated with Engagement, both for boys from special education for ASD and regular education.

Differences in relationship quality and school engagement

With regard to differences in relationship quality and school engagement, School Type appeared to be significantly associated with Conflict ($b = 0.30$, $SE = 0.14$, $p = .045$) and Engagement ($b = -0.52$, $SE = 0.13$, $p < .001$). Boys from special education for ASD reported *more* conflict in the relationship with their teachers and *less* engagement with schoolwork than boys from regular education (see Table 1). School Type was not significantly associated with Closeness ($b = -0.08$, $SE = 0.15$, $p = .585$), indicating that there were no differences between boys from special and regular education in the degree of closeness experienced in the relationship with their teachers.

Differences in associations between student-teacher relationships and school engagement

In Table 2, the multilevel associations between student-teacher relationship quality and school engagement can be found. Closeness was positively associated with Engagement, whereas Conflict was negatively associated with Engagement (see Table 2). A significant interaction effect of Conflict and School Type on Engagement was also found. As can be seen in Fig. 1, the negative association between Conflict and Engagement was stronger for boys from special education for ASD than for boys from regular education.

Discussion

The present study examined whether boys from special education for ASD shared less favorable affective relationships with their teachers and whether these boys were less engaged with their schoolwork than boys from regular education. Furthermore, we investigated whether relationships with teachers were more strongly associated with these boys'

Table 1

Means (Standard Deviations), range, and Pearson’s correlations between student-teacher relationship quality and school engagement for boys from regular education and boys from special education for autism spectrum disorders.

	1.	2.	3.	M (SD)	Range
1. Closeness	–	–0.52**	0.48**	3.48 (0.76)	1.50–5.00
2. Conflict	–0.44**	–	–0.49**	1.66 (0.61)	1.00–3.80
3. Engagement	0.34**	–0.56**	–	4.02 (0.51)	2.58–4.92
M (SD)	3.44 (0.85)	1.83 (0.63)	3.74 (0.64)	–	–
Range	1.25–5.00	1.00–4.20	1.67–4.92	–	–

Note. ** $p < .01$. Descriptives and correlations for boys from regular education are above the diagonal; descriptives and correlations for students from special education for ASD are below the diagonal. Means (and standard deviations) and ranges in bold differ significantly ($ps < 0.05$) between boys from special education for ASD and regular education.

Table 2

Associations between student-teacher relationship quality and boys’ school engagement and moderation by school type.

	Engagement <i>b</i> (SE)
Independent variables at the student level	
Age	0.02 (0.05)
Closeness	0.31 (0.08)**
Conflict	–0.32 (0.08)**
Independent variable at the classroom level	
School type	–0.36 (0.11)**
Interactions between independent variables at the student and classroom level	
Closeness x School Type	–0.18 (0.12)
Conflict x School Type	–0.27 (0.12)*
Variance	
Students	0.65
Classrooms	0.01

Note. * $p < .05$, ** $p < .01$. For School Type, 0 = boys from regular education, 1 = boys from special education for autism spectrum disorders.

school engagement than with the engagement of boys in regular education. Different from most previous studies with students’ with ASD (e.g., Blacher et al., 2014; Santos et al., 2016), we focused on students’ relationship perceptions rather than on those of their teachers. Although more research is needed on this relatively understudied group of students, our results seem to provide support for the following conclusions.

First, as expected (Blacher et al., 2014; Longobardi et al., 2012; Prino et al., 2014; Santos et al., 2016), boys from special education for ASD

experienced more conflict in their relationship with teachers than boys from regular education. Thus, both teachers (Blacher et al., 2014) and boys from special education for ASD themselves, seem to experience more conflict in their mutual relationship than teachers and students from regular education. Apparently, the training and guidance in dealing with students with ASD that the teachers in those special schools received, is not enough to prevent the development of conflict in the relationships with these boys. Likewise, some previous studies (Brown & McIntosh, 2012; Caplan et al., 2016) found that simply receiving a general training about ASD did not change student–teacher relationship quality. These higher levels of conflict are problematic, as we also found that student–teacher conflict was more strongly associated with the school engagement of boys in special education for ASD than for boys from regular education (Hamre & Pianta, 2001; Roorda et al., 2011). This finding is in line with the academic risk hypothesis (Hamre & Pianta, 2001), suggesting that boys from special education for ASD also form an at-risk group, who are more hampered by higher levels of conflict in the relationship with their teachers than boys from regular education. Therefore, interventions aimed at diminishing the degree of conflict in student–teacher relationships in special education for ASD seem to be needed. As far as we know, however, interventions targeting conflict in relationships between teachers and students with ASD are not yet available. Therefore, interventions targeting teachers’ relationships with students with externalizing problems (e.g., Spilt et al., 2012) may be adapted to improve relationships with students with ASD as well.

