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Early Student-Teacher Relationships of Children With and Without Intellectual Disability: Contributions of Behavioral, Social, and Self-Regulatory Competence

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Abstract

We investigated the student-teacher relationships (STRs) of 6-year-old children with (n=58) and without (n=82) intellectual disability (ID). We also examined early (age 3) and concurrent (age 6) child behavioral, self-regulatory, and social characteristics as predictors of age 6 STR quality. Children with ID experienced significantly poorer relationships with their teachers, marked by less closeness and more conflict and dependency, compared to typically-developing children. This group difference was not accounted for entirely by IQ differences. The relation between ID status and STR quality was fully mediated by four age 6 child variables: mother- and teacher-reported behavior problems and mother- and teacher-reported social skills. The quality of children's relationships with teachers was also predicted by child characteristics as early as age 3, including early behavior problems, self-regulation, and behavior during parent-child interactions. The relation of ID status to STR quality at age 6 was fully mediated by children's self-regulatory abilities at age 3. Our findings demonstrate the importance of child behavioral and social characteristics in predicting relationships with teachers for children with and without ID.

Keywords

student-teacher relationship; intellectual disability; transition to school; self-regulation; behavior problems; social skills

Children's early school experiences place many new demands on their academic, social, and self-regulatory skills. The ability to adjust to the school environment, in turn, has important implications for children's long-term behavioral adjustment, social engagement at school, and academic success. Whereas many factors influence children's adjustment in the early school years, the developing student-teacher relationship has emerged as an important predictor of children's concurrent and long-term adjustment in school. The student-teacher relationship (STR) has been examined well among young, typically developing children; however, little research has examined the STRs of children with intellectual disability (ID).

Children with ID, by definition, have more limited cognitive and adaptive skills. An understanding of STRs among children with ID and their teachers in the primary grades is important given the heightened risk for school maladjustment, including poor social acceptance and competence, classroom disengagement, and behavioral problems, facing children these children (e.g. de Kruif & McWilliam, 1999; Guralnick, Hammond, Connor, & Neville, 2006; McIntyre, Blacher, & Baker, 2006). From an intervention standpoint, an improved understanding of the factors that contribute to STR quality for children with ID can aid in the development of interventions designed to improve these children's preparation for school and likelihood of school success. The current study examines STR quality among 6-year-old children with and without ID, and considers child characteristics that may predict STR quality for these children, both concurrently at age 6, and predictively, using data from when the children were age 3.

Student-Teacher Relationships: Implications for Adjustment

The quality of the STR in kindergarten and first grade has been shown to predict children's behavioral adjustment, social acceptance, school attitudes, engagement, and academic performance both concurrently and in later elementary school (Hamre & Pianta, 2001; Pianta & Stuhlman, 2004; Silver, Measelle, Armstrong, & Essex, 2005). Research supports the theoretical idea that young children who have close, positive relationships with the adults in their lives are better equipped to attend to their environment, communicate with adults, and devote their energy toward learning (e.g. Ladd, Birch, & Buhs, 1999). On the other hand, as attachment theory would suggest, children who have conflictual, overly dependent, or detached relationships with important adults may be less emotionally secure and more poorly positioned to explore their environment and learn from adults (e.g. Pianta, 1999).

