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Elementary School Children with Characteristics of Autism Spectrum Disorders:
Predictors of the Student-Teacher-Relationship

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Education

by

Erica Joy Howell

August 2010

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University of California, Riverside
ABSTRACT OF THE DISSERTATION

Elementary School Children with Characteristics of Autism Spectrum Disorders: Predictors of the Student-Teacher-Relationship

by

Erica Joy Howell

Doctor of Philosophy, Graduate School of Education
University of California, Riverside, August 2010
Dr. Jan Blacher, Chairperson

The student-teacher-relationship (STR) during the early school years is formative in children’s later academic, social, and behavioral functioning. Children with typical development who enter school with behavior problems and social deficits are at heightened risk for developing poor STRs. Autism is the fastest growing special education disability category in the nation, yet little is known about the STR for this population, who, by definition, have associated behavioral and social deficits.

Participants were 90 elementary school-aged children with autism spectrum disorders (ASD) in public and non-public school campuses. Teacher and parent-rated measures were collected in addition to a child-completed task. Path modeling was utilized in order to investigate the STR as a multidimensional construct comprising
underlying and interconnected variables that work together to influence the STR. The proposed path model consisted of several latent variables: classroom, child, family, and teacher characteristics. When teacher-rated data were entered into the model, a good fit was confirmed for the overall student-teacher relationship as well as for the Student Teacher Relationship subscale of student-teacher closeness. Child and classroom characteristics accounted for significant variance in the student-teacher. Students with more challenging child characteristics and in more restrictive educational settings were more likely to have poor-quality STRs.

When parent-ratings of child characteristics were entered, the model was a good fit for the overall student-teacher relationship as well as for the subscales of conflict, closeness, and dependency. Child characteristics and classroom characteristics accounted for the most variance in the model. Children who displayed more challenging child characteristics and who were in more restrictive educational settings had poorer-quality STRs. Specifically; students in restrictive educational settings were rated as experiencing more conflict and less closeness with the teacher. Furthermore, students from families with low-incomes were at-risk for low STR closeness. Student-teacher dependency was predicted by the teacher’s classroom experience, with veteran teachers more likely to rate students as being dependent.
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Elementary School Children with Characteristics Autism Spectrum Disorders: Predictors of the Student-Teacher-Relationship (STR)

A plethora of research indicates that the student-teacher relationship (STR) can be predicted by variables occurring before the entry into formal schooling (Copeland, Denham, & DeMulder, 1997; Howes, Matheson, & Hamilton, 1994; Jerome, Hamre, & Pianta, 2008; O’Connor & McCartney, 2007). These findings are startling in light of research indicating the STR has long term implications for students’ academic, behavioral, and social outcomes in later elementary and middle school (Alexander & Entwistle, 1988; Hamre & Pianta, 2001). For students at-risk for adverse outcomes due to disruptive behavior problems (Hamre & Pianta, 2001), low socioeconomic backgrounds (Ladd, Birch, & Buhs, 1999), and insecure mother-child attachments (Copeland et al., 1997), a poor STR may exacerbate risk characteristics while a positive STR may act as a protective factor in elementary and middle school. Due to the crucial role of teacher-child relationships in students’ development, it is important to understand the underlying factors comprising its formation.

Little is known about the STR in children with autism spectrum disorders (ASD) who, by definition, have deficits in behavioral and social functioning that put them at heightened risk for student-teacher conflict. One of the major goals of the present study was to examine how key characteristics of children with autism related to successful STRs in elementary school. The current literature review has four aims: (1) To review autism prevalence, and associated behavior problems and characteristics of autism; (2) To
examine the impact of autism on the public school system; (3) To provide an in-depth review of research analyzing the impact of STR’s on children’s school adjustment, with a specific emphasis on the contributions of child, teacher, and classroom characteristics; and (4) To describe studies specifically focusing on the STR involving students with disabilities.

**Autism Spectrum Disorders**

**Prevalence and Definition**

From June 2002 to June 2007, the rate of autism spectrum disorders have dramatically risen by 70% (California Department of Developmental Services, 2007) and now affects 1 in 110 individuals (Center of Disease Control, 2010). As the autism prevalence continues to climb, families and researchers are eager to understand this unique disorder. Autism was originally introduced in Kanner’s 1943 report, but now has evolved into a spectrum of disorders that includes individuals from mild to severe levels of impairment. Included on the spectrum are autistic disorder, pervasive developmental disorder- not otherwise specified, and Asperger’s Disorder [American Psychiatric Association (APA), 2000]. While each of these disorders has some of the same symptoms, characteristics such as cognitive functioning and speech delay may differ [National Research Council (NRC), 2001]. Autistic disorder generally encompasses the most severe levels of impairment and prevalence is four to five times more likely in males than females (APA, 2000). Typical characteristics include abnormal social interaction and communication, stereotyped or repetitive behaviors, and communication delays, with 75-80% of affected individuals displaying mental retardation (APA, 2000;
Goin & Myers, 2004) or “intellectual disability” (ID) using current terminology (Schalock, et al., 2007). Although the majority of individuals with autistic disorder have ID, areas of specialized skills and interests may emerge (NRC, 2001). Individuals who meet criteria for autistic disorder, but demonstrate an IQ>70 are described as having high functioning autism (Tsatsanis, 2004). Current DSM-IV-TR criteria differentiate Asperger’s Disorder from autism by the absence of a speech delay (APA, 2000). However, proposed revisions to the DSM-IV-TR may subsume Asperger’s Disorder under the Autistic Disorder diagnostic category.

**Autism and Associated Behavior Challenges**

Problem behaviors associated with ASD pose unique challenges for schools and parents (NRC, 2001), as individuals with autism demonstrate significantly more behavior problems than peers with typical or intellectual development (Eisenhower, Baker, & Blacher, 2005) One study found that among young children with autistic disorder, one third demonstrated significant behavior problems related to withdrawal, aggression, and inattention (Hartley, Sikora, & McCoy, 2008). Additional research indicated that behavior problems such as physical aggression, self-injury, and tantrums were correlated with poor expressive language and severity of autistic symptoms (Dominick, Ornstein Davis, Lainhart, Tager-Flusberg, & Folstein, 2007; Horner, Carr, Strain, Todd, & Reed, 2002; Shattuck et al., 2007). One can imagine that the behavioral profile of individuals with autism presents challenges for classroom teachers, whether in special education or general education. In light of this, it is important to view these maladaptive behaviors as a
form of expressing sensory needs, confusion, or frustration rather than a symptom of a
“bad” student (NRC, 2001).

**Autism and Associated Social Challenges**

A wide-range of research indicates that social functioning in early childhood lays the framework for the STR across childhood and adolescence (Hamre & Pianta, 2001; Howes et al., 1994; Jerome, Hamre, & Pianta, 2008). This finding is especially important for students on the autism spectrum and their teachers, as social functioning is believed to be the core, central impairment of autism (Kleinman, Marciano, & Ault, 2001). Due to the social challenges associated with autism, one may assume these students enter school at-risk for low levels of STR quality and peer relationships, although the latter was not the focus of this study.

Specifically, some researchers identified a cognitive structure known as Theory of Mind (TOM) as underlying social understanding. This important construct allows one to infer a person’s thoughts, desires, beliefs and intentions (Howlin, Baron-Cohen & Hadwin, 1999) and is a crucial tool for social, interpersonal and communicative relationships (Perner, Frith, Leslie & Leekman, 1989). The relationship between autism and TOM occurs on a spectrum, with some individuals having more theory of mind skills than others (Kleinman et al., 2001). However, even within the spectrum of social functioning, teachers should not expect children with ASD to demonstrate age-appropriate social interactions, behavior, communication, or academic progress without appropriate intervention (Kunce & Mesibov, 1998; Munday, Sullivan & Mastergeorge, 2009).
Assessing theory of mind is a difficult task, with widely-used tests of pragmatics unable to detect social abnormalities for students with strong IQ scores (Garcia Winner, 2002). For example, a child on the autism spectrum with a history of being teased, experiencing awkward social interactions, and demonstrating difficulty with class work, may perform acceptably on some social tasks, indicating normal or above normal results, as the tests are limited in their ability to assess the underlying, complex skills needed for social interaction (Garcia Winner, 2002).

Several researchers and clinicians have developed tasks to assess whether students with autism possess a strong theory of mind. The “Sally-Anne” task is a single-item activity developed to investigate one’s understanding of what one person believes another person is thinking or feeling (Baron-Cohen, Leslie, & Frith, 1985). Materials involve two dolls, a marble, and a basket; the task requires the participant to take the perspective of the doll. Another “second-order” task assesses whether one knows what another person is thinking about him or her or someone else (Ozonoff & Miller, 1995). While these tasks give insight into the way an individual with ASD might think, they do not compose a sequential development of TOM skills. Wellman and Liu (2004) developed seven tasks that move through a developmental sequence of TOM that prior assessments (i.e. Sally Anne task) were unable to do. By identifying a scaled set of tasks, researchers may possibly identify a relationship between theory of mind development and various factors such as language and social interaction.

An additional measure of social functioning that is used specifically for individuals with autism is the Social Responsiveness Scale (Constantino, 2000). This
measure provides a rating of social behavior across a spectrum of impairment for individuals with autism. Included in this measure are five subscales that purportedly examine the underlying constructs contributing to social impairment in autism. These constructs evaluate social awareness, social cognition, social communication, social motivation, and autistic mannerisms and provides a reliable measure of the severity of social impairment (Constantino, 2000).

While researchers seek to further understand and assess the social constructs in ASD, educators and families witness the everyday interactions permeated by TOM that make successfully navigating the school environment challenging (Bjorklund, 2005). Throughout the day, there are multiple implied social “rules” that are difficult for individuals with ASD to interpret that are not explicitly taught (Smith Myles, Trautman, & Schlevan, 2004). As a result, mistakes in understanding and interpreting social interactions have serious implications for relationships with peers and teachers (Eeske van Roekel, Scholte, & Didden, 2010; Webb, Miller, Pierce, Strawser, & Jones, 2004). For example, developing and maintaining friendships may be tough, as components such as reciprocity (Bauminger, Solomon, Aviezer, Heung, Gazit, Lilach, Brown, & Rogers, 2008; Solomon, Goodlin-Jones, & Anders, 2004), understanding others’ perspectives (Peterson, Garnett, Kelly, & Attwood, 2009), and communicating successfully (Bauminger et al., 2008) are severely impaired. One study investigated the prevalence of bullying among adolescents and found that students with ASD encountered significantly more incidences of bullying than their typical peers (Eeske van Roekel et al., 2010). The
results also indicated that adolescents with ASD had more difficulty discerning true bullying from typical adolescent playful behavior.

In addition, difficulties in the classroom environment may be observed when behavioral norms linked to social understanding are violated. A student with ASD who loudly yells that he is “bored” during his teacher’s instructional lesson may need explicit instruction in appropriate ways to communicate during class. The challenges discussed above leave many general educators feeling unprepared to handle students with ASD (Chamberlain, Kasari, & Rotheram-Fuller, 2007) and may result in relationships where the student with ASD simply does not get along as well with his teachers. In order for a teacher to meet her student’s academic, social and behavioral needs, an understanding of theory of mind or social functioning should be pursued. In addition, this understanding may require patience and a renewed effort in forming a positive STR.

The Impact of Autism on the Public School

Since 1987, the number of students receiving services for autism through California’s Department of Developmental Services has increased twelve-fold (California Department of Developmental Services, 2007), making it the fastest growing special education disability category in California and in the nation (California Education Code, § 56846-56847). As the autism prevalence increases, school districts encounter more students with special needs. In order to accommodate this influx, public school campuses are implementing special classrooms designed for autism and general educators are receiving specialized training to work with ASD (California Commission on Teacher Credentialing, 2009). A study in the United Kingdom found that over 50% of students
with ASD experience various levels of inclusion in general education activities (National Autistic Society, 2003). While psychologists, psychiatrists, and other mental health/medical professionals qualify individuals as having autism based on the DSM-IV-TR, school personnel classify children as having “autistic like behaviors” in order to qualify them for special services. This classification is not as stringent as the DSM-IV-TR criteria, but was used for the public school participants in the current study so that the findings will also generalize to typical public school samples.

According to California Education Code 56846.2, an educational diagnosis describes a “pupil with autism” as the following:

A pupil who exhibits autistic-like behaviors, including, but not limited to, any of the following behaviors, or any combination thereof:

1. An inability to use oral language for appropriate communication.
2. A history of extreme withdrawal or of relating to people inappropriately, and continued impairment in social interaction from infancy through early childhood.
3. An obsession to maintain sameness.
4. Extreme preoccupation with objects, inappropriate use of objects, or both.
5. Extreme resistance to controls.
6. A display of peculiar motoric mannerisms and motility patterns.
7. Self-stimulating, ritualistic behavior. (Chapter 7.5)
With regard to public school placement, the Individuals With Disabilities Education Act (IDEA), as amended in 2004, requires that children with disabilities be placed in the “least restrictive environment appropriate” to meet their individual needs. When the IEP team discusses appropriate placement options, consideration must begin with the general education classroom. IDEA mandates that a “continuum of placements” be available as the general education environment may not be the appropriate place for all children. Using the continuum concept makes it more likely that each child will be placed in an environment that is specifically suited to meet his/her needs. Inclusion decisions are driven by the student’s needs as determined by the IEP team. The unique abilities and skill sets of children with autism may necessitate an environment where they learn with neurotypical peers and a general education teacher. The level of involvement in a general education classroom may vary, with some children attending full day and others in increments for specific lessons. Since IDEA requires that all students participate in the least restrictive environment possible, the IEP must include an explanation of why the child is not in the general education. The needs of some students may necessitate an environment with small class size and specialized, individualized instruction. These classrooms often include additional teaching staff and are referred to as special day classes (IDEAIA, 2004). While most students with disabilities are educated within the public school system, IEP teams, with the agreement of the special education director, may decide that the district is unable to provide a least restrictive environment that is appropriate to the child’s needs in a public school setting. In these limited circumstances, a non-public school placement may be decided upon with the current school district
paying the expense [sec 612 (a)(10)(b)]. The current study includes students who participate in a continuum of placements from general education to a non-public school setting.