Second, in contrast to our hypothesis (Blacher et al., 2014; Longobardi et al., 2012; Prino et al., 2014; Santos et al., 2016), boys from special education for ASD did not experience less closeness in the

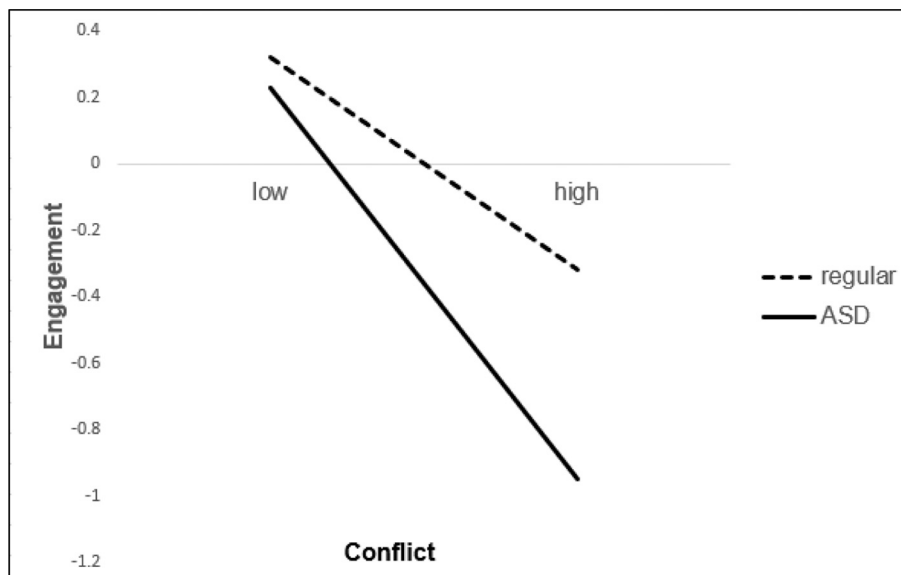


Fig. 1. Interaction effect of Conflict and School Type (regular = boys from regular education, ASD = boys from special education for autism spectrum disorders) on Engagement.

relationship with their teachers than boys from regular education. Zee et al. (2020) also found that students with ASD did not perceive less closeness in their relationships with teachers than typically developing students, whereas teachers did experience such differences. The study of Zee et al. (2020) focused on students with ASD in regular education, whereas the present study concentrated on boys with ASD in special education. This finding indicates that students with ASD do not experience struggles with forming a warm and close relationship with their teachers, regardless of whether their symptoms were severe enough to warrant referral to special education. Probably, only teachers experience lower levels of closeness, because students' with ASD tend to have problems with social communication and interactions (Robertson et al., 2003; Santos et al., 2016). These problems could make students with ASD less attentive to the more subtle manifestations of the closeness dimension, whereas they are able to perceive the more pronounced negative behaviors and interactions of the conflict dimension (cf., Hughes, 2011; Koomen & Jellesma, 2015). More studies including student reports are needed to find out whether this is indeed the case.

In contrast to the academic risk hypothesis (Hamre & Pianta, 2001; Roorda et al., 2011), associations between closeness and students' engagement were just as strong in special education for ASD as in regular education. Thus, both boys from special education for ASD and boys from regular education seem to profit equally from a close relationship with their teacher as a stimulator of their engagement with schoolwork. As such, closeness could be considered a protective factor, both for boys in regular education and boys in special education for ASD. Teachers in special and regular education could use this knowledge by actively investing in developing close relationships with boys in order to promote boys' engagement with schoolwork and, hence, their academic achievement (cf., Roorda et al., 2017). School practitioners could provide relationship-focused interventions when teachers are having trouble to develop close relationships with individual students (see Spilt et al., 2012).

Third, as expected (Eisenhower, Blacher, & Bush, 2015; Keen, 2009), boys from special education for ASD reported less engagement with schoolwork than boys from regular education. A possible explanation is that the adapted school environment of special education was still not sufficiently aligned with boys' specific educational and pedagogical needs or not supportive enough (cf., DePape & Lindsay, 2016) to elicit similar levels of interest and engagement in boys from special education for ASD as for boys from regular education. Furthermore, students with ASD tend to have very specific and limited focuses of interest (Eisenhower, Blacher, & Bush, 2015) and, hence, may not be interested in large parts of the topics that are dealt with at school (Keen, 2009). For instance, special schools spend more time than regular schools on lessons focusing on the development of social and emotional skills and special education teachers most likely also have to spend more time on behavior regulation and the support of behavioral and emotional needs than in regular education. Therefore, less time can be devoted to academic instruction and academic learning activities, which could have made lessons less academically challenging for students. This may have resulted in more boredom and less motivation to pay attention to and put effort in lessons in boys from special education for ASD.

Finally, part of the boys from special education for ASD had comorbid disorders (e.g., ADHD), which may further have limited their abilities to effectively focus on and become engaged with their schoolwork. It is important that special education teachers and other school practitioners become aware of these lower levels of engagement in their schools. Teachers can then strive to make the lessons as tailored to students' specific foci of interest as is possible within the required curriculum and to offer them choices in which assignments they make (cf., DePape & Lindsay, 2016). Our own findings suggest that teachers in special education can also stimulate the engagement of their students with ASD by striving to develop close and conflict-free relationships with their students. Longitudinal studies are needed, however, to find out whether these effects also remain to exist over time.