Most of the research on STRs has focused on the experiences of typically developing children in the early school years. For instance, Ladd and colleagues found that children with less conflictual relationships with teachers in the early months of kindergarten displayed higher classroom participation and better academic achievement by the end of the kindergarten year (Ladd, Birch, & Buhs, 1999). Pianta and colleagues have reported that children with closer, less conflictual STRs in the spring of their kindergarten year were better-adjusted--with fewer behavior problems and higher levels of competence behaviors--in first and second grade than would be predicted based on their adjustment at the start of kindergarten. On the other hand, highly conflictual or dependent STRs in kindergarten were associated with a downward trend in adjustment, including more behavior problems and lower levels of competence behaviors in the spring of first grade than would be predicted based on early kindergarten adjustment (Pianta, Steinberg, & Rollins, 1995). Likewise, Silver and colleagues found that student-teacher conflict predicted greater increases in externalizing behaviors from kindergarten to first grade, whereas student-teacher closeness predicted decreases in externalizing behaviors (Silver et al., 2005). The quality of children's early relationships with teachers has also predicted children's academic development and school achievement over time (Birch & Ladd, 1997; Peisner-Feinberg et al., 2001). In fact, children's relationships with teachers in kindergarten have been shown to predict work habits, number of disciplinary infractions, and academic grades into the upper grades of elementary school (Hamre & Pianta, 2001).

In addition to behavioral and academic outcomes, early STRs also have been shown to predict children's social adjustment. Children who showed secure attachment relationships with their preschool teachers subsequently received higher sociometric acceptance ratings from classmates, were more empathetic and sensitive with peers, less withdrawn and aggressive, and engaged in more complex play with peers, compared to children who

showed insecure student-teacher relationships in preschool (Howes, Matheson, & Hamilton, 1994). In fact, Howes and colleagues found the relationship with teachers to be a stronger predictor of a child's subsequent behavior with peers than the relationship with parents (Howes, Hamilton, & Matheson, 1994).

Student-Teacher Relationships: Implications for At-Risk Children

Positive relationships with teachers seem to play a particularly strong role for children at risk for adverse outcomes, by deflecting the course of their adjustment in school. For instance, Hamre and Pianta (2001) reported that, when children began school with high behavior problems, kindergarten STRs characterized by low conflict and high closeness predicted better work habits, fewer disciplinary infractions, and lower likelihood of school suspension in later elementary school. This protective effect of early STRs was not found for children who began school with low behavior problems (Hamre & Pianta, 2001). In their study of kindergarten and first grade outcomes, Silver et al. (2005) found that student-teacher closeness was most strongly linked to decreases in externalizing behavior problems for the group of children who began kindergarten with high levels of externalizing behaviors. Finally, Pianta and colleagues (1995) examined STR quality among kindergarten children who were at high risk for grade retention or special education placement based on their poor performance on a readiness screening test and classroom tasks. Among these "high-risk" children, those who had more positive, closer, and less conflictual relationships with teachers were ultimately less likely to be retained or placed in special education by the end of the school year, even after controlling for classroom noncompliance and behavior with peers (Pianta, Steinberg, & Rollins, 1995). In all, these findings suggest that a positive STR can have a buffering effect on academic and behavioral outcomes especially for children with behavioral, academic, or social risk factors. This pattern underscores the importance of understanding STR quality among children with ID.

Risk Factors for Poor STRs among Children with Intellectual Disability

Children with ID require more adult assistance in mastering the basic behavioral, academic, and social skills necessary to get by in school. Relative to their typically developing peers, these children enter school with more behavior problems (e.g. Baker et al., 2003), more negative parent-child interactions (e.g. Floyd & Phillippe, 1993), and difficulties with emotional and behavioral regulation (Wilson, 1999), each of which may put them at risk for school maladjustment and difficulty forming positive relationships with teachers in the early school years. We expect that behavior problems, negative parent-child interaction patterns, and poor self-regulation displayed by children with ID at home will carry over to school, setting the stage for problematic interactions with teachers, including high levels of conflict and reduced opportunities for closeness.

Behavior Problems and Negative Parent-Child Interactions

Children with ID face about 3 times as great a risk of behavioral and psychiatric problems than their typically developing counterparts (Baker et al., 2003; Emerson, 2003). Even as early as age 3, 26% of children with ID in one sample had clinically elevated behavior problems, compared to 8% of their typically developing peers (Baker, Blacher, Crnic, & Edelbrock 2002), and in later childhood more than half of children with ID have been found to have behavioral or psychiatric problems that meet clinical criteria (Dekker, Koot, van der Ende, & Verhulst, 2002; Emerson, Robertson, & Wood, 2005).