In response to the growing numbers of students with autism in the State of California and the lack of teacher training addressing these specialized needs, Governor Arnold Schwarzenegger signed an Assembly Bill requiring specific coursework in the area of autism for special education teachers holding a mild/moderate teaching credential (Education Code 44265.1). In order to teach a child with autism in their classrooms, educators are required to receive training in four standards as described by the California Commission on Teacher Credentialing: (1) Characteristics of students with autism spectrum disorders; (2) teaching, learning, and behavior strategies for students with ASD; (3) collaborating with other service providers; and (4) completing a fieldwork component. Teachers with an Education Specialist credential who have an emphasis in moderate/severe or early childhood already have this specified training embedded in their coursework. Teachers with a mild/moderate emphasis will need to enroll in or complete the autism authorization by 2012. After this date all Education Specialist credential programs will be required to embed this coursework into their program, eliminating a need for the autism authorization. However, even as this is written, new legislation is being considered that may extend this timeline to 2015 (Assembly Bill 2160).

For general and special educators, the question is not if they will encounter a student with autism, but when. With increasing numbers of students with ASD in school
districts, state legislative involvement in autism education, and federal education codes paving the way for general education inclusion, it is surprising that so little is known about the factors that contribute to the STR for students with autism. One may surmise that these children are especially vulnerable to a poor STR due to their externalizing behavior problems, learning difficulties, and social deficits. Further investigation into the factors that contribute to a positive STR for students with ASD may help facilitate a successful school experience.

Typically Developing Students and the Student-Teacher-Relationship

The student-teacher relationship is a crucial dynamic as the teacher’s interactions with her students contribute to a foundation for their learning in social, emotional, and cognitive dimensions (Davis, 2003). The STR is especially important from preschool to kindergarten, as children transition into the formal education system and encounter an environment with new goals, demands and relationships. This initial transition period is important in determining later school success (Rimm-Kaufman & Pianta, 2000).

Most of the literature referenced below uses the Student-Teacher-Relationship Scale (STRS; Pianta, 2001) to assess teacher beliefs on their relationship with a student. The 28-item questionnaire produces an overall total score of STR quality and three subscales aimed to measure conflict, closeness, and dependency.

The Implications of Child Characteristics on the STR

Behavioral Characteristics. Children with disruptive behavior problems are at heightened risk for developing poor STRs. An examination of child characteristics and
the transition to school by Jerome, Hamre, and Pianta (2008) found that children in preschool with higher behavior problem ratings had more conflict as measured by the Student Teacher Relationship Scale (STRS). In addition, boys had more conflictual relationships with teachers and girls had higher ratings of closeness. This finding has been widely corroborated by other research (Birch & Ladd, 1997; Howes, Phillipsen, & Peisner-Feinberg, 2000; Silver, Measelle, Armstrong, Essex, 2005). However, in one study, girls with levels of problem behaviors comparable to boys also experienced conflict with the teacher. Put simply, children who experienced more conflict in the STR did so because they also exhibited more problem behaviors.

Interestingly, some students with high ratings of behavior problems received lower conflict scores, indicating the presence of specific child characteristics that acted as a protective factor to a conflictual STR (Jerome et al., 2008). Current research conducted by Rudasill and Rimm-Kaufman (2009) looked more indepth at the contribution of child temperament and the STR for first grade students. Specifically, children who were more shy were less likely to have close relationships with teachers, and children with low levels of inhibition and focused attention experienced more conflict. With teachers attempting to meet the needs of multiple students, these findings come as no surprise. Shy students may tend to “fall through the cracks” as they engage in fewer bids for teacher attention and experience less connectedness with the teacher. In contrast, while children with low regulatory control may interact more with the teacher, interactions tend to be negative and focused on increasing students’ on-task behaviors, ultimately adding conflict to the relationship. Furthermore, in another study examining specific child factors,
Ladd et al. (1999) found that kindergarteners with behavior styles characterized as aggressive, possessive, and argumentative experienced more conflict with the teacher and more rejection from peers (Ladd et al., 1999).

Unfortunately, there is evidence that conflictual and dependent STRs in the early school years are strong predictors of behavioral challenges over time. Hamre and Pianta (2001) followed 179 children from kindergarten to eighth grade. Using regression analyses and controlling for other variables, findings indicated that students in kindergarten with high levels of behavior problems and conflictual or dependent STRs were more likely to receive disciplinary infractions and suspensions in upper elementary grades. Additional longitudinal studies reported that students who received high ratings of problem behaviors were predicted to have lower STRs throughout elementary school and junior high (Howes et al., 2000; Jerome et al., 2008). The investigations above demonstrated the dire long-term outcomes of early behavior challenges, but what is known about the STR as a protective factor for children at-risk for early behavior problems? One optimistic study found that the STR acted as a protective factor for students in kindergarten. Those students with high problem behavior ratings and with medium to high levels of teacher closeness decreased externalizing behavior from kindergarten to third grade (Silver et al., 2005). However, for peers with high behavior problem ratings but low STR closeness, externalizing behavior remained stable. These findings indicate that a positive STR may change the course of development in school for at-risk students.
The long term implications of behavioral challenges on the STR are alarming especially in light of the severe behavioral challenges associated with autism. Teachers who understand these unique behavioral factors, and are educated in the risks associated with a poor STR may specifically attempt to foster closeness with students.

**Academic Characteristics.** In addition to behavior problems, academic outcomes in early school are linked to the STR. Birch and Ladd (1997) examined the association between the STR and 206 kindergarteners’ adjustment to school and found that higher STR closeness and lower STR dependency were predictive of higher scores on the visual and language academic scores on the Metropolitan Readiness Test. Importantly, children who had higher ratings of teacher closeness indicated that they liked school more than students with low closeness ratings. Thus, for these children, closeness to their teacher not only contributed to academic performance, but also to enjoyment of school.

Baker (2006) examined factors contributing to the STR for 1,310 socio-economically disadvantaged children in grades kindergarten to fifth grade, and found that students with less promising academic outcomes had poorer STRs than peers without such problems at all ages. However, children with behavioral challenges and a close STR performed better on reading assessments than peers with comparable behavior problems, but low STR closeness. Another key study demonstrated that students at-risk for grade retention or special education placement were less likely to be retained or placed in special education if they had closer and less conflictual STRs (Pianta, Steinberg, & Rollins, 1995). Students who continued to have higher levels of conflict and dependency
with teachers demonstrated poorer math and reading grades from elementary to middle school (Hamre & Pianta, 2001). These studies indicated that a positive STR provides an academic advantage to children at-risk for poor academic performance, while students who begin school with conflictual and dependent STRs encounter long-term academic deficits.

While the current study is not investigating the academic ability of participants with ASD, approximately 70% of individuals with autistic disorder have intellectual disability putting them at-risk for poor academic achievement (National Research Council, 2001). One could hypothesize that these students enter the school system especially vulnerable to poor STRs due to their behavioral and academic challenges. Conflictual or less close STRs may compound these at-risk characteristics over time, while the development of a close STR may foster progress in educational performance.

**Social Characteristics.** A wide range of research has documented the link between social characteristics and quality of the child-teacher relationship. In a study of children’s attachment to caregivers and social competence among 94 pre-schoolers, Howes et al. (1994) found that children with secure attachment to their teacher had higher ratings of sensitivity, empathy, and engaged in more complex play than children who were ambivalent or avoidant toward their teacher. Similarly, Griggs, Gagnon, Huelsman, Kidder-Ashley, and Ballard (2009) found that lower conflict in the STR was associated with less disruptive peer play. Longitudinal investigations highlighted the stability of early social behavior ratings on long-term STR quality with higher social ratings predicting more closeness, less dependency, and less conflict (Howes et al., 2000). One
study investigated third to fifth grade children’s early attachment styles and student appraisal of the STR and found that participants with a higher secure attachment style rated teachers as more accepting and less rejecting, while participants with higher avoidant attachment styles found teachers to be more rejecting (Al-Yagon & Mikulincer, 2008). Furthermore, students who perceived the teachers as less rejecting had higher levels of academic performance. Thus, the research highlights the possible role of the teacher on elementary-aged students’ socio-emotional adjustment.

Studies in young children found that factors related to early attachment may be linked to quality of teacher-child relationship. Copeland et al. (1997) found evidence that preschoolers with secure attachment to their teacher were rated as having more prosocial behavior and social competence. In addition, their findings suggested that a secure relationship with the teacher may partially compensate for an insecure maternal attachment. In a study of 1,364 children from birth to sixth grade, O’Connor and McCartney (2007) also investigated parental attachment in children. Findings indicated that children with high quality STRs were buffered from the negative affect that insecure maternal attachment had on achievement. Prior research by the investigators found that insecure, avoidant attachment with a caregiver was predictive of a negative STR as early as 15 months (O’Connor & McCartney, 2006). Interestingly, previous research by Hamre and Pianta (2001) also investigated the relationship between attachment styles at 15 months and later STR quality, but did not find the same relationship.
These findings emphasized the importance of the STR on a child’s trajectory throughout elementary to junior high school, and highlighted early social factors that predicted the STR. This information is especially salient for students with ASD who exhibit intense social deficits that not only may interfere with connecting with the teacher, but also in forming secure attachment to caregivers. Examining specific social characteristics related to ASD that significantly impact the STR could inform intervention approaches for training teachers. For example, a teacher who understands that a child’s awkward social behavior is a symptom of his disability and not purposefully “rude,” may be more inclined to pursue a close relationship and establish a secure base from which that child could attempt to make social connections. Moreover, the teacher may construct different expectations with regard to what a close relationship looks like for a child with autism, based on the child’s unique characteristics. In addition, interventionists may work to improve specific social skills that influence the STR in order to foster more positive relationships with the teacher.

**The Implications of Teacher and Classroom Characteristics on the STR**

It is well-documented that child characteristics significantly impact the STR, but what impact do teacher and classroom characteristics contribute to this relationship? Among specific teacher characteristics, low self-efficacy and higher depression ratings contributed to a more conflictual STR (Jerome et al., 2008). In addition, teachers who were perceived by students as being more accepting had higher rates of academic performance in their classrooms (Al-Yagon & Mikulincer, 2008). Another study by
Skinner and Belmont (1993) revealed that the STR was reciprocal in nature, with strong emotional support from the teacher predicting behavioral and emotional engagement from the student.

Specific teacher characteristics may act as protective factors for students at-risk for behavioral challenges. A recent study identified emotional support from the teacher as a protective factor for relational functioning for kindergarteners at-risk for behavior challenges (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008). Information, including the Dutch version of the STRS, was obtained from the teachers of 237 kindergartners. Results indicated that students who entered kindergarten with internalizing behavior problems were no longer at-risk for less close STRs when they had an emotionally supportive teacher. In addition, students with high externalizing behavior problems at entry into kindergarten and emotionally supportive teachers were no longer at-risk for developing conflictual STRs. Another intriguing finding was that classroom composition was found to predict STR quality. Classrooms composed of students exhibiting behavior problems were at higher risk for negative STRs. When the classroom was composed of a higher make-up of behaviorally challenged students, even the students with average levels of behavior problems had higher conflict with the teacher. The behavior of disruptive students impacted the STR not only for those individuals, but for all students in the class. Thus, a teacher who established an emotionally supportive environment with a disruptive student may be, in effect, helping all students (Buyse, et al., 2008).
Buyse et al. (2008) also examined teaching styles, but were surprised to learn it was not predictive of STR quality. Contrary results were found in Mantzicopoulos’ study (2005) which examined the quality of classroom practices (teacher instructional practices, transition-to-school activities, and perceptions of support provided by the school) and its relationship to the STR. Teachers who provided transition activities from preschool to kindergarten had lower conflict with students and several instructional practices were related to higher levels of STR conflict: (a) teacher-directed instruction; (b) the use of normed assessments, rote learning, and teaching isolated skills; and (c) punishment-based disciplinary strategies and little individuation. Teacher workload stress also made a significant contribution to teacher conflict. This study sheds a much needed light on specific features in classroom practices that make it possible for a teacher to form more positive relationships with students.

The student-teacher relationship is the most powerful and central force in the lives of young students while they spend time in the school setting (Murray and Pianta, 2007). The actions, practices, and beliefs of teachers can potentially impact the development the STR, that in turn has a long-lasting and instrumental effect on students (Al-Yagon & Mikulincer, 2008; Buyse et al., 2008; Jerome et al., 2008; Mantzicopoulos, 2005). Understanding teacher and classroom characteristics is pertinent for students with ASD. Many of these children are placed in special classrooms with other students with disability, often creating a behaviorally challenged classroom composition. These findings add additional layers of difficulty to the behaviorally, academically, and socially challenged population of ASD, contributing more risk to poor teacher-relationship
quality. While the current study did not specifically address teacher efficacy or rates of teacher depression, one may hypothesize that teachers of students with autism may have unique teaching challenges that lead them to question their efficacy or that impact their perceived well-being or mental health. The importance of developing an emotionally supportive environment may be especially important in working with the at-risk population of children with autism.

The Implications of Family Characteristics on the STR

A paucity of information is available with regard to the relationship between family characteristics and teacher-child quality. One would assume that characteristics related to the home environment would impact factors related to the child’s development, including behavioral, academic, and social functioning. Peisner et al. (2001) examined the moderating influence of family characteristics on early child-care experiences from preschool to second grade. The finding that children in higher quality child care settings in preschool had better math skills in second grade was moderated by maternal education. A stronger effect was present for lower maternal education. Howes et al. (2000) also found maternal education to be related to the STR. In their examination of the consistency of the STR between preschool and kindergarten, the researchers found that although preschool behavior problems were the strongest predictor of STR conflict in kindergarten, maternal education made a significant and independent contribution to predicting STR. Specifically, lower maternal education predicted higher conflict in the STR. Students with more behavioral challenges and mothers with less education may be
especially vulnerable to developing poor STRs.

Another study by Ladd et al. (1999) found that ethnicity and socioeconomic status were directly and indirectly linked to achievement for kindergarten students. Path analysis indicated that direct paths existed between family background and STR quality and acceptance by peers. In fact, less close and more conflictual relationships developed for students with minority status and disadvantaged families. This same group received lower achievement scores at the end of kindergarten. Moreover, an indirect pathway originated from family background to peer acceptance to classroom participation to achievement. Ethnicity was also found to be related to the school experience in a study by Jerome et al. (2009). Black students were identified as having higher conflict ratings on the STRS than their peers. This finding was stable throughout kindergarten to sixth grade.