Limitations

Some limitations of the present study need to be taken into account when interpreting the results. First, students reported both about the quality of the student-teacher relationship and about their engagement with schoolwork, which may have led to an overestimation of associations due to same-informant bias (cf., Roorda et al., 2011). Furthermore, as students with ASD tend to have difficulties with social communication and interactions (Robertson et al., 2003; Santos et al., 2016), this may have influenced the ability of boys from special education for ASD to adequately report about their relationship with their teacher. Nevertheless, Cronbach's alphas were comparable to those for regular education, (partial) strong measurement invariance was supported, and differences in conflict were found. It thus seems that reports of students with ASD may still provide valuable insights into the student-teacher relationship quality. Still, future studies are advised to include both student and teacher reports of relationship quality and/or students' engagement to prevent same-informant bias and to investigate whether teachers have similar experiences as their students.

Second, the present study used a cross-sectional design, which prevents us to draw conclusions about the direction of influences. In the present study, we considered student-teacher relationship quality as independent variable and students' school engagement as dependent variable. This decision was based on both theoretical assumptions (Pianta, 1999; Verschueren & Koomen, 2012) and previous cross-lagged studies in regular education, which revealed that student-teacher relationships predicted students' engagement but not the other way around (Archambault et al., 2013; Engels et al., 2016). Still, there are also studies reporting that students' engagement affects the quality of student-teacher relationships as well (Hughes et al., 2008; Skinner & Belmont, 1993). Therefore, cross-lagged studies, in which student-teacher relationships and engagement are measured at different occasions, are needed. These studies could then provide more insight in whether it is mostly the student-teacher relationship that influences the school engagement of students with ASD or the other way around. Perhaps an even more likely scenario is that student-teacher relationships and engagement impact and strengthen each other over time, with high levels of conflict leading to lower student engagement, which in turn leads to even more student-teacher conflict (cf., Hughes et al., 2008).

Third, the present study compared students from special education for ASD with students from regular education. It is therefore not possible to disentangle the effects of the different educational settings and students' ASD status. Future studies including students with ASD in both regular and special education may help to unravel these two factors.

Fourth, our sample included only boys, as there were just a few girls in the two special education schools. Girls in regular education tend to share more close and less conflictual relationships with teachers than boys (e.g., Koepke & Harkins, 2008; Koomen et al., 2012) and also tend to be more engaged with schoolwork than boys (e.g., Furrer & Skinner, 2003; Ladd & Burgess, 2001; Verkuyten & Thijs, 2002). It has not yet been examined whether girls with ASD also share more advantageous relationships with teachers and display higher engagement than boys with ASD, probably because most previous studies included only a small amount of girls with ASD (usually around 18%; e.g., Longobardi et al., 2012; Robertson et al., 2003). Future research could strive to include a larger number of girls with ASD to see whether our findings also generalize to female students with ASD.

Fifth, the present study focused on boys from upper elementary school (grade 3 to 6). In addition, only students with an IQ higher than 70 were included. For the students that were included in the present sample ($TIQ > 70$), the IQ scores per student were not known. Furthermore, information about ASD diagnoses at the student level were not available, nor did we have information about possible comorbid disorders (e.g., ADHD, ODD). Studies including both older and younger students, and students with an IQ lower than 70 are needed to find out

whether our findings would generalize to students from other age categories and students with ASD with accompanying cognitive disabilities. These studies would also do well to include information about ASD diagnoses, IQ, and comorbid disorders at the student level, to be able to investigate how comorbid disorders and intellectual disabilities may influence differences between students with and without a formal diagnosis of ASD.

Conclusion

Our study was one of the first to measure affective, dyadic student–teacher relationships from the perspective of boys from special education for ASD and the first to focus on engagement as aspect of the school functioning of boys from special education for ASD. Our results suggest that boys from special education for ASD, just as teachers (Blacher et al., 2014), experience more conflict in their mutual relationship than boys from regular education. In contrast with teachers' relationship perceptions (Blacher et al., 2014), however, no differences in student–teacher closeness were found. As student–teacher conflict also seems to be more strongly associated with the school engagement of boys from special education for ASD than for boys from regular education, interventions targeting the degree of conflict in the relationship between teachers and students with ASD are advisable (Spilt et al., 2012). Furthermore, boys from special education for ASD appeared to be less engaged with schoolwork than boys from regular education. Our results suggest that investing in close and conflict-free relationships with students with ASD may be a promising avenue for special education teachers to promote their students' school engagement. More research focusing on this relatively understudied group of students is needed to find out whether the present findings also generalize to girls with ASD and students with ASD in regular education, and whether the found associations hold over time.

Funding

This work was supported by a grant from the Dutch organization ABBAS Fund for development of tests and questionnaires rewarded to Helma Koomen.

Declaration of Competing Interest

None.

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