Beyond behavior problems, the quality of early parent-child interactions is also a key predictor of the development of social relationships (Guralnick, 1999). In fact, some research shows a stronger relationship between early parent-child interactions and children's

later social competence for children with ID than for children with typical development, indicating that these early variables may be especially crucial for children with ID (Baker, Fenning, Crnic, Baker, & Blacher, under review).

Many of the ways in which children with ID have been shown to impact their parents may also characterize their interactions with teachers. Reports of behavior problems and social skills by parents and teachers are generally modestly correlated (Gagnon, Vitaro, & Trambly, 1992; Stanger & Lewis, 1993), suggesting that teachers are seeing many of the same problem behaviors and social skills as parents, and indicating that behaviors and parent-child interactions at home are likely to predict the quality of interactions with teachers at school. Likewise, the attachment that children develop with their parents would likely carry over to their relationships with teachers (e.g. O'Connor & McCartney, 2006). Parents of young children with ID report more parenting stress than parents of typically developing children (e.g. Baker et al., 2003; Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001). Parents of school-age children with ID have been shown to spend more time working to gain compliance in their parent-child interactions compared to parents of typically developing children, and experience more behavior management struggles and more coercive interactions with their children (Floyd & Phillippe, 1993). Among families of 6-year-old children with and without intellectual disability, parents also have shown more negativity and less positivity in their interactions when their children had greater developmental delays; children with developmental delays, in turn, displayed less positivity with their parents (Croft, O'Connor, Keveaney, Groothues, & Rutter, 2001). This pattern of heightened stress, coercive interactions, and relational negativity may carry over into children's relationships with teachers. We expect that early parent-child interactions and child behavior problems at home will predict the quality of children's later interactions with teachers.

Self-Regulation

In addition to behavioral and cognitive risk factors, children with ID also experience poorer self-regulation skills, in both the emotional and behavioral domains, compared to typically-developing children (e.g. Wilson, 1999). As in the current study, children's emotional self-regulation is often measured during difficult problem-solving laboratory tasks designed to elicit frustration, and in this way mirrors the type of emotionally-arousing situations children are likely to experience in the school context. Meanwhile, behavioral self-regulation is often measured during delay of gratification tasks, where the child must use behavioral self-control to withstand the desire to look at or play with a forbidden toy. This measure closely parallels the kind of limit-setting that occurs in the school setting and the compliance behaviors expected of children in the classroom. Previous research has shown that children with ID are less skilled at delaying gratification than typically developing children, suggesting that this task is a meaningful way of assessing of the early self-regulatory risk factors that may place children with ID at risk for poor school outcomes (Kopp, Krakow, & Johnson, 1983).

The ability to regulate emotions when faced with negative emotion-arousing situations is particularly important in predicting school adjustment, as the transition to school presents children with new behavioral demands (e.g. waiting one's turn, following classroom rules), academic tasks (understanding new concepts, solving problems), and social challenges (e.g. group entry, resolving conflicts) that can elicit negative emotions, such as frustration or anger. These academic, behavioral, and social challenges require children to employ self-control over their behavior and to regulate and cope with their emotions. An inability to meet the classroom demands for behavioral and emotional self-regulation may lead to heightened conflict and fewer positive interactions with teachers. Indeed, early child self-regulation is a strong predictor of later social relationships and social competence

(Guralnick, 1999; Denham, et al., 2003). In fact, as with early parent-child interactions, there appears to be an even stronger relationship between children's early self-regulation and later social skills and relationships for children at developmental risk than for typically developing children (Baker et al., under review). Thus, the deficits in emotional and behavioral self-regulation experienced by children with ID may contribute to difficulties building relationships with teachers (Fabes, et al., 1999).