The identification of specific family characteristics that were predictive of the STR provided another layer of information regarding students who may be especially at-risk for forming poor STRs. Unlike some disabilities that may be more likely to occur in families with specific characteristics (i.e. Down Syndrome and maternal age), no definitive familial factors have been identified to determine when, where or with whom autism is most likely to occur. Thus, the family characteristics that make typically developing children vulnerable to poor STR’s are worth exploring as they apply to families who have children with autism.
Students with Disabilities and the Student-Teacher-Relationship

Research on typically developing students is quite clear about the risk-factors associated with developing a poor STR. These behavioral, social, and academic challenges that are linked to the STR have long-term outcomes from pre-school to middle school. Students with disabilities may be especially prone to low quality relationships with teachers as they enter the school system with behavioral, social, and academic disadvantages (Hamre & Pianta, 2001; Peisner-Feinberg et al., 1995; Pianta et al., 1995; Silver et al., 2005). Moreover, these students are no longer only segregated in self-contained settings, but are increasingly participating in general education environments. One would expect general education teachers who have little training in working with children who have behavior and/or intellectual disabilities, to have difficulty forging close and emotionally supportive relationships with these students. By identifying specific child and classroom components that contribute to the STR, interventions might inform classroom practices in order to foster a positive outcome for at-risk students. In one investigation on classroom characteristics and the STR, Murray and Pianta (2007) reported that classrooms with clear organizational systems, a positive teacher belief system, and a focus on students’ unique skills promoted healthy student-teacher relationships for adolescent students with high-incidence disabilities such as emotional disturbance, learning disabilities, mild mental retardation, and other health impairments.

If early child characteristics of typically developing (TD) students have been identified and linked to the STR over time, what child and classroom setting characteristics are related to the STR for young children with intellectual disability (ID)?
A series of three reports from a longitudinal study of children with and without intellectual disabilities used the STRS to explore the student-teacher relationship at multiple ages. The first report by McIntyre, Blacher, and Baker (2006) examined the early school experiences of kindergartners with intellectual disability (ID) and typical development (TD) and found that children with intellectual disability had poorer STRs and were three times as likely as children without disabilities to demonstrate behavior problems. Overall, higher ratings of problem behaviors, fewer social skills, and poorer self-regulatory behaviors were found in the ID group when compared to their typically developing peers.

The above findings were expanded in a second report by Eisenhower, Baker and Blacher (2007), who studied STR’s for preschool and kindergarten aged children with intellectual disabilities (N = 58) or who were typically developing (N = 82). The students with ID had significantly lower STRS scores than the TD children at age 6; analyses of subscale scores indicated that the ID group had higher scores on conflict and dependency, and lower scores on closeness. Predictors at age six were examined, with mother-reported behavior problems, teacher-reported behavior problems, and teacher-reported social skills fully mediating the relationship between ID and STR quality, suggesting that behavior problems and social skills, not ID per se, accounted for the ID/TD differences in the STRS scores. When predictors at age 3 were investigated, self-regulatory skills fully mediated the STRS scores and ID status at age 6, such that ID children with more developed self-regulation had higher STRS scores.
The most recent report by Blacher, Baker, and Eisenhower (2009) investigated the stability of the STR at ages six through eight for children with ID (n=37) and TD (n= 61). Results indicated that children with ID had less closeness, and higher ratings of dependency and conflict than the TD children across all ages. These differences were not related to IQ, but to the greater behavior challenges and social skills deficits in the ID group. Specifically, behavior ratings were positively associated with teacher conflict and social skills rating were positively associated with teacher closeness. Decreases in problem behavior at age eight were significantly associated with positive STRs at ages six and seven. Interestingly, when classroom placement was investigated, children with ID in general education classrooms had poorer STRs than children with ID in special day classes. Though not investigated in Blacher et al. (2009), findings suggest that unexplored teacher variables such as training or expectations may mediate this relationship.

These three reports indicated that the STR remained relatively stable over time, with students with ID having consistently poorer STRs. Other findings were similar to research for typically developing children, with problem behaviors predicting more conflict, and social skills predicting less closeness. Findings from these investigations highlight the need to provide early interventions aimed at improving child behavioral and social skills while also educating the teacher on effective ways to relate to students with disability.

While most research investigating the student-teacher-relationship used the STRS as an outcome measure, Murray and Greenberg (2001) surveyed fifth and sixth grade
students with high incidence disabilities to assess their bonding to the classroom teacher through the use of a student questionnaire. Students with disabilities reported greater dissatisfaction with teachers than the students without disabilities. When the specific disability was accounted for, students with emotional disturbance had significantly higher dissatisfaction with their teachers than students with learning disability, other health impaired and students without disabilities. Furthermore, students with lower STR quality and school bonding scores demonstrated poorer social and emotional adjustment scores.

Not only do teachers report relationships with students with disabilities that are categorized as conflictual and less close, but the students themselves reported dissatisfaction in their bonding with teachers. These findings do not fare well for students on the autism spectrum who present a disability that is more involved behaviorally, socially, and academically than students with ID or other high incidence disabilities.

**Autism Spectrum Disorders and the STR**

If little known is about students with ID and their relationships with their teachers, an even smaller understanding exists for children on the autism spectrum and their relationships to teachers. Only one study, to date, has focused on the STR and students with autism spectrum disorders. Specifically, it examined the relationship between general education teachers and students with autism who were fully included in 2nd and 3rd grades (Robertson, Chamberlain and Kasari, 2007). One hundred and eighty seven children were included in the study, with 12 students having autism, and six of those students attending general education classrooms with the accompaniment of a paraprofessional. All participants with autism received a primary handicapping label of
“autistic-like behaviors” on their IEP and received a clinical diagnosis of autism outside of the school district. In order to participate, a verbal or full-scale IQ of at least 70 was required. Teachers were interviewed and completed the STRS and a behavioral assessment. In order to assess the extent to which students with ASD were socially included, researchers interviewed classmates who provided information about social groups in the classroom. Ratings were assigned by the researchers to indicate the extent to which social affiliation occurred as described in the student interviews. Surprisingly, students with autism were rated as comparable to TD peers in social inclusion ratings.

The sample had wide variation in STRS scores and behavioral symptomatology. Correlational analyses indicated that students with ASD who demonstrated more hyperactive and impulsive behaviors, as well as students who demonstrated oppositional and defiant behaviors, had higher ratings on conflict and dependency. Students rated higher on inattention had lower closeness scores. The less socially included a child was, the higher he or she was rated on conflict and dependency. Thus, for the children with ASD in this study, both higher behavior ratings and student social status were associated with STR quality.

Clearly, with the low sample size and focus on one educational setting, this study does not generalize to other students with ASD. Students with autism who are fully-included in the general education tend to be higher functioning students who may not exhibit the behavioral or social impairments that are typically characteristic of autistic disorder. This current study incorporated important elements to better understand the STR for children with autism and differed from the previous study in four key ways.
First, Robertson et al. (2003) used students with autism in one setting: general education. This study recruited participants who attended non-public schools, special day classes in public schools, and full-inclusion students in general education on a public school campus. Different educational settings garnered participants with more variance in autism characteristics, as high functioning students may be more prone to participate in general education while students with more moderate to severe characteristics of autism may participate in more segregated settings in special day classes or non-public schools. In addition, the various educational placements in the current study included teachers with different content and quantity of training.

Second, this sample was much larger with 90 participants (as opposed to a total of 12) on the spectrum. Third, like Robertson et al. (2003), both children’s social functioning and behavioral functioning were assessed. However, this current study utilized a more widely accepted measure of behavior problems and two standardized scores of social skills. In addition, each student was individually assessed using a scaled set of social tasks measuring TOM and an autism rating scale. Lastly, both parents and classroom teachers completed measures in order to investigate the extent to which they agreed on child characteristics, and to provide demographic information so that the parent, teacher, and child characteristics that underlie the STR could be examined.

Typical peers were not included in the study, as information using the STRS measure with typically developing students is largely available, including norms. On the other hand, far less is known about STR’s for students with ASD. These additional elements in the current study brought a broader understanding to the relationships
between child and teacher for students with autism in various educational settings and grade levels.

**Research Questions**

In the present study, the association of child, family, and teacher factors to the STR among children with autism were investigated. Specifically, four primary research questions were addressed.

Question 1: Do parents and teachers agree on ratings of children’s behavioral problems, autistic characteristics, and social responsiveness?

Question 2: What family, teacher, child, and classroom characteristics are predictive of the student-teacher-relationship?

Question 3: Are there differential effects on the student-teacher-relationship for children in public and non-public school settings?

(a) Are there significant differences between public and non–public schools on ratings of child characteristics?

(b) Are there significant differences between public and non-public schools on rating of the student-teacher-relationship?

(c) Across all educational settings (general education/mild moderate special day classes, autism-only special day classes, and non-public school classrooms), are there significant differences in the student-teacher-relationships?

(d) Are there significant differences among the three educational classroom groups (GE/MM, autism only, and non-public) on ratings of problem behaviors, social responsiveness, and theory of mind performance?
(e) Across the public school classrooms (GE/MM and autism-only), are there significant differences on ratings of autistic characteristics?

Question 4: Are there differential effects on the Student-Teacher-Relationship Scale for children with high, moderate, and low performance in social responsiveness?

(a) Are there significant differences between the groups on ratings of the STRS total score and subscale scores?

(b) Are there significant differences between the groups on ratings of behavior problems and social performance?

(c) What involvement do students with high, moderate, and low social responsiveness have in various educational settings?
CHAPTER 2

Method

This section will provide a description of the sample and procedures used for data collection. In addition, the variables and instruments selected to operationalize the study will be thoroughly described, followed by an explanation of the strategies used to analyze the data.

Participants

Participants were 90 students, 89 mothers, and 47 teachers recruited to take part in a study investigating the student-teacher-relationship, with samples drawn from Southern California (80%) and Massachusetts (20%). The non-public school sample (N = 33) was recruited from a bi-coastal study investigating the school adaptations for children with autism spectrum disorders (Blacher, 2008-2010). The public school sample was recruited (n=57) from nine public-schools in Southern California with children who were classified with an educational diagnosis of “autistic-like” characteristics.

Non-public school placement is a consideration made by the child’s IEP team when the needs of the student cannot be met in a public school setting (PL 94-142). A child with exceptional needs who requires specialized services is more likely to be educated in a nonpublic school setting. This setting must provide “appropriate special educational facilities, special education or designated instruction and services required by the individual with exceptional needs if no appropriate public education program is available” (Education Code Section 56356).
Tuition is paid for by the local education agency. If parents decide to place their child in a nonpublic setting without the agreement of the IEP team, they are responsible for the cost of the education.

Special education classrooms in public schools are often referred to as “special day classes” and are described using terminology based on current teacher credentialing descriptions. For example, teachers who have earned a mild/moderate teaching credential are authorized to teach students who display characteristics compatible with mild/moderate disabilities (California Commission on Teacher Credentialing, 2010). The same applies for Education Specialists with a moderate/severe emphasis. Autism is categorized as a moderate/severe disability and classrooms with an autism-only composition are typically taught by teachers with credentials that emphasize moderate/severe disabilities. Classrooms in this study that were described as “autism-only” were labeled as moderate/severe or early childhood classrooms.

Table 1 summarizes demographic information for the child, parent and teacher participants in the public and non-public school settings. For the combined sample, 79% of the children were boys with a mean age of 6.8 years (SD = 2.6). Grade levels ranged from preschool to eighth grade with the majority of the sample being in preschool or kindergarten. Two percent were African-American, 6% were Asian, 62% were Caucasian, 16% were Hispanic, and 1% was Native American. Thirteen percent identified with the “other” category, which generally represented families of mixed ethnicity. On the average, mothers were 39 years of age (SD = 6.7) and 43.8% of mothers had a bachelor’s degree or further education. Eighty-five percent of families earned more
than $35,000 annually. Public school teachers were largely female (83%) and all but nine had a credential or graduate degree. New and veteran teachers were about evenly represented, with 49% of teachers working for 1-3 years and 51% teaching for more than 3 years. Significant differences were found between the two groups (public school vs. non-public school) on children’s age, children’s grade in school, child ethnicity, maternal age, and income. These variables were entered as covariates in all analyses when they were also associated with the dependent variable of interest.
## Table 1

<table>
<thead>
<tr>
<th>Child, Parent, and Teacher Demographic Information for Public and Non-Public Schools</th>
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<tbody>
<tr>
<td><strong>Public</strong> (n = 57)</td>
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<tr>
<td><strong>Child</strong></td>
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<tr>
<td>Age (mean years)</td>
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<tr>
<td>Gender (% male)</td>
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<tr>
<td>Grades (%)</td>
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<tr>
<td>Preschool</td>
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<tr>
<td>Kinder-3rd</td>
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<tr>
<td>4th-8th</td>
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<tr>
<td>Ethnicity</td>
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<td>Afr. Amer.</td>
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<tr>
<td>Asian</td>
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<tr>
<td>Caucasian</td>
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<tr>
<td>Hispanic</td>
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<tr>
<td><strong>Parent</strong></td>
</tr>
<tr>
<td>Age (mean years)</td>
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<tr>
<td>Maternal Education</td>
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<tr>
<td>HS Diploma</td>
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<tr>
<td>AA</td>
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<tr>
<td>BS/BA</td>
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<tr>
<td>MA/MS</td>
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<tr>
<td>Income</td>
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<tr>
<td>(% &gt; 35,000/year)</td>
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<tr>
<td><strong>Teacher</strong></td>
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<tr>
<td>Gender (% female)</td>
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<tr>
<td>Ethnicity</td>
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<tr>
<td>Afr. Amer.</td>
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<tr>
<td>Asian</td>
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<tr>
<td>Caucasian</td>
</tr>
<tr>
<td>Hispanic</td>
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<tr>
<td>Education</td>
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<tr>
<td>BA or BS</td>
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<tr>
<td>Credential</td>
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<tr>
<td>MS</td>
</tr>
<tr>
<td>Teacher Experience</td>
</tr>
<tr>
<td>Beginner</td>
</tr>
<tr>
<td>Veteran</td>
</tr>
</tbody>
</table>

na= not available
Procedures

Public school recruitment began with a meeting between school administrators and UC Riverside researchers where consent was given for study recruitment to occur in two Southern California school districts. Emails were sent out to elementary school principals explaining the study’s purpose and requesting the names of teachers in grades pre-K through 3rd grade who had students with an “autistic-like” diagnosis on the IEP. These general education and special education teachers were contacted via email by the researcher with a request for the number of children with autism in their classrooms and an accompanying explanation of the study. Teachers who responded to the email were sent packets with information about the study and were asked to send study information home in student backpacks. This procedure ensured the privacy of students with autism until their families contacted the researcher with an interest in being involved with the study.

Included in the packets that were sent home was a “contact me” postcard that parents filled out and returned to the University if they were interested in participating. Once the postcard of interest was obtained, an initial interview was conducted with a parent over the phone. The purpose of the interview was to: (1) ensure that the child met the eligibility criteria of “autistic-like behaviors,” (2) allow parents to ask further questions, and (3) provide the opportunity to gather basic contact information. Following the phone interview, two consent forms and a packet of questionnaires were mailed to families. One consent form was for the family to keep for their records and the other was to be signed and mailed back to the researcher. In addition, parents signed a teacher
authorization form that allowed their child’s teacher to participate in the study. Parents returned their completed measures, their signed consent forms, and the signed teacher authorization form in the self-addressed, stamped envelope provided. All parents gave consent for their child’s teacher to provide data.