STR Quality among Children with ID

The cognitive, social, and behavioral risk factors facing children with ID suggest that they may experience poorer relationships with teachers than typically developing children. There is some evidence to support this hypothesis. In their study of early school adjustment in kindergarten children, Ladd and colleagues (1999) found that children's cognitive abilities at school entry were positively related to STR quality and peer acceptance in kindergarten, based on behavioral observations of children's relationships with teachers and peers (Ladd, Birch, & Buhs, 1999). Examining a subset of children in the present sample at an earlier age, McIntyre, Blacher, and Baker (2006) found that five-year-old children with ID experienced poorer adaptation to school, including poorer social skills and relationships with teachers and more problem behaviors in the classroom than their typically developing peers.

The Current Study

This study examined the relationship of child factors to STR quality among children with and without ID. We considered how 6-year-old children's behavior problems and social skills at home and at school, as well as aspects of children's interactions with parents, related to their concurrent relationships with teachers. We also examined how early child characteristics at age 3--including behavior problems, parent-child interaction quality, self-regulation, and children's ability to delay gratification--predicted the quality of children's relationships with teachers three years later. We addressed the following primary research questions:

1. Do children with intellectual disability have poorer quality relationships with their teachers than typically developing children at age 6?
2. If intellectual disability status does relate to STR quality at child age 6, is this relationship a function of cognitive abilities or mediated by other concurrent child characteristics at age 6? What is the relative contribution and total predictive power of these variables?
3. What is the relative contribution and total predictive power of earlier child characteristics at age 3 to later STR quality at age 6? Is the relationship between intellectual disability status and STR quality mediated by these age 3 characteristics?

Methods

Participants

Participants were 140 children with intellectual disability ($n = 58$) or typical development ($n = 82$), as well as their parents and teachers. Families were recruited into a longitudinal study when the child was 3 years old (30 - 40 months). The larger study from which this sample was drawn addressed the development of behavior problems and psychopathology in children with and without intellectual disability, and the sample was recruited at age three specifically to include children with intellectual disability as well as typically-developing children. Families in the present study included 123 children followed annually from age 3 to 6 years, as well as 17 children recruited to the sample at age 5. Families were from rural

Pennsylvania (16%) and southern California (84%). Families of children with ID were recruited primarily through regional agencies that provide and purchase diagnostic and intervention services for individuals with developmental disabilities. In California, practically all families with young children with intellectual disability register for services with one of a network of Regional Centers.

The Diagnostic and Statistical Manual of Mental Disorders (APA, 2000) defines intellectual disability, or mental retardation, as characterized by deficits in both cognitive functioning and adaptive functioning. As defined by the DSM-IV, individuals with scores of 71-84 on tests of cognitive functioning are in the borderline range of intellectual disability, scores of 50-55 to 70 are in the mild range, scores of 35-40 to 50-55 are in the moderate range, and lower scores are in the severe or profound ranges. In accordance with the DSM-IV criteria, children in our sample were classified as having intellectual disability if, at age 5 years, they scored 84 or below on the Stanford-Binet Intelligence Scale IV (Stanford-Binet), a measure of cognitive functioning, and also scored 84 or below on the Vineland Adaptive Behavior Scales (VABS), a measure of adaptive functioning. Of the 58 children in the ID group, 19 scored in the Borderline Intellectual Disability (ID) range (Stanford-Binet scores = 71-84), 24 scored in the Mild range (51-70) and 15 scored in the Moderate range (36-50). Children with borderline intellectual disability were included in the ID group in order to encompass the range of children whose low level of cognitive functioning is likely to interfere with their social and academic experiences in school. Children in the typically developing (TD) group were recruited primarily through preschools and day care centers. They scored 85 or above on the Stanford-Binet at age 5, were not born prematurely, and did not have a developmental disability.