Upon receipt of a signed teacher authorization form, teachers received an introductory letter about the study, a consent form, a copy of the teacher authorization form signed by the parents, and a small packet of measures. Teachers received a packet of measures for each child in his/her classroom whose parents were participating. The signed teacher consent form, along with the completed measures, were returned to the researcher in a self-addressed, stamped envelope. It took teachers and parents approximately 30 minutes to complete the measures. Upon completion of the measures, both teachers and parents received a $15 Target gift card as an honorarium; teachers received one of these gift cards per packet of student measures that he or she completed. Funding was provided by a grant from the Riverside Community Foundation (J. Blacher, P.I.).

**Instruments**

Measures included questionnaires on demographics pertaining to families and their children. In addition, parents and teachers completed measures rating the student’s behavioral, and social functioning. Teachers completed a specific questionnaire assessing the student-teacher-relationship and parents rated their child’s school experiences. An autism rating scale was completed by parents and teachers for the public school participants only. Most instruments were completed during the parent or teacher’s free
time in a setting of their choosing, except for one measure of social functioning (Theory of Mind) that the researcher completed with the student at school. Parent, teacher, and child completed measures are located in Table 2.

Table 2

*Parent, Teacher, and Child Completed Measures*

<table>
<thead>
<tr>
<th>Rater</th>
<th>Measurement</th>
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<tbody>
<tr>
<td><strong>Teacher-Rated Measures</strong></td>
<td></td>
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<tr>
<td>Student Teacher Relationship</td>
<td>Total Score and Subscales</td>
</tr>
<tr>
<td>Social Responsiveness</td>
<td>SRS-T (Total Score)</td>
</tr>
<tr>
<td>Behavior Problems</td>
<td>TRF (Total Score)</td>
</tr>
<tr>
<td>Autism</td>
<td>GARS (Autism Index)</td>
</tr>
<tr>
<td>Classroom Demographics</td>
<td>Classroom Climate Inventory</td>
</tr>
<tr>
<td><strong>Parent-Rated Measures</strong></td>
<td></td>
</tr>
<tr>
<td>Social Responsiveness</td>
<td>SRS-P (Total Score)</td>
</tr>
<tr>
<td>Behavior Problems</td>
<td>CBCL (Total Score)</td>
</tr>
<tr>
<td>Autism</td>
<td>GARS (Autism Index)</td>
</tr>
<tr>
<td>Family Demographics</td>
<td>Family Information Form</td>
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<tr>
<td><strong>Child-Completed Measure</strong></td>
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<tr>
<td>Theory of Mind</td>
<td>TOM Tasks</td>
</tr>
</tbody>
</table>

**Outcome Variable**

The dependent variable for this study was the Student Teacher Relationship Scale (STRS; Pianta, 2001), a teacher-completed measure that assesses the student-teacher relationship. The STRS yields a total scale score and three subscale scores, Conflict, Closeness, and Dependency, with each item rated as follows: (1) *definitely does not apply*, (2) *not really*, (3) *neutral, not sure*, (4) *applies somewhat*, and (5) *definitely*
Teacher feelings of negativity and conflict with the student are measured through 12 items on the Conflict subscale (e.g. “This child sees me as a source of punishment and criticism”). In addition, feelings of affection and open communication toward the student are measured through 11 items in the Closeness subscale (e.g. “This child openly shares his/her feelings and experiences with me”). Finally, the Dependency subscale (5 items) measures the teacher’s perception as to whether the student is overly dependent (e.g. “This child asks for my help when he/she really does not need help”). Higher total scores indicate a more positive student relationship while higher conflict scores indicate relationships where the teacher and student struggle with one another. High closeness scores reflect a relationship that is characterized by warmth and high dependency scores indicate the student may be overly dependent on the teacher. The STRS normative sample was composed of 1,535 students in preschool to third grade. Means and standard deviations for the total score (M = 114.23, SD = 15.47), conflict subscale (M = 24.40, SD = 8.93), closeness subscale (M = 42.01, SD = 6.22), and dependency subscale (M = 10.74, SD = 3.54) were reported. The Professional Manual for the STRS reports sufficient evidence for validity. This measure has been found to be valid through factor analysis (Pianta, 1994; Pianta & Nimetz, 1991; Pianta, Steinberg, & Rollins, 1995). The total score is of most interest, but subscales were examined in analyses. Strong test-retest reliability has been established for conflict (r = .92), closeness (r = .88), dependency (r = .89) and for the total score (r = .89) (Pianta, 2001). Internal consistency correlations were high for conflict (α = .92), closeness (α = .86) and the total score (α = .89) and a moderate
correlation was found for dependency ($\alpha = .64$). The following formula calculates the total score: $(72 - \text{Conflict}) + \text{Closeness} + (30 - \text{Dependency})$.

**Parent-Completed Measures**

**Behavior Problems.** *The Child Behavior Checklist* (CBCL; Achenbach, 1991, 2000) was administered to parents of preschool, elementary, middle school children in order to assess child behavior problems. Parents of students aged 3 to 5 years received the preschool version with 99 items; students ages 6 to 18 received a version with 118 items. Behaviors problems were listed and participants rated each item on a 3-point Likert-type scale: *not true* (0), *somewhat or sometimes true* (1), or *very true or often true* (2). The CBCL for ages 6-18 contains eight syndrome scales labeled as anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior. These syndrome scales can also be examined in two broad groupings of externalizing and internalizing behaviors. The externalizing behavior broadband is composed of rule-breaking and aggressive behavior. Anxious/depressed, withdrawn/depressed, and somatic complaints make up the internalizing broadband. A total score broadband is composed of all items. A T-score with a mean of 50 and standard deviation of 10 is derived for the internalizing, externalizing, and total behavior problems broadband scores. CBCL reliability for total behavior problems is .84 and .90 for the preschool version. According to the CBCL manual, the criterion-related validity is widely supported through multiple regressions, relative risk odd ratios, and discriminant analyses. The CBCL is highly correlated with other instruments such as the Conners Rating Scales and the Behavior Assessment
System for Children and is a commonly used to determine the extent of maladaptive behaviors for children with autism spectrum disorders.

**Social Responsiveness.** The *Social Responsiveness Scale* (SRS; Constantino & Gruber, 2005) is a 65-item questionnaire that can be completed by a teacher or parent for children or adolescents between the ages of 4 and 18 years. The SRS is used as a screener and to aid in diagnosis for Autistic Disorder, Asperger’s Disorder, Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS), and Schizoid Personality Disorder of Childhood. Sixty-five items in the areas of interpersonal behaviors, communication, and repetitive/stereotypic behaviors that typify autism spectrum disorders are assessed and rated on a four-point Likert-type scale as *not true* (1), *sometimes true* (2), *often true* (3), and *almost always true* (4). Five treatment subscales are generated that aid in educational planning and includes social awareness (e.g., “Doesn’t recognize when other are trying to take advantage of him or her), social cognition (e.g., “Is aware of what others are thinking or feeling”), social communication (e.g., “Is awkward in turn-taking interactions with peers”), social motivation (e.g., “Doesn’t join group activities unless told to do so”), and autistic mannerisms (e.g., “Has repetitive, odd behaviors such as hand flapping or rocking”). Separate norms are provided for parents and teachers, and males and females are scored differently. A total t-score was calculated and interpreted as being in the normal range, mild to moderate range, or severe range. A t-score of below 60 places children in the normal range where they are not suspected of being affected by autism spectrum disorders. Scores between 60 and 75 indicate students experience mild to moderate deficits in everyday reciprocal social interaction. Students with t-scores above
are described as being in the severe range where they have a strong association with autism spectrum disorders. Day-to-day social interactions are severely impacted for this group. Of the students who received a t-score of 70 or higher, 75% will earn a diagnosis of autism spectrum disorders on further assessment. The SRS demonstrates concurrent validity with the Autism Diagnostic Interview-Revised and discriminate validity in differentiating autism spectrum disorders from other psychiatric disorder. Total score alpha reliability estimates for males and females are above .90. The SRS provided a measure of severity of social functioning for the participants along a continuum of impairment. Higher scores on the SRS indicated more impairment in social functioning.

**Autism Rating.** The *Gilliam Autism Rating Scale-2* (GARS-2; Gilliam, 1995, 2006) assesses severity of autism symptoms and contains subscales typical of ASD symptoms- Stereotyped Behaviors (e.g., “Whirls, turns in circles”); Communication (e.g., “Repeats words or phrases over and over”); and Social Interaction (e.g., “Shows no recognition that a person is present”) for individuals between the ages of 3 and 22. A summary score or Autism Quotient describes severity of autism from unlikely, possibly, and very likely. Teachers and parents completed this measure. The GARS has high rates of internal consistency with alpha = .94. The GARS autism index was used in this study and converted to z-scores for the analysis. The GARS allowed the researcher to obtain a score to assess severity of autism of the participants.

**Demographic Information.** The *Family Information Form* (FIF; Baker, Blacher, Crnic, & Edelbrock, 2002) is a brief questionnaire that parents completed in order to provide the researcher with demographic information such as child’s gender and
ethnicity, marital status, mother and father’s age, education, job description and employment status.

**Teacher-Completed Measures**

**Behavior Problems.** The *Teacher Report Form* (TRF; Achenbach, 1991) is the teacher version of the CBCL. It provides a standardized measure of problem behavior and offers 112 items investigating a range of behavior problems. The preschool version for ages 1.5-5 years was also completed by the teacher. The classroom teacher rated each item on a Likert-type scale as follows: *is not true* (0), *somewhat or sometimes true* (1) or *very true or often true* (2) currently or within the past two months. A total problem score, broadband externalizing and internalizing scores, and narrowband scales were generated. The total score consisted of a T-score with mean of 50 and standard deviation of 10. Test-retest reliability indicated a mean correlation of .90 for Academic Performance and Adaptive Functioning scores, and .92 for the Total Problems score. Preschool reliability to total behavior problems was 0.88. The manual provided evidence for the validity of the TRF by showing that the item scores, syndrome scores, and clinical cut-off points were able to significantly discriminate between matched students. The TRF generated a score of teacher’s perceptions on student behavior that was compared to parent ratings and investigated as a predictor of the STR.

**Social Responsiveness.** The *Social Responsiveness Scale-Teacher* (SRS; Constantino & Gruber, 2005) is the same as the version previously described.

**Autism Rating.** *Gilliam Autism Rating Scale-2* (GARS-2; Gilliam, 1995, 2006) is the same version that parents filled out, as previously described.
**Teacher and Classroom Demographics.** The *Classroom Climate Inventory* (Eisenhower et al., 2007) is a teacher completed measure that assessed the child’s classroom and school demographics. The questions addressed classroom placement (special day class or general education), teacher demographics (years, teaching, type of credential, gender), and the daily percentage of participation in a general education classroom. The *Classroom Climate Inventory* allowed the researcher to understand the type of educational environment that the children and teacher shared.

**Teacher Interview.** For pilot purposes only, six teachers who worked in general education, mild/moderate, and moderate/severe classrooms, and autism-specific classrooms participated in teacher interviews in order to determine if additional aspects of the STR needed to be investigated. While the pilot data were not reported in this overall study, the teacher feedback helped inform the choice of measures for the study. Questions revolved around the central themes of teacher experience working with children with autism, positive and challenging aspects of these experiences, teacher preparedness for working with children with autism, and perceived dynamics of the child’s family. It was determined that the open-ended interviews with teachers did not provide sufficient information above and beyond the chosen battery of measures to justify the time demand.

**Student-Completed Measure**

**Theory of Mind.** The measure used to assess theory of mind was developed by Wellman and Liu (2004). These researchers compiled seven tasks that sequentially assessed theory of mind for young children. The tasks formed a developmental progression that is supported by a Guttman and Rasch scale. A Guttman scale is a
measure where items are ranked in order of difficulty and a person must successfully complete all previous tasks before advancing to more difficult tasks. While a Guttman scale requires a person to have correctly answered prior questions before moving on, the Rasch scale is less stringent, i.e., it assumes that the respondent “probably” answered the previous, easier items correctly.

The first task examined the student’s ability to recognize that others have desires that may be contrary to his or her own. The second task presented a scenario about a lost cat and choice between where the cat may be hiding. The child must recognize that his own belief about where the cat hid may be different from another person’s belief. The third task involved the ability of the child to consider the knowledge that another person has by showing them a particular item hidden in a box. A toy doll was presented and the child was informed that the doll has never seen inside the box. When asked if the doll knows what is inside the box, the student must answer, “no,” in order to pass this task. The fourth task expanded on task three by showing the child a band-aid box with a toy pig inside. In order to pass this task, the student must indicate that a toy doll who has never viewed the contents of the box would guess that band-aids were inside, not a toy pig. The fifth task also probed the child’s ability to determine the location of an object, despite his or her belief of its location. The sixth task examined the child’s belief about the emotion a doll would feel upon receiving a favorite snack and finding out that the food was replaced with rocks. The last task included a verbal story about the feelings of the main character in the story. In order to pass this task, the student must indicate that the main character had sad feelings, despite the fact the main character appeared happy.
The tasks were completed in 10-15 minutes and participants started with the easiest task, progressing to the most difficult. A researcher administered the tasks one-on-one with the use of pictures and toys. The TOM tasks gave insight into the participants’ developing social cognition. The total score on the TOM task set was used in analyses.

**Data Analysis**

**Descriptive Analysis**

Descriptive analyses were completed in order to examine the normality or shape of the data. Normality was assessed for the independent and dependent variables. Descriptive statistics also aided the investigator in identifying any input errors or missing data. The presence of outliers, skewness, and kurtosis were examined and bivariate scatterplots were run to assess linearity. Information regarding the GARS-2 and the number of years teaching was estimated using the Maximum Likelihood Estimate for 37% of the sample for the GARS-2 and years teaching variables. In addition, the nested structure of the data was investigated in order to see if teachers who had multiple students in their classrooms contributed significant measurement error on the STRS total score. Teacher ratings were considered to be independent and not contributing significant bias to the measure, $F(1, 26), = 1.14, p = 0.36$.

**Planned Analysis**

The planned analyses to answer the questions of interest for this study will be addressed in this section. Study variables and measures are displayed in Table 3. The first question under investigation focused on differences between parents’ and teachers’ ratings on children’s behavioral and social skills? To address this inquiry, correlation
coefficients were computed among the teacher and parent questionnaires for the total scores of the GARS, CBCL/TRF, and SRS.