Table 1 shows child, parent, and classroom demographic characteristics by ID status group. The information reported reflects demographics at child age 6, the primary focus of analyses. For the combined sample at the age 6 assessment, 63% of the children were boys; by race and ethnicity, 57% were Caucasian, 16% were Latino, 8% were African-American, 1% were Asian-American, and 17% were mixed ethnicities. Because recruitment initially focused on intact families, 82% of participating parents were married (defined here as legally married or living together for at least six months). On average, mothers were 37.2 years old ($SD = 6.3$) and fathers were 39.9 years old ($SD = 6.6$). Overall, 46% of mothers and 65% of fathers had a bachelor's degree or further education. Sixty-six percent of families earned more than \$50,000 annually.

As shown in Table 1, the two groups did not differ on child age, race, or gender, but did differ significantly on certain parent and family variables (marital status, maternal education, maternal employment, and family income). Our dependent measure, the Student Teacher Relationship Scale Total score, was not even marginally related to any of these four variables, and thus none was co-varied in subsequent analyses. All but eight children were in kindergarten (70.7%) or first grade (20%); six children from the ID group and 1 child from the typically developing group were in preschool and one child from the typically developing group was in second grade. As would be expected, children in the ID group were more likely to be in special education classes and were in smaller classes on average. However, it is notable that over half of the ID group children at age 6 were in regular education classes. Only two teachers had more than one participating child in their classroom (two each); due to the small degree of overlap in teachers, we did not nest our child data within classrooms.

Assessments

Data were obtained through laboratory sessions (child ages 3, 5), parent-completed questionnaires (ages 3, 6), teacher-completed questionnaires (age 6), and home observation

(age 6). All procedures were approved by the Institutional Review Boards of the three universities involved (Penn State University, UCLA, and UC Riverside). The initial measures of the child's cognitive development and problem behaviors were obtained at a home assessment at child age 3. Prior to this visit parents received project descriptions and an informed consent form, and completed a telephone interview with project staff. Two examiners visited the family's home; after reviewing study procedures, answering questions, and obtaining parental informed consent, they administered the Bayley Scales of Infant Development-II (BSID; Bayley, 1993) to the child. During this testing, the child's mother, and father if present, completed the Child Behavior Checklist (CBCL; Achenbach, 2000) and a demographic questionnaire, including information about the child's health and development. Observational measures of children's behavior and parent-child interactions were obtained during a laboratory session held shortly after the home assessment visit.

At age 5, families returned to the lab, where an examiner administered the Stanford-Binet Intelligence Scale – 4th Edition (Thorndike, Hagen, & Sattler, 1986) to the child, and the Vineland Adaptive Behavior Scales (Sparrow & Cicchetti 1989) to the mother. These measures were used to classify children as having intellectual disability or typical development.

At age 6, generally within one month of the child's 6th birthday, experimenters conducted home visits, at which time they coded naturalistic observations of child and parent behavior and collected parent-completed questionnaires. The age 6 teacher-report measures were completed in the spring of the school year, so that teachers would have sufficient time to get to know the child before completing the measures. Thus, teacher-report measures were mailed to teachers in the March closest to children's 6th birthday.

Child Age 3 Measures

Delay of Gratification—Each child's ability to delay gratification was assessed by a widely-used laboratory task to assess children's self-regulatory ability (developed by Vaughn, Kopp, & Krakow, 1984). The child was presented with a large toy village. The child was seated directly in front of the toy within arms reach, was instructed to wait until the experimenter and the child's mother returned before playing with the toy, and was told not to touch the toy in the meantime. The child was left in the room alone with the toy for three minutes. Children's ability to delay gratification was measured as a latency score, or the number of seconds (maximum 180) that they waited before touching the desired toy. After this task, the child was allowed to play with the toy for five minutes.

Observed Child Behavior and Parent-Child Interactions—Children and mothers participated in three problem-solving tasks, including an easy puzzle task, a moderate task requiring children to copy a model with blocks, and a difficult ball drop task. These tasks were selected for examination in the current study because they were expected to closely parallel the kinds of tasks children face in the classroom. For each task, the child was presented with the materials and very brief instructions, and the mother was told to provide the child with whatever help she thought he/she needed to complete the task. Tasks were videotaped and coded later by trained staff. The following dimensions of child behavior were utilized for the present study: Self-Regulation, Lively/Active Behavior, Sustained Attention, and Demandingness. Two dimensions of mother-child interaction were assessed: Mother-Child Dyadic Pleasure and Mother-Child Dyadic Conflict. All child and mother behaviors during the problem-solving tasks, except children's self-regulation, were coded based on the Parent-Child Interaction Rating System (PCIRS; Belsky, Woodworth, & Crnic, 1996), with each variable coded on a 5-point scale, ranging from 1 (not all characteristic) to 5 (highly characteristic). Child and parent behaviors were also coded along other dimensions

of the PCIRS; however, the present study utilized only these 5 variables, as these were hypothesized to most closely predict children's relationships with teachers. Children's self-regulation was coded on a 4-point scale, as follows: 1 = immobilized, 2 = dysregulated, 3 = partially regulated, and 4 = regulated; however, no children in our sample received a score of immobilized during the included tasks. Self-regulation codes could reflect children's ability to regulate positive, negative, or neutral affect, and were based on the Emotion Regulation: Affective Expression Coding System (Zahn-Waxler, et al., 1994).

Coding was completed by pairs of coders who worked together to come to a consensus on each rating. Twenty percent of videotapes were also coded by an individual designated as the master coder in order to evaluate inter-observer reliability. The average weighted kappa for these reliability checks was 0.85 for Lively/Active Behavior (100% within 1), 0.73 for Sustained Attention (100% within 1), 0.80 for Demandingness (100% within 1), 0.71 for Mother-Child Dyadic Pleasure (100% within 1), 0.90 for Mother-Child Dyadic Conflict (100% within 1), and 0.61 for Self-Regulation (96% within 1). For each dimension, scores were converted to z scores and averaged across the three problem-solving tasks for the present analyses.

Child Behavior Checklist (CBCL) for Ages 1.5-5—This CBCL, designed for preschool-age children from 1.5 to 5 years (Achenbach, 2000) has 99 items indicating child problems, listed in alphabetical order (from “aches and pains without medical cause” to “worries”). For each item, the child's mother indicates whether it was not true (0), somewhat or sometimes true (1), or very true or often true (2), now or within the past two months. The CBCL produces a total behavior problems T score with a mean of 50 and a standard deviation of 10, broadband externalizing problems and internalizing problems T scores, and seven narrowband scale scores. The present study utilized only the total behavior problems T scores; in this sample, $\alpha = .95$.

Child Age 5 Measures

Stanford-Binet Intelligence Scale – 4th Edition (Stanford-Binet; Thorndike, Hagen, & Sattler, 1986)—The Stanford-Binet is a standardized test of intelligence that is appropriate for children with intellectual disability and typically-developing children. Eight subtests most appropriate for 5-year-olds were used in the present study (Vocabulary, Comprehension, Absurdities, Pattern Analysis, Copying, Quantitative, Bead Memory, and Memory for Sentences). This instrument yields a Composite Standard Age IQ Score of cognitive functioning with a mean of 100 and a standard deviation of 16. The Stanford-Binet has extremely high internal consistency (Glutting, 1989), and sufficient evidence for its validity is presented in the technical manual (Thorndike et al., 1986). The Composite IQ score was used to determine the ID status groups for the present study. Table 1 shows Stanford-Binet scores by status group.

Vineland Adaptive Behavior Scales (VABS; Sparrow & Cicchetti 1989)—The VABS is a structured interview assessing the adaptive behavior of children and young adults with or without disabilities. In the present study mothers were respondents and subscales used were *communication*, *daily living skills*, and *socialization*. These were combined to form the adaptive behavior composite standard score ($M=100$; $SD=16$), with a Cronbach α coefficient of 0.93. The adaptive behavior composite standard score was used to confirm the intellectual disability status of children with Stanford-Binet scores of 85 or below. Children were classified as having intellectual disability only if both their Stanford Binet composite score and the VABS composite score at age 5 years were 85 or below. Table 1 shows VABS scores by status group.