The second question under investigation examined what family, teacher, child, and classroom characteristics were predictive of the STRS total score and subscale scores for children with ASD. Based on prior research, this study hypothesized that a path model incorporating latent factors representing classroom, child, family, and teacher characteristics would fit the data with the 4 different outcome measures of the STRS total score, conflict, closeness, and dependency scores. The AMOS 7 program was utilized to investigate this question and overall goodness of fit was examined by the Chi-square statistic and three goodness-of-fit indices. In particular, the CFI, RMSEA and CI indices were reported. Fit criteria were met when the model Chi-square statistic was below 2.0 and non-significant, the CFI values were above .90, the RMSEA was below 0.05, and the left endpoint of the 90% confidence interval (C.I.) was markedly smaller than 0.05 with the interval not excessively wide.

The third question under investigation examined differential effects on the student-teacher relationship for children in public and non-public school settings. Although educational placement was an observed variable in the path model, mean scores between educational settings for the STRS and child characteristics were examined to see specifically how these groups differed on the STR and child characteristics. The first approach classified the sample into two groups consisting of public and non-public schools. STRS total and subscales scores were compared between the two groups through independent samples t-tests, or an ANCOVA when covariates were necessary. Non-
public schools were hypothesized to have better STRs with higher closeness, lower conflict, and less dependency. Behavior problems, social responsiveness, and student performance on TOM tasks were also examined using independent samples t-tests. Students in non-public schools were hypothesized to have more behavior challenges, poorer social responsiveness, and lower performance on the TOM tasks. Although past research indicates more behavior and social skills problems contribute to a poor STR, this study hypothesized that students in more restrictive settings will have more behavioral and social challenges, but will still have better quality STRs than students in less restrictive settings. Teachers in more restrictive settings are expected to have more training and preparation in working with students with autism and, thus, will possess more skills to foster positive STRs.

Educational setting was further specified into three educational placements. The least restrictive educational setting was composed of general education students and students in mild/moderate special day classes (GE/MM). The next group was composed of students who were in autism-specific classrooms mostly classified as moderate/severe placements (referred to as “autism only” in text). The last and most restrictive educational setting was non-public schools. Child characteristics were investigated among the three groups with one-way ANOVAs or ANCOVAs utilized to investigate behavior problems, social responsiveness, and TOM tasks. Students were hypothesized to have more problem behaviors, less social responsiveness, and poorer social performance in more restrictive settings. One-way ANOVAs or ANCOVAs were conducted to evaluate the relationship between the STR and educational placement. Follow-up tests were conducted to evaluate
pair-wise differences between the means. The hypothesis here was that students in more restrictive settings would experience higher STRS total scores and less conflict, more closeness, and less dependency than students in less restrictive settings.

The final question examined differential effects on the student-teacher-relationship for children with higher and lower impairment in social responsiveness. Using the teacher-rated data, the sample was divided into the three based on total t-scores. According to the SRS scoring requirements, t-scores of 59 or below result in the normal range and indicate students who may not be affected by autism spectrum disorders. This group was labeled as the low-impairment group. Students who received a t-score of 60-75 were labeled as being in the moderate impairment group and indicated mild to moderate deficits in reciprocal social behavior. Students in this group may demonstrate mild or high functioning characteristics of autism spectrum disorders. The final group was composed of students with t-scores at 76 or higher and was labeled as having high social responsiveness impairment. Scores in this range are considered severe and are associated with social interference in everyday social interactions. One-way ANOVAs and ANCOVAs were conducted to evaluate the relationship between the STR and social responsiveness impairment. The researcher hypothesized that that students with higher social responsiveness skills would experience lower STRS total scores and more conflict, less closeness, and more dependency than students in with lower social impairment. Child characteristics were also investigated between the three groups with one-way ANOVAs and ANCOVAs utilized to examine behavior problems, social responsiveness, and TOM tasks. Students with more social impairment were
hypothesized to have more problem behavior, and poorer social performance. A chi-square statistic examined differences in SRS across educational settings.

Table 3

Variables and Measures used for this study

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Child-Related Variables</td>
<td></td>
</tr>
<tr>
<td>Behavior Problems</td>
<td>CBCL-P; TRF</td>
</tr>
<tr>
<td>Social Responsiveness</td>
<td>SRS-P; SRS-T</td>
</tr>
<tr>
<td>Autism Rating</td>
<td>GARS-P; GARS-T</td>
</tr>
<tr>
<td>Family-Related Variables</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>Family Information Form</td>
</tr>
<tr>
<td>Teacher-Related Variables</td>
<td></td>
</tr>
<tr>
<td>Years Teaching</td>
<td>Classroom Climate Inventory</td>
</tr>
<tr>
<td>Classroom-Related Variables</td>
<td></td>
</tr>
<tr>
<td>Educational Setting</td>
<td>Classroom Climate Inventory</td>
</tr>
<tr>
<td><strong>Dependent Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Student-Teacher-Relationship</td>
<td>STRS total score</td>
</tr>
<tr>
<td></td>
<td>STRS conflict subscale</td>
</tr>
<tr>
<td></td>
<td>STRS closeness subscale</td>
</tr>
<tr>
<td></td>
<td>STRS Dependency Subscale</td>
</tr>
</tbody>
</table>
CHAPTER 3

Results

Question 1: Do parents and teachers agree on ratings of children’s behavior and social skills?

Teacher and parent-ratings were used throughout the analyses in this paper. In order to understand the extent in which parents and teachers agree on ratings of child characteristics, correlation coefficients were computed among the parent and teacher measures for the total scores on the Child Behavior Checklist/Teacher Report Form, Social Responsiveness Scale, and Gilliam Autism Rating System. The results of the correlation analyses presented in Table 4 show that all measures completed by parents and teachers were significantly correlated. In general, the results suggest that parents and teachers tend to score the student/child similarly on measures of behavior problems, social skills and autistic-like characteristics.

Table 4

Correlations among Teacher and Parent-Rated Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>CBCL</th>
<th>SRS-P</th>
<th>GARS-P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRF</td>
<td>.25*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRS-T</td>
<td></td>
<td>.35**</td>
<td></td>
</tr>
<tr>
<td>GARS-T</td>
<td></td>
<td></td>
<td>.41**</td>
</tr>
</tbody>
</table>

*p<.05, ** p<.01
Question 2: What family, teacher, child, and classroom characteristics are predictive of the student-teacher-relationship?

Data from the overall sample of children with autism (n = 90) were examined and compared. A structural model was proposed in order to assess the relative strength of the independent latent variables on the dependent latent variable. Specific variables in the model were posited a priori to investigate characteristics that influence the student-teacher-relationship. The outcome of interest was the teacher-completed measure, the Student-Teacher-Relationship Scale (STRS), represented in the model by the STRS total score. Four latent factors were posited to influence the STR. These latent variables were classroom, child, family characteristics, and teacher experience. Each latent factor is defined in terms of observable variables as displayed in Table 5.
Table 5

*Latent and Observed Variables in Teacher-Rated STRS Total Score Path Model*

<table>
<thead>
<tr>
<th>Latent Factor</th>
<th>Observed Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Behavior Problems</td>
<td>Teacher Report Form (total score)</td>
</tr>
<tr>
<td>Autistic Characteristics</td>
<td>Gilliam Autism Rating Scale-T (autism index)</td>
</tr>
<tr>
<td>Social Responsiveness</td>
<td>Social Responsiveness Scale-T (total score)</td>
</tr>
<tr>
<td><strong>Classroom Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Educational Placement</td>
<td>Educational Placement</td>
</tr>
<tr>
<td>General education/mild moderate</td>
<td>General education/mild moderate</td>
</tr>
<tr>
<td>Autism-only classrooms</td>
<td>Autism-only classrooms</td>
</tr>
<tr>
<td>Non-public school classrooms</td>
<td>Non-public school classrooms</td>
</tr>
<tr>
<td><strong>Family Characteristics</strong></td>
<td>Income</td>
</tr>
<tr>
<td><strong>Teacher Experience</strong></td>
<td>Years Teaching</td>
</tr>
<tr>
<td><strong>Student-Teacher-Relationship</strong></td>
<td>Student Teacher Relationship Scale (total score and subscales)</td>
</tr>
</tbody>
</table>

The classroom characteristics variable was measured by educational placement which occurred in three specified settings ranging from less to more restrictive: General education and mild/moderate special day classes, autism specific classrooms, and, finally, to the most restrictive setting, non-public school classrooms. The child characteristics latent factor was measured by problem behaviors (TRF or CBCL Total Score), social responsiveness (SRS T-Score), and autism characteristics (GARS autism index). The GARS autism index scores were converted to z-scores for analyses. The family characteristics latent factor was measured by income and the teacher characteristics latent
factor was measured by teaching experience. Data for the GARS-2 and teacher experience were not available for the non-public school settings and the Maximum Likelihood Estimate was utilized to estimate the missing data for these variables in the non-public school group. All of the observed variables were theoretically determined to have an impact, positive or negative, on the STR. Each observed variable had strong content validity.

The AMOS version 7 statistical software package was used to run this model (Arbuckle, 2009). Several criteria were used to evaluate the overall fit of the model: Chi square statistics and three goodness-of-fit indices (Hu & Bentler, 1999). Specifically, the model was deemed a good fit if a non-significant Chi-square value was obtained, the Comparative Fit Index (CFI) was greater than 0.90, the Root Mean Square Error of Approximation (RMSEA) was under 0.05, and the left endpoint of the 90% confidence interval (C.I.) was markedly smaller than 0.05 with the interval not excessively wide (Raycov & Marcoulides, 2006; 2008). According to these indices, the teacher-rated model, as shown in Figure 1, provided a good fit to the data, $\chi^2$/d.f. = 13.04/11, $p = 0.29$, CFI =0.986, RMSEA = 0.045, and the C.I., .000 to .124. Model fit statistics are displayed in Table 6. The results of the analysis indicated that the observed variables which had a direct impact on the STR were child characteristics ($\beta = -0.69$, $p<0.001$) and classroom characteristics ($\beta = -0.27$, $p = 0.006$). In addition, the model still exhibited a good fit when parent ratings were used to measure behavior problems, autistic characteristics, and social responsiveness, $\chi^2$/d.f. = 9.43/11, $p =0.58$, CFI = 1, RMSEA = 0.000, and C.I. .000 to .098. Similarly to the teacher-rated model, child characteristics ($\beta = -0.28$, $p = \ldots$
0.02) and educational placement (β = -0.32, p = 0.008) contributed significantly to the STRS total. However, in the teacher-rated model, child characteristics contributed the most variance to the STR (47.6%) while the parent-rated model attributed educational placement in accounting for the most variance (10%).

Table 6

*Measures of Model Fit for the Teacher-Rated STR Total*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square Statistic</td>
<td></td>
</tr>
<tr>
<td>Chi-Square</td>
<td>13.04</td>
</tr>
<tr>
<td>Df</td>
<td>11</td>
</tr>
<tr>
<td>p-value</td>
<td>0.29</td>
</tr>
<tr>
<td>Goodness-of-Fit Indices</td>
<td></td>
</tr>
<tr>
<td>CFI</td>
<td>0.99</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.045</td>
</tr>
<tr>
<td>RMSEA CI</td>
<td>0.00 to 0.124</td>
</tr>
</tbody>
</table>
Figure 1. Teacher-Rated Path Model Predicting the Overall STR
Additional model analyses were conducted in order to investigate the interrelationships among variables and their strength in explaining conflict, closeness, and dependency in the student-teacher-relationship.

**Conflict**

The model investigating conflict utilized all participants in the study and the same latent predictor variables as described in the first model, using teacher’s data. The outcome latent variable was measured by the STRS conflict subscale and the examined model did not fit the data well, $\chi^2/df = 22.33/11$, $p = 0.02$, CFI = .903, RMSEA = .107, and C.I., .039 to .171. The model Chi-square value was statistically significant and relatively high. The goodness-of-fit indices were at the acceptable benchmark of 0.90 while the RMSEA was above the acceptable cut-off value of 0.05. Based on this information, the model was not a good fit in determining conflict in the STR.

However, using parent-reported data on child characteristics in lieu of the teacher-reported data, the model was a good fit with $\chi^2/df = 10.741/11$, $p = 0.465$, CFI = 1.00, RMSEA = 0.000., and CI, .000 to .109. The classroom characteristics latent factor was the only path contributing significantly to the model ($\beta = 0.26$, $p = .048$), with seven percent of the variance in STR conflict being accounted for by educational placement. The more restrictive the setting, the more conflict occurred between the student and teacher. Figure 2 demonstrates the path model results and table 7 displays the goodness of fit statistics.
Table 7

*Measures of Parent-Rated Model Fit for the STR Conflict*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chi-Square Statistic</strong></td>
<td></td>
</tr>
<tr>
<td>Chi-Square</td>
<td>10.74</td>
</tr>
<tr>
<td>Df</td>
<td>11</td>
</tr>
<tr>
<td>p-value</td>
<td>0.465</td>
</tr>
<tr>
<td><strong>Goodness-of-Fit Indices</strong></td>
<td></td>
</tr>
<tr>
<td>CFI</td>
<td>1.000</td>
</tr>
<tr>
<td>RMSEA</td>
<td>.000</td>
</tr>
<tr>
<td>RMSEA CI</td>
<td>0.00 to 0.109</td>
</tr>
</tbody>
</table>
Figure 2. Parent-Reported Path Model Predicting STR Conflict
Closeness

Another analysis was run to examine closeness in the STR using the same latent predictor factors as in the previous two models, using the teacher data. The outcome latent factor was measured by the STRS closeness subscale. The Chi-square statistics and goodness-of-fit statistics, as displayed in Table 8, indicated that the model was a good fit, $\chi^2/df = 11.04/11$, $p = 0.44$, CFI at 1.00, RMSEA at 0.06, and CI at .000 to .111. Figure 3 represents this model. The Child Characteristics latent factor was the only significant contributor to the STR ($\beta = -0.64$, $p < 0.001$) and the social responsiveness measure had the highest loading on the latent factor (0.91).