Child Age 6 Measures

Observed Child Behavior and Parent-Child Interactions—Child behavior and mother-child interactions were assessed during the age 6 home visit. Families were instructed to behave as they normally would at home, while two observers coded their behavior during four, 15-minute periods in the evening. Observers coded the behavior of the participating child, any parent behavior toward the target child, and any interactions between child and parents. These behaviors were coded along the same five domains that were coded at age 3, based on the PCIRS (Belsky, Woodworth, & Crnic, 1996). Codes for self-regulation were not available at age 6. Scores on each dimension were averaged across the four 10-minute observation periods for the present analyses. All coding was completed by pairs of coders in order to assess inter-rater reliability, but in each case the scores of the more experienced coder were used in analyses. The average weighted kappa for inter-rater reliability checks between coding pairs was 0.76 for Lively/Active Behavior (100% within 1), 0.72 for Sustained Attention (98% within 1), 0.81 for Demandingness (98% within 1), 0.80 for Mother-Child Dyadic Pleasure (100% within 1), and 0.88 for Mother-Child Dyadic Conflict (100% within 1).

Child Behavior Checklist for ages 6 –18, and Teacher Report Form—These versions of the CBCL and TRF (Achenbach, 1991) are parent-report and teacher-report respectively. They are used extensively with school-aged children; the items, responses, and scales are similar to one another and to the preschool version described above. In the present study, only the total behavior problems T scores were used. In this sample, CBCL and TRF reliabilities were $\alpha = .95$ and $.96$ respectively.

Social Skills Rating System (SSRS) – parent and teacher—Child social skills were evaluated using the parent and teacher forms of the Social Skills Rating System (SSRS-P and SSRS-T; Gresham & Elliott, 1990). Each scale yields scores that can be converted to standard scores ($M = 100$; $SD = 15$). The parent and teacher forms measure the domains of Cooperation (10 items), Assertion (10 items) and Self-Control (10 items); the parent form also assesses Responsibility (8 items). The Social Skills total score, used in the present analyses, had alphas of 0.87 (SSRS-P) and 0.94 (SSRS-T) in the standardization sample (Gresham & Elliott, 1990).

The Student-Teacher Relationship Scale (STRS; Pianta, 2001) is a 28-item self-report instrument that uses a five-point scale to assess a teacher's perception of her or his relationship with a target student. The STRS is designed to be used for children 3-8 years (Pre-K through 3rd grade) and contains three subscales: Conflict (12 items) measures the teacher's feelings of negativity and conflict with the student (e.g. "This child and I always seem to be struggling with each other," and "This child remains angry or is resistant after being disciplined"); Closeness (11 items) measures the teacher's feelings of affection and open communication with the student (e.g. "I share an affectionate, warm relationship with this child," and "When I praise this child, he/she beams with pride"); and Dependency (5 items) measures the teacher's perception of the student as overly dependent (e.g. "This child asks for my help when he/she really does not need help"). The total index raw score can range from 28 to 140 and is computed using the following formula: Total Raw Score = (72 – Conflict) + Closeness + (30 – Dependency). Pianta (2001) reports adequate reliability and validity; in the present sample, alphas were 0.87 (Conflict), 0.83 (Closeness), and 0.60 (Dependency).

Results

Analytic Plan

Analyses first used *t* tests to determine whether there were significant differences in STRS Total scores by status group (ID vs. TD) at age 6, and correlations to examine whether cognitive level (IQ) within status groups correlated significantly with STR total score. We next examined what other differences between ID status groups, such as child behavior problems, social skills, and behavior with parents, might mediate the relationship between status group and STRS Total scores. To test for mediation, three criteria must be met (Baron & Kenny, 1986): In addition to the status variable being significantly related to STRS Total score, the status variable must correlate significantly with the mediator, and the mediator with STRS Total score. For each age 6 child variable that was significantly related to both ID status and to STRS Total score at $p < .01$, we used hierarchical regression to examine whether it met criteria as a mediator of the relationship between ID status and STR quality.