Using parent-reported measures for the child characteristics latent factor, the model was also a good fit, $\chi^2/df = 18.86/11$, $p = 0.064$, CFI = .945, RMSEA = .089, and C.I., .000 to .156. The child characteristics ($\beta = -0.25$, $p = 0.045$) and family characteristics ($\beta = 0.213$, $p = .04$) latent factors contributed significant variance to the model. Like the teacher-rated model, social responsiveness had the highest loading on the Child Characteristics latent variable (.91). The key difference between the two models was that income accounted for 4.5% of the variance in STR closeness for the parent-rated model, but it was not a significant path for the teacher-rated model. While the parent-rated path model was a good fit to the data, it only explained 10.5% of the variance in student-teacher closeness. In comparison, child characteristics in the teacher-rated path model accounted for 41% of the variance.
Table 8

Measures of Teacher-Rated Model Fit for the STR Closeness

<table>
<thead>
<tr>
<th>Chi-Square Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>11.04</td>
</tr>
<tr>
<td>Df</td>
<td>11</td>
</tr>
<tr>
<td>p-value</td>
<td>0.440</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goodness-of-Fit Indices</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFI</td>
<td>1.000</td>
</tr>
<tr>
<td>RMSEA</td>
<td>.006</td>
</tr>
<tr>
<td>RMSEA CI</td>
<td>0.00 to 0.111</td>
</tr>
</tbody>
</table>
Figure 3. Teacher-Rated Path Model Predicting Closeness in the STR
Dependency

The final model tested predictors of STR dependency. The same latent predictor factors as described in the previous models were used, but the outcome latent factor was measured by the STRS dependency subscale, using the teacher data. The teacher-rated examined model provided the following fit criteria: $\chi^2/df = 17.97/11, p = 0.082$, CFI = 0.924, RMSEA = 0.084, and the C.I., 0.00 to 0.151. The Chi-square statistic was non-significant, but an examination of the goodness-of-fit indices determined that the model did not fit the data well. The CFI was greater than 0.90, the RMSEA was above 0.05, and the C.I. was excessively wide. However, when parent-rated data were used for child characteristics, the model was a good fit, $\chi^2/df = 9.455/11, p = 0.580$, CFI = 1.000, RMSEA = 0.000, and C.I., 0.00 to 0.098. The teacher experience latent factor was the only significant contributor to the model ($\beta = .32, p = 0.02$). Veteran teachers were more likely to have higher rates of dependency with their students. The results of the parent-rated model are displayed in Figure 4 and goodness-of-fit statistics are shown in Table 9.

Table 9

*Measures of Parent-Rated Model Fit for the STR Dependency*

<table>
<thead>
<tr>
<th>Chi-Square Statistic</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>9.46</td>
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<td></td>
</tr>
<tr>
<td>Df</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>0.580</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goodness-of-Fit Indices</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CFI</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>RMSEA CI</td>
<td>0.00 to 0.098</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4. Parent-Rated Path Model on STR Dependency
Summary of Model Analyses Findings

A number of child, family, classroom, and teacher characteristics were predictive of the STR as mentioned in question two. Teacher and parent path models were examined to investigate the conflict, closeness, dependency and the overall student-teacher-relationship. When examining the overall STR, teacher and parent path models were a good fit. Both models indicated that child and classroom characteristics were significant contributors to the STR. The teacher-rated model indicated that child characteristics accounted for the majority of the variance in the STR (48%). The classroom characteristics latent variable accounted for 7% of the variance. In comparison, the parent-rated model found classroom characteristics as accounting for the most variance in the STR (10%) while child characteristics accounted for 8% of the variance. In sum, child characteristics and classroom characteristics predicted the overall student-teacher relationship for both parent and teacher-rated models.

When conflict was examined separately as the outcome measure, the teacher-rated model was not a good fit. However, the parent-rated model was a good fit and indicated that 6.5% of the variance in the STR was attributed to classroom characteristics. Children in more restrictive educational settings were more likely to have higher conflict in the STR. Classroom characteristics defined by educational setting was a significant predictor of conflict in the STR, even when child characteristics were accounted for.

The models for teacher and parent-rated closeness fit the data with the teacher-rated model indicating that 41% of the variance in STR closeness was attributed to child characteristics. Similarly, child characteristics in the parent-rated model contributed the
most variance to closeness (6%), in addition to family characteristics (4.5%). According to the parent-rated model, children with more challenging child characteristics and in more restrictive educational settings were less likely to have closeness with their teachers. The teacher-rated dependency model did not fit the data well, but the parent-rated model was a good fit and indicated that teacher characteristics significantly contributed 10% of the variance in the STR. Teachers who were veteran teachers were more likely to have STRs characterized by higher rates of dependency.

Question 3: Are there differential effects on the student-teacher-relationship for children in public and non-public school settings?

Although the displayed path models provided information regarding child characteristics and educational placement in relation to the STR, further investigation was conducted to examine the extent to which school settings affect the STR. Analyses will explore differences between public and non-public school groups, in addition to investigating a continuum of less to more restrictive educational settings made up of the following classroom settings: General education and mild/moderate classrooms, autism-specific classrooms, and non-public school classrooms.

3a. Are there significant differences between public and non-public schools on ratings of child characteristics?

**Behavior Problems**

A one-way analysis of covariance (ANCOVA) was conducted to explore differences across educational settings, here defined as public vs. non-public schools. A
preliminary analysis evaluating the homogeneity of slopes assumption indicated that the relationship between income and behavior problems did not differ significantly as a function of school setting, $F(1, 67) = .601$, $p = .441$, partial $\eta^2 = .009$. When controlling for income, teacher-reported behavior problems, represented by the total TRF score, were not significantly different across the two types of school settings, $F(1, 68) = 2.43$, $p = .124$.

**Social Responsiveness**

A one-way ANCOVA was conducted to determine whether there were significant differences between public school and non-public school on teacher-rated social responsiveness scores, controlling for income. The dependent variable was the SRS total score. Social responsiveness ratings between the two groups were not significantly different, $F(1, 73) = 1.30$, $p = .258$. The results for teacher-rated problem behaviors and social responsiveness differences are displayed in Table 10.

<p>| Table 10 |
|-------------------------|-------------------------|-------------------------|-------------------------|
| Public and Non-Public Group Differences on Teacher-Rated Child Characteristics |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Public School (n = 49)</th>
<th>Non-Public School (n = 28)</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavior Problems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRF</td>
<td>61.83(6.72)</td>
<td>64.24(5.57)</td>
<td>$F(1, 68) = 2.43$</td>
</tr>
<tr>
<td><strong>Social Responsiveness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRS-T</td>
<td>63.91(1.53)</td>
<td>66.64(2.08)</td>
<td>$F(1, 73) = 1.30$</td>
</tr>
</tbody>
</table>

*p = .05*
Although teacher ratings of behavior problems and social responsiveness did not show significant differences between the two groups on mean scores, parent ratings yielded different results, as shown in Table 11. Child characteristics, as assessed by parents, appeared to differentiate the two groups, with child behavior problems, \( t(77) = -2.474, p < .05 \), and social responsiveness, \( t(77) = -3.49, p = .001 \), significantly differentiating the two educational settings. Children with more behavior problems and less social responsiveness as assessed by parents were more likely to participate in non-public school settings.

Table 11

Public and Non-Public Group Differences on Parent-Rated Child Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Public School (n = 52)</th>
<th>Non-Public School (n = 27)</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior Problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL</td>
<td>61.38(10.81)</td>
<td>66.52(7.45)</td>
<td>( t(77) = -2.474^* )</td>
</tr>
<tr>
<td>Social Responsiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRS-P</td>
<td>75.27(13.25)</td>
<td>84.07(9.04)</td>
<td>( t(77) = -3.49^{**} )</td>
</tr>
</tbody>
</table>

\(^*p = .05, \ **p < .01\)

TOM Tasks

An ANCOVA evaluated the relationship between the public school and non-public school educational settings and student performance on the TOM tasks, controlling for child’s age, mother’s age, and income. The children with ASD were the respondents on this measure. The dependent variable was the total score on the Theory of Mind tasks. The findings, as shown in table 12, indicated significant differences between the two groups with public school students scoring higher, \( F(1, 70) = 7.432, p = .008 \).
Table 12

*Public and Non-Public Group Differences on TOM tasks*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Public School (n = 47)</th>
<th>Non-Public School (n = 28)</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOM tasks</td>
<td>3.13(2.3)</td>
<td>1.35(2.56)</td>
<td>$F(1, 70) = 7.43^*$</td>
</tr>
</tbody>
</table>

*p < .01

3b. Are there significant differences between public and non-public schools on ratings of the student-teacher-relationship?

In light of the findings that significant differences emerged between the public and non-public schools in regard to parent-ratings of behavior problems and social responsiveness, and the child-completed TOM tasks, correlations were run between these variables and the outcome variable of interest, the STRS total score. These correlations are presented in Table 13. All measures were significantly correlated with the outcome variable with the parent-rated social responsiveness variable receiving the highest rating. Thus, social responsiveness and problem behavior problems were co-varied with the STRS total score.
Table 13

Correlations

<table>
<thead>
<tr>
<th>Measure</th>
<th>CBCL</th>
<th>SRS-P</th>
<th>TOM Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRS Total Score</td>
<td>-.31*</td>
<td>-.40*</td>
<td>.30*</td>
</tr>
</tbody>
</table>

*p<.01

Controlling for parent-rated social responsiveness and problem behaviors, a one-way ANCOVA was conducted and found that the STRS total score was different between public school educational settings and non-public school educational settings, $F(1, 74) = 6.63, p < .05$. Students in the public school setting on the average had higher student-teacher-relationship scores ($M=108.03$) than students in a non-public school setting ($M=100.65$).

An additional, independent samples $t$ test revealed significant school setting (public, non-public) differences on conflict, $t(88) = -2.55, p = .012$. Student in public schools had significantly less conflict than students in non-public school settings. A one-way ANCOVA was conducted for school setting and STR closeness. Even when controlling for income and child age, the ANCOVA was significant, $F(1, 73) = 9.46, p = 0.003$. Public school students were rated as having more closeness with their teacher than non-public school students. No significant differences were found between the two groups on ratings of STR dependency, $F(1, 78)= .242, p = .624$. These results are displayed in Table 14.
Table 14

Public and Non-Public Group Differences on the STR

<table>
<thead>
<tr>
<th>Variable</th>
<th>Public School (n = 49)</th>
<th>Non-Public School (n = 28)</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Score</td>
<td>108.03(12.29)</td>
<td>100.65(11.34)</td>
<td>$F(1, 74) = 6.63^*$</td>
</tr>
<tr>
<td>Conflict</td>
<td>23.12(7.19)</td>
<td>27.52(8.91)</td>
<td>$F(1, 88) = 6.53^*$</td>
</tr>
<tr>
<td>Closeness</td>
<td>40.48(8.11)</td>
<td>35.30(6.61)</td>
<td>$F(1, 73) = 9.46^{**}$</td>
</tr>
<tr>
<td>Dependency</td>
<td>10.77(2.56)</td>
<td>10.26(4.53)</td>
<td>$F(1, 78) = .24$</td>
</tr>
</tbody>
</table>

*$p = .05$, $^{**}p < .01$

3c. Across all educational settings (GE/MM, autism-only, and non-public), are there significant differences between the three groups on the student-teacher-relationship?

A one-way analysis of variance of co-variance was conducted to evaluate the relationship between educational setting and the STR when controlling for social responsiveness and behavior problems. The independent variable, educational setting, included three levels: general education and mild/moderate classrooms, autism-only classrooms, and non-public school settings. The dependent variable was the STRS total score. The ANCOVA was significant, $F(2, 73) = 4.79$, $p < .05$.

Follow-up tests were conducted to evaluate pairwise differences among the means. The variances among the three groups ranged from 132.71 to 167.70, and the Levene’s Test for Equality of Variances was non-significant, indicating that there was no significant difference in the variances. Thus, Tukey’s HSD was used for Post Hoc comparisons. Ratings from the teacher indicated general education and mild/moderate educational settings ($M = 113.21$, $SD = 11.53$) received significantly higher STRS total
scores than the non-public school group (M = 101.20, SD = 12.12). There were no significant differences between the autism-only classrooms (M = 106.64, SD = 11.84) and non-public school settings. Students with lower STRS total scores were in more restrictive educational settings. Figure 5 presents a boxplot to show the distribution of changes in the STRS total score for the three comparison groups.

Figure 5. STRS Total Score Distributions by Educational Placement

Further analysis investigated differences between the conflict, closeness, and dependency subscales of the STRS and educational placement. A one-way ANOVA indicated significant differences in conflict among the educational settings, $F(2, 87)=
6.105, p < .01. The strength of the relationship between educational placement and STR conflict, as assessed by $\eta^2$, was strong, as educational placement explained 12% of the variance in STR conflict.

Follow-up tests were conducted to evaluate pairwise differences among the means. The Levene’s Test for Equality of Variances was non-significant, indicating that there was no significant difference in variances. Thus, Tukey’s HSD was used for Post Hoc comparisons. The results of these tests, as well as the means and standard deviations for the three educational placement groups, are reported in Table 15. There were significant differences between the means for the GE/MM group and the non-public school group, with students in the non-public school group experiencing more conflict with the teacher. No significant differences emerged between the autism only group and the other two groups.

Table 15

*STRS Conflict Among the Educational Settings*

<table>
<thead>
<tr>
<th>Educational Placement</th>
<th>GE/MM</th>
<th>Autism-Only</th>
<th>Non-Public School</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19.00a</td>
<td>24.47ab</td>
<td>27.52b</td>
</tr>
<tr>
<td></td>
<td>[14.92, 23.08]</td>
<td>[22.14, 26.79]</td>
<td>[24.86, 30.17]</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate more STR conflict. Means that do not share subscripts differ at $p < .05$ in the Tukey Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.
An ANCOVA was used to examine differences between educational placement and closeness in the STR, controlling for income and child grade. The ANCOVA used to examine closeness among the educational settings was significant, $F(2, 72)= 5.245$, $p = .007$. The means of the STR closeness scores adjusted for initial differences show differences across the three groups with the GE/MM group having the highest score ($M = 42.6$), autism only in the middle ($M = 39.45$) and the non-public school having the lowest ($M = 35.29$). Follow-up tests were conducted to evaluate pairwise differences among these adjusted means. Tukey’s HSD was used to control for Type I error across the pairwise comparisons. There were significant differences in the adjusted means between the GE/MM group and the non-public school group as shown in Table 16. Mean scores between the autism-only group and the non-public school group were also significantly different. Non-public school students were less close to their teacher than students in public school settings.

Table 16

*STRS Closeness Among the Educational Settings*

<table>
<thead>
<tr>
<th>Educational Placement</th>
<th>GE/MM</th>
<th>Autism-Only</th>
<th>Non-Public School</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$42.61_{a}[37.98, 47.25]$</td>
<td>$39.45_{a}[37.43, 42.26]$</td>
<td>$35.29_{b}[32.57, 38.00]$</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate more STR closeness. Means that do not share subscripts differ at $p < .05$ in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.
An ANCOVA was used to examine differences between educational placement and dependency in the STR, controlling for child race and child grade. The ANCOVA used to examine dependency among the adjusted means for the educational settings was not significant, $F(2, 77)=.355, p=.702$.

3d. Are there significant differences between the three educational classroom groups (GE/MM, autism only, and non-public), on ratings of problem behaviors, social responsiveness, and theory of mind performance?

Behavior problems, social responsiveness, and performance on TOM tasks were examined and compared across the three educational groups. The groups were composed of general education and mild/moderate classrooms, autism only classrooms, and non-public school settings.

**Behavior Problems**

A teacher-rated ANCOVA controlling for income found no significant differences between the group, $F(2, 67) = 1.615, p = .207$. However, a one-way ANOVA was utilized to examine parent-rated behavior problems between the groups and significant differences were found, $F(2, 76)= 5.084, p < .01$. Pairwise comparisons among the means on the Child Behavior Checklist Total Problem Behaviors scores across the three educational classroom groups were conducted. The results of these tests, as well as the means and standard deviations for the three educational placement groups, are reported in Table 17. There were significant differences in the means between the GE/MM and non-
public school group with the GE/MM educational setting receiving significantly lower behavior problem ratings. No significant differences emerged between the other groups.

Table 17

*Parent-Rated Behavior Problems Among the Educational Settings*

<table>
<thead>
<tr>
<th>Educational Placement</th>
<th>GE/MM</th>
<th>Autism-Only</th>
<th>Non-Public School</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>56.23a [50.95, 61.51]</td>
<td>63.10ab [60.05, 66.15]</td>
<td>66.52b [62.86, 70.18]</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate more behavior problems. Means that do not share subscripts differ at $p < .05$ in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.

**Social Responsiveness**

An ANCOVA was used to examine differences among the means for social responsiveness and educational setting, controlling for income. Teacher-rated scores on the social responsiveness scale were not significantly different between the adjusted means for the three groups, $F(2, 72)= 1.337, p= .269$. However, parent-rated scores on the social responsiveness scale yielded significant differences between the groups, $F(2,76)= 8.175, p = .001$. As displayed in Table 18, pairwise comparisons among the means indicated that significant differences occurred between the GE/MM group and the other two groups, with the GE/MM group having better ratings on social responsiveness. There were no significant differences between the autism-only classes and the non-public school group.
Table 18

*Parent-Rated Social Responsiveness Among the Educational Settings*

<table>
<thead>
<tr>
<th>Educational Placement</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GE/MM</td>
<td>66.17&lt;sub&gt;a&lt;/sub&gt;[61.51, 74.82]</td>
<td></td>
</tr>
<tr>
<td>Autism-Only</td>
<td>77.46&lt;sub&gt;b&lt;/sub&gt;[73.77, 81.15]</td>
<td></td>
</tr>
<tr>
<td>Non-Public School</td>
<td>84.07&lt;sub&gt;b&lt;/sub&gt;[79.71, 88.43]</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate poorer social responsiveness. Means that do not share subscripts differ at *p* < .05 in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.

**TOM Tasks**

Group differences on the Theory of Mind tasks were also investigated using an ANCOVA and controlling for child age, maternal age, and income. Findings indicated that significant differences existed between the groups, *F*(2, 69)= 9.24, *p* < .001. Post-hoc comparisons indicated that the GE/MM group performed significantly higher than the autism-only classes, and non-public classrooms. There were no significant differences between the autism-only and non-public school groups. Results are shown in Table 19.

Table 19

*TOM Task Performance Among the Educational Settings*

<table>
<thead>
<tr>
<th>Educational Placement</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GE/MM</td>
<td>4.98&lt;sub&gt;a&lt;/sub&gt;[3.64, 6.31]</td>
<td></td>
</tr>
<tr>
<td>Autism-Only</td>
<td>2.46&lt;sub&gt;b&lt;/sub&gt;[1.68, 3.24]</td>
<td></td>
</tr>
<tr>
<td>Non-Public School</td>
<td>1.59&lt;sub&gt;b&lt;/sub&gt;[0.67, 2.50]</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate better performance on the TOM tasks. Means that do not share subscripts differ at *p* < .05 in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.
3e. Across the public school classrooms, do significant differences emerge on ratings of autistic characteristics?

An ANCOVA was used to examine mean differences on the autism measure (GARS) between the two public school classroom settings, general education and mild/moderate and autism-only classrooms. Data was not available for the non-public school setting as it was not collected and they were excluded from the analysis. Teacher-rated autistic characteristics indicated that no significant differences emerged between the general education/mild moderate classrooms and the autism only classrooms when controlling for mother’s age, income, and child’s age, $F(1, 44) = .173, p = .679$. However, parent-ratings on the GARS yielded significant differences between the two groups with students in the autism-only classrooms demonstrating more autistic characteristics when controlling for mother’s age, $F (1, 49)= 4.82, p < 0.05$.

**Summary of Public and Non-Public School Findings**

As described in question three, differential effects were found between public and non-public school settings. When the public and non-public school teacher-ratings on behavior problems and social responsiveness were compared, no significant differential effects were found. However, parent-ratings yielded significant differences on behavior problems and social responsiveness, with students in non-public school settings having more behavior problems and more social impairment. Students in the public school performed significantly better on the TOM tasks than non-public school students. Public school students were also rated as having higher overall STRs with significantly lower
conflict and higher closeness than students in non-public school settings. The groups were similar in their ratings of dependency.

When specific educational settings were investigated, significant differences emerged between the groups. The GE/MM educational setting had significantly higher overall STRS scores and lower conflict than the non-public school setting. Both public school placements (GE/MM and autism-only) had significantly higher ratings on student-teacher closeness than the non-public school setting. The three groups were similar in ratings of student dependency on the teacher. When teacher-ratings of behavior problems, social responsiveness, and autistic characteristics were examined, no significant differences emerged between the three educational settings. However, parent-ratings indicated that the GE/MM setting had significantly less behavior problems than the non-public school setting. In addition, students in the GE/MM setting also performed better on the social responsiveness measure and on the TOM tasks. When autistic characteristics between the two public school settings (GE/MM and autism-only) were compared, teacher rating did not differ between the two groups. The autism-only classrooms demonstrated more autistic characteristics when parent-ratings were used.

Question 4: Are there differential effects on the student-teacher-relationship for children with high, moderate, and low performance in social responsiveness?

4a. Are there significant differences between the three groups on ratings of the STRS total score and subscale scores?
The sample of children with autism was divided into three groups based on teacher ratings on the Social Responsiveness Scale. Students who received a t-score of 59 or below were placed in a high performing group indicating that their socially responsive behavior did not fall clearly in the autism range. The group of children who received a t-score of 60-75 were labeled as being moderately socially responsive. The last group scored at 76 or above, and were placed in the low socially responsive group. Thus, higher scores indicated poorer social responsiveness.

Mean differences between the three groups on the STRS total and subscale scores were investigated. Results indicated that the ANOVA for the STRS total score was significant, $F(2, 86) = 16.02, p = 0.000$. Follow-up tests were conducted to evaluate pairwise differences among the means. Tukey HSD Post Hoc comparisons found significant differences among means. Students designated as high performing with respect to their social responsiveness had teachers who perceived them as having higher STRs than students in the moderate or low performing groups. Students in the low performing group fared the worst, with significantly lower STRs than the other two groups. The more socially impaired a student was, the lower the quality of the STR. Figure 6 displays a boxplot to show the differences among the groups.
An ANOVA was used to examine STR conflict among the three social performing groups and significant differences were found among the groups, $F(2, 86)=3.331, p < .05$. Post-hoc analyses were conducted for the conflict subscale and the results of these tests, as well as the means and 95% confidence intervals for the three social responsiveness groups, are reported in Table 20. There were significant differences in the means between the high and low performing groups, but no significant differences were found between the moderate and high performing groups or the moderate and low
performing groups. Students in the high performance group on social responsiveness had less conflict overall.

Table 20

*STRS Conflict Among the Social Responsiveness Groups*

<table>
<thead>
<tr>
<th>Social Responsiveness</th>
<th>High Performers</th>
<th>Moderate Performers</th>
<th>Low Performers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22.39&lt;sub&gt;a&lt;/sub&gt; [19.56, 25.23]</td>
<td>25.10&lt;sub&gt;ab&lt;/sub&gt; [22.67, 27.53]</td>
<td>28.63&lt;sub&gt;b&lt;/sub&gt; [24.69, 32.57]</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate more conflict in the STR. Means that do not share subscripts differ at \( p < .05 \) in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.

In order to investigate closeness in the STR among the three social groups, an ANCOVA was used to examine adjusted mean differences, controlling for income and child grade, and found significant differences between the groups, \( F(2, 71) = 21.746, p < .001 \). Post-hoc analyses indicated that significant differences were found between all three groups as shown in Table 21. Teachers rated more closeness with students who performed better socially. Regarding the dependency subscale, an ANCOVA, controlling for child race and child grade, investigated the three performance groups and the findings were non-significant, \( F(2, 76) = .837, p = .437 \).
Table 21

**STRS Closeness Among the Social Responsiveness Groups**

<table>
<thead>
<tr>
<th>Social Responsiveness</th>
<th>High Performers</th>
<th>Moderate Performers</th>
<th>Low Performers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43.78\textsubscript{a} [41.40, 46.15]</td>
<td>38.14\textsubscript{b} [36.07, 40.20]</td>
<td>29.81\textsubscript{c} [26.40, 33.23]</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate more closeness in the STR. Means that do not share subscripts differ at $p < .05$ in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.

4b. Are there significant differences between the three groups on rating of behavior problems and theory of mind performance?

**Behavior Problems and TOM Performance Differences**

With regard to behavior problems and TOM performance among the three social responsiveness groups, two analyses were conducted. First, a one-way ANCOVA evaluated the relationship between behavior problems and social responsiveness group, controlling for income. The ANCOVA was significant, $F (2, 66) = 6.7, p < .01$. Post hoc tests revealed that students in the high performing group had significantly fewer behavior problems than students in the moderate and low groups as shown in Table 22. A one-way ANOVA investigating parent-rated problem behaviors did not indicate significant differences between the group, $F(2, 75)= .886, p = .023$. 


Table 22

*Teacher-Rated Problem Behaviors Among the Social Responsiveness Groups*

<table>
<thead>
<tr>
<th>Social Responsiveness</th>
<th>High Performers</th>
<th>Moderate Performers</th>
<th>Low Performers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59.21&lt;sub&gt;a&lt;/sub&gt; [56.81, 61.60]</td>
<td>64.12&lt;sub&gt;b&lt;/sub&gt; [62.13, 66.10]</td>
<td>65.75&lt;sub&gt;b&lt;/sub&gt; [62.36, 69.15]</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate more deficits in social responsiveness. Means that do not share subscripts differ at \( p < .05 \) in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.

A second analysis investigated the performance on TOM tasks among the three social groups. A one-way ANCOVA, controlling for child’s age, income, and maternal age, indicated significant among the three groups, \( F (2, 68) = 11.76, p = 0.000 \). Post hoc tests revealed that students in the high social responsiveness group scored significantly higher than students in the moderate and low groups on TOM tasks. No significant differences occurred between moderate and low performers on the TOM tasks. Table 23 contains the means and the standard deviations on the dependent variables for the three groups.
Table 23

*TOM Task Performance Among the Social Responsiveness Groups*

<table>
<thead>
<tr>
<th>Social Responsiveness Groups</th>
<th>High Performers</th>
<th>Moderate Performers</th>
<th>Low Performers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.96&lt;sub&gt;a&lt;/sub&gt; [3.19, 4.74]</td>
<td>1.89&lt;sub&gt;b&lt;/sub&gt; [1.20, 2.58]</td>
<td>0.994&lt;sub&gt;b&lt;/sub&gt; [-0.15, 2.14]</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate better performance on the TOM tasks. Means that do not share subscripts differ at *p* < .05 in the Bonferroni comparison. Numbers in brackets are 95% confidence intervals of the means.

4c. What involvement do students with high, moderate, and low social responsiveness have in various educational settings?

A two-way contingency table analysis examined the classroom settings in which students in the different social responsiveness groups participated. The general education classrooms were composed mainly of high performers (25.8%) and moderate performers (14.3%). There were no low performers in this setting. The majority of the high performers were placed in autism-only classrooms (51.6%). Moderate and low performers were evenly distributed across the autism-only setting (42.9%). All three groups participated in non-public school settings where 43.8%, 42.9%, and 22.6% were, respectively, in the low, moderate, and high performing groups. The percentages of social responsiveness groups in the various educational settings are displayed in Figure 7. Social responsiveness and educational placement were not found to be significantly different among the groups, Pearson *χ<sup>2</sup>* (4, *N* = 89) = 7.48, *p* = .113.
Summary of Findings for Social Responsiveness Groups

When question four was investigated, differential effects were found between high, moderate, and low-performing groups in social responsiveness. When the student-teacher-relationship and child characteristics were investigated between the three social responsiveness groups, the high performing group or students with the most social responsiveness, had significantly higher STR ratings for the overall scores and closeness ratings. Conflict ratings were significantly lower than the low performing groups and no significant differences emerged on the dependency subscale. The high performing group also demonstrated significantly less behavior problems than the other two groups and significantly better performance on the TOM tasks. No significant differences emerged between the moderate and low performing groups on behavior problems or TOM task.
performance. The involvement of these three groups in the GE/MM, autism-only, and non-public school settings was examined. The findings indicated that the high performers participated in all three settings, but were mostly represented in the autism-only classes. The moderate performers also participated in all settings, but had the highest percentage of involvement in the autism-only and non-public school classrooms. The highest percentage of classroom involvement for the low performers was found in the autism-only classrooms. None of the students in the low performing group participated in the general education. Thus, students with more social responsiveness had lower behavior problems, closer STRs, less conflict with the teacher, and were more likely to participate in autism-only settings.
CHAPTER 4

Discussion

The primary aim of this study was to investigate the student-teacher-relationship (STR) for children with autism spectrum disorders. Child, classroom, teacher, and family characteristics were examined through the use of path analysis. Path analysis allows the researcher to examine the STR as a multidimensional construct comprised of underlying and interconnected variables that work together to influence the outcome measure (Marcoulides & Heck, 1993). It is a useful tool in theory development and the theoretical model proposed in this study was a good fit to the data for several key aspects of the STR.

This study provided a unique contribution to the literature regarding the STR. Not only was the focus on students with autism, but a theoretical model was proposed to explain the relationship between children with autism and their teachers. While past research highlighted the contribution of child characteristics in isolation (e.g., externalizing behavior problems predicted conflict), this study considered classroom, child, family, and teacher factors working together simultaneously to impact the STR. This approach was representative of real life interactions between students and teachers, where a variety of factors likely work together to influence the STR.

With regard to the overall STR, the proposed path model was deemed a good fit in determining whether the included latent variables predicted the overall student-teacher-relationship. The teacher-rated path model accounted for the most variance in the STR when compared to the parent-rated model. Both models had significant paths from the
latent variables of child characteristics (behavior problems, autistic characteristics, social responsiveness) and classroom characteristics (educational placement). For the teacher-rated path model, 48% of the variance in the STR was accounted for by child characteristics and 7% was accounted for by classroom characteristics. In comparison, the parent-rated path model indicated that child characteristics accounted for 7% of the variance in the STR while 10% of the variance was accounted for by classroom characteristics.

These findings were consistent with previous studies indicating that child behavior problems and social factors contributed to the STR for students with typical development (Ladd et al., 1999; Jerome et al., 2008; Rudasill & Rimm-Kaufman, 2009). Prior studies of children with intellectual disability also highlighted the contribution of child factors such as IQ, self-regulation, behavior problems, and social skills to successful school adaptation, including the STR (Eisenhower et al., 2007; McIntyre et al., 2006). In this study, the concert of behavior problems, autistic characteristics, and social responsiveness accounted for significant variance in the model. Students with more problematic child characteristics were rated as having poorer quality STRs. These findings corroborated the Robertson et al. (2003) study where the behavior problems of children with high-functioning autism had poorly impacted the STR.

Even when the relationship between classroom and child characteristics was accounted for, the classroom characteristics latent variable (educational placement) still contributed significant variance to the STR in the teacher and parent-rated path models. Teachers of students in more restrictive educational settings reported poorer quality
student-teacher-relationships. These findings differed from Blacher et al. (2009) who found that students with intellectual disability in more restrictive special education classrooms experienced higher quality STRs than students included in less restrictive general education classrooms. The implications of the STR in more restrictive settings are important in light of the issues surrounding non-public school attendance. While the cost of sending students to non-public schools is considerable when compared to public schools, a more important point is implicit in the idea that moving a student from a lesser to more restrictive setting exposes the pupil to specialized supports and services that contribute to the student’s success. While students may truly be receiving educational tools that encourage their progress, they may also be at-risk of the longitudinal challenges associated with a poorer STR (Silver et al., 2005).

Although this present study can only speak about the examined variables contributing to the STR, future research could investigate to what extent non-public school characteristics contribute to the STR. For example, differences in school culture between public and non-public may impact the STR. Typical public elementary schools have a normal distribution of learners, where the non-public school campuses in this study specialized in teaching students with disabilities. Special education teachers on public school campuses interact with a variety of educators teaching multiple grade levels and different types of learners, thus, exposing them to a campus of mixed perspectives and abilities. In contrast, non-public school settings may be composed of teachers and students who have similar classroom compositions and challenges related to teaching students with autism. The issue of classroom composition was explored in a study by
Buyse et al. (2008) where classrooms with high levels of externalizing behavior contributed to more conflict in the STR for all students. Commiserating with one another on challenging teaching experiences may provide stress relief, but also contribute to a school culture that has lower expectations for students, including the ability to bond with teacher.

Although teacher ratings on behavior problems and social responsiveness did not differ between public and non-public schools, teachers in non-public school settings may assume that their classroom assignment is more difficult by nature of the non-public school label. One study indicated that teachers who perceived their teaching assignment as more difficult experienced higher levels of relational conflict with students (Mantzicopoulos, 2005). Again, this finding lends evidence to the idea that there may be factors unique to more restrictive settings outside the scope of this study that contributed to poorer student-teacher relationships, regardless of the child’s behavioral, social, or autistic characteristics.

Furthermore, teachers in non-public school settings may experience more work-related stress. Concerns over teacher stress were voiced by Mantzicopoulos (2005), who reported that teacher workload stress significantly contributed to student teacher conflict. When STR conflict was examined in this study, more restrictive educational settings predicted higher conflict. Although workload stress was not investigated in this study, one may wonder if teachers in non-public school settings experience additional stressors that public school teachers do not. For example, non-public school teachers may feel more pressure from school officials and families to improve student functioning. Families
of students in non-public schools may have more involvement and input in their child’s schooling. The move to a non-public school is typically enacted when the IEP team agrees that public school system cannot support the student in order for him to make progress. Parents may feel a high level of hope that their child will improve in a specialized setting, thus, having higher expectations for the classroom and teacher. Additionally, administrators in non-public schools may be more likely to have background experiences working with special populations and closely supervise staff. In comparison, public school teachers are on campuses that serve a variety of children and some educators may be the only special education teacher on site. Special education classrooms may be tucked away in the corner of the public school and the principal may have little experience working with children with autism, providing low supervision. Differences between the two settings may contribute to lower workload stress for public school teachers that indirectly impacts the STR.

When closeness in the STR was investigated, the proposed path model was a good fit teacher and parent-rated data. The teacher-rated model explained the most variance of the two models, with child characteristics accounting for 41% of the variance in STR closeness. In comparison, the parent-rated model indicated that child and family characteristics explained 6% and 4.5% of the variance, respectively. For both models, the social responsiveness scale had the highest loading on the child characteristics latent factor. Findings from past research highlighted the association of lower social skills and with less-close STRs (Al-Yagon & Mikulincer, 2008; Copeland et al., 1997; Howes et al., 1994; Howes et al., 2000). Clearly, the child characteristics latent variable composed of
behavior problems, autistic characteristics, and social responsiveness were linked to closeness in the STR. Rather than identifying a single variable that predicts the STR in isolation, the path model allowed one to gain an understanding of how characteristics pertinent to the expression of autism related to the STR. In this study, students who demonstrated more challenging child characteristics (i.e. more problem behavior, higher social impairment, and more autistic characteristics) experienced less closeness in the STR.

One troubling finding in the parent-rated path model was the predictive relationship between income and student-teacher closeness. A similar finding occurred in a study by Ladd et al. (1999), where students from families considered disadvantaged had less close relationships with their teachers. One future area to investigate may involve the teacher-parent relationship as a protective factor to less close STRs. For example, it may not be low income per se that impacts the STR, but the availability and involvement of a parent with more monetary resources. A parent with more financial resources may have the ability to work fewer hours or act as a full-time parent, affording him or her more opportunity to interact with the teacher, or even to have a volunteer presence in the classroom. These parents may be more likely to discuss their child’s progress and education plan, in effect, holding the teacher accountable. Teachers may react to this pressure by providing the child with more attention in order to improve the child’s progress in school. The financial burdens experienced by low-income families may weaken their capacity to be involved in the day-to-day education of their child.
Aside from affecting the STR, low income can affect the level of support from teachers (another indicator of a positive student-teacher-relationship) and even parents. For example, one study of adolescents in a low-income urban environment explored the effects of parent and teacher relationships on children’s perceived school competence. Typically developing children from low-income families who received low levels of parent and teacher support perceived themselves as having low schooling competence (Murray, 2009). This finding underscores the collateral damage to children as a result of a poor STR, whether measured as closeness, dependency, conflict, or involvement.

Teacher and parent path models were also run to determine whether the proposed latent factors predicted dependency in the STR. The model was not a good fit to teacher-generated data, but was deemed a better fit for the parent-generated data. The only significant latent factor that contributed to dependency in the parent-rated model was teacher characteristics (teacher experience), which accounted for 10% of the variance. Teachers with four or more years of teaching experience rated more dependency in the STR. Strategies used in the classroom to promote independence may be related to whether a teacher is a beginner or veteran. For example, beginner teachers may have recently exited a credential program where they learned current strategies regarding instructional practices. Supports to promote independence such as prompting or scaffolding may be utilized more frequently. Veteran teachers may never have learned about these strategies and how to incorporate them into the classroom; too, they may hold lower expectations for children on the spectrum. Furthermore, veteran teachers may feel fatigued and employ fewer activities to facilitate independence, in contrast to beginning
teachers who may have more excitement and eagerness in making students with autism self-sufficient.

For veteran teachers, this fatigue from teaching may impact instructional practices (Olivier & Venter, 2003). The strategies involved in teaching students to increase independent skills may appear more cumbersome than completing the activity for the student, thus making the student more dependent on the teacher. Teachers working with students with autism may be especially vulnerable to teacher burnout due to the associated behavioral challenges. One study found a relationship between the rate of special education teacher emotional exhaustion and student problem behaviors (Hastings & Brown, 2002). In addition, Lecavalier, Leone, and Wiltz (2006) reported that teacher stress was associated with high externalizing behavior problems. On average, 25% of beginning teachers in the United States leave the profession in the first three years. Within the first five years of teaching, 40% of teachers leave their jobs (Ingersoll, 2003). These statistics included all teachers. Teacher turnover rates may be significantly higher for teachers for teachers of children with autism who face additional challenges not typically present in most educational settings.

This study utilized teacher and parent completed measures in order to investigate various characteristics related to the STR. Initial correlations indicated that teachers and parents rated students in a similar fashion; however, differences emerged when these ratings were investigated across educational settings. With regard to the path models, when teacher-ratings were utilized, the impact of child characteristics on the STR was the main predictor for the overall relationship and closeness. An examination of parent-rated
path models indicated that factors outside of child characteristics predicted the most variance in the total score, conflict, and dependency. In general, teacher ratings on behavior and social responsiveness did not differentiate between the public and non-public school settings while parent-ratings were more pronounced between the educational settings. This finding may be explained by the environmental in which teachers and parents interact with the student. Perhaps teachers across both school settings implement strategies and structure throughout the day that minimize challenges related to behavior. This may explain why teacher-ratings between public and non-public schools were not significantly different. Indeed, one study of the adaptive behavior problems of elementary-school aged children with autism found teacher mean score ratings to be higher than parents, despite initial correlations showing parent/teacher agreement (Szatmari, Archer, Fisman, & Streiner, 1994). Teachers may also hold a different expectation of “normal” behavior than parents. For example, teachers in autism-only and non-public settings are working with classrooms of students with disabilities and lack a “typical” comparison group. On the other hand, parent ratings on behavior indicated that students in non-public schools demonstrated more challenging behavior problems. Parents typically interact with their child outside of the structured school setting. They may view behavior problems in contexts the teacher does not typically observe like the shopping at the grocery store, taking a bath, or buying clothes (Foster-Gaitskell, & Pratt, 1998). Behavior problems may be more prevalent in real-world settings where parents don’t have as much control over the environment.
Social functioning of students in public and nonpublic schools was investigated through teacher and parent ratings, and child performance on TOM tasks. Like the behavior problem measure, teacher-ratings on social responsiveness did not differentiate between the groups. Again, the parent-ratings indicated significant differences between the school settings, with public school students receiving higher ratings. The same points discussed regarding differences on teacher and parent rated behavior problems can be applied to differences in the social scores. The environmental context may shape how teachers and parents report behavior and social problems. In addition, students completed social cognitive tasks (i.e., the theory of mind measure) that were independent of teacher or parent-ratings. These tasks were completed directly by the children without input or involvement from families or teachers. Performance on these tasks were significantly different between the two groups, indicating that students in non-public schools performed more poorly. Overall, parent-ratings indicated that students in non-public school settings demonstrated more behavior challenges and poorer social responsiveness.

Due to the critical role that social functioning contributes to autism, the participants were categorized into three groups based on their social responsiveness ratings. Results from these comparisons indicated that students with better social responsiveness had less conflict, more closeness with the teacher, less behavior problems, and higher performance on the TOM tasks. This is an important distinction because grouping in this manner was free from any labeling distinctions of public or non-public schools.
Implications

The present findings highlighted the importance of classroom, child, family, and teacher characteristics in understanding various aspects of the STR for elementary-school aged children with autism. Teacher-rated path models clearly indicated that child characteristics predicted the most variance in the STR. The finding that students with more behavioral challenges experienced poorer STRs is informative for teacher education and early intervention programs. Interventionists can provide behavioral programs to increase pro-social behaviors and decrease problem behaviors, thus reducing some of challenging factors that contribute to poor STRs. However, external characteristics such as family, teacher, and classroom characteristics that were predictive of poor STRs are troubling. Variables that parent-rated models indicated were important contributors to the STR such as educational placement, income, and teacher experience cannot be addressed through early intervention. Interventionists cannot “fix” or improve family income or the number of years a teacher has taught. However, a focus on teacher training may help mitigate the effects of these variables on the STR.

With regard to teacher training, educating teachers on key characteristics contributing to autism and informing them about the powerful dynamics underlying the STR may contribute a notable impact in the student-teacher relationships. Teachers who are prepared for the demands and challenges of working with students with autism, prior to classroom entry, may develop realistic expectations about what a positive relationship with a student may look like. For example, one item on the STRS asks teachers to rate the following statement, “I share an affectionate warm relationship with this child.” An
affectionate and warm relationship with a child with autism may look different than it would with a typically developing student. Teachers with an understanding on the unique factors comprising students with autism may be more skilled in encouraging close relationships with such students.

Furthermore, in light of the behavioral and social challenges associated with autism, teachers of children with autism may be especially vulnerable to teacher burnout. Schools need to evaluate how they can support teachers in order to alleviate stress associated with teaching students with autism. Informing teachers prior to classroom entry, preferably while earning a credential, about the joys and challenges associated with teaching children with autism may be one simple and cost-effective strategy to safeguard teachers against burn-out. At the very least, teachers who received high quality training via their credentialing program or professional development opportunities may well feel more competent in handling the stressors of teaching students with autism.

**Limitations**

Although these results are informative and have practical application for educators, they must be interpreted in light of several limitations. One limitation is the inability to include all relevant variables in the path model. While the model was successful in providing information on various aspects of the STR, important variables that influence the STR may have been excluded from the model.

Criterion for inclusion in the study was based on the CA education diagnostic code of autistic-like behaviors which has less stringent criteria for identification than a medical diagnosis according to the DSM-IV-TR. In addition, some participants in the
study scored in the normal range on the SRS indicating that they may not display characteristics of autism spectrum disorders. It may be possible that some participants received the autistic-like label from their school district, but do not have autism spectrum disorders.

**Future Research**

Future studies should examine variables specific to educational settings that impact the STR above and beyond child characteristics. Factors such as school culture, teacher instructional practices, teacher training, and workload stress may have direct impacts on relationships with students. In addition, incorporating classroom observations to supplement parent and teacher-reported data may provide valuable information about child, teacher, and classroom characteristics independent of parent and teacher perspectives. While the focus of this study was specifically on children with autism, comparing this population to STR ratings for other disabilities and typical peers may provide valuable information regarding students at-risk for poor STRs. Finally, further investigation should examine the contribution of parent-teacher dynamics to the STR.
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