We conducted further hierarchical regression on the STRS Total score to determine the relative importance of the age 6 child variables that were highly related to STRS Total scores, as well as the total variance accounted for in STR Total scores. We entered variables beginning with most objective (obtained from testing or observation), then those obtained from mothers, and finally those obtained from teachers themselves, which would be expected to share method-related variance with the teacher-completed STRS, as both questionnaires were completed by teachers.

Having established that child characteristics at age 6 related to concurrent STRS Total scores, we sought to determine whether these same and similar variables, measured three years earlier (at age 3), predicted STR quality at age 6, first utilizing *t* tests and correlations as above. We then examined whether variables at age 3 mediated the relation between status and STR quality, as well as the variance accounted for in STRS Total score, using the selection criterion ($p < .01$), hierarchical regression, and order of entry as described above for concurrent relationships at age 6. This approach also allowed us to identify which child variables were most important in predicting later STR quality, according to which variables contributed significantly in the final model.

Student-Teacher Relationship and Intellectual Disability Status

Our first question asked whether children with ID experienced poorer STR quality than typically developing children. Independent sample *t*-tests, shown in Table 2, revealed that the ID group had significantly lower STRS Total scores. Moreover, the ID group was significantly higher than the typically-developing group on the Conflict and Dependency sub-scales, and significantly lower on the Closeness sub-scale.

Because the STRS is based on teachers' perceptions of their relationships with students, we might expect that these perceptions would be influenced by teachers' expectations relative to the other students they teach. In particular, teachers in special education classrooms might adjust their expectations for normative student behavior relative to the other children with special needs in their class. These teachers might be likely to rate their students with ID in a more positive light than teachers in regular education classrooms, for whom a student with ID might fall below their standards for normative student behavior. Thus, we might expect that STRS Total scores would be higher for children with ID who were in special education classes than for children with ID in regular education classes. In order to test this hypothesis, we ran an independent samples *t*-test with classroom setting (regular education versus special education) as our independent variable and STRS Total score as the dependent variable. The *t*-test did not approach significance, $t(56) = 0.67$, $p = 0.51$; thus, classroom setting does not significantly predict STR quality for children with ID.

Student-Teacher Relationship and Other Concurrent Child Domains

We further asked whether the ID status group difference could be explained by aspects of the child's functioning beyond cognitive ability alone. Table 2 shows mean scores by status group for the primary variables assessed. Most observation, parent-report, and teacher-report measures taken at child age 6 significantly differed by status group, with the largest differences in parent and teacher-reported child behavior problems and social skills, as well as differences in observed child sustained attention, demandingness, and mother-child dyadic pleasure and conflict.

Table 2 also shows the correlation with STRS Total score for each of the variables assessed. Child's cognitive ability (Stanford Binet scores, see Table 1), correlated $r = .34$ ($p < .001$) with the STRS Total score. However, within the typically developing or ID status groups, IQ was not significantly related to the STRS total score, r 's = .12 and .16 (ns) respectively. Although there was a modest relationship between cognitive ability and STRS in the whole sample, each of the age 6 variables that strongly differentiated the two status groups (e.g. parent and teacher-reported child behavior problems and social skills, child sustained attention, demandingness), was also significantly correlated with STRS, and in several cases more strongly. Thus it is likely that the status group differences were not entirely, or even mainly, due to cognitive differences but, rather, to one or more of these other variables that differentiated status groups and correlated significantly with the STRS.

Child Domains at age 6 as Mediators of Student-Teacher Relationship Quality

To determine whether these specific domains of child behavior at age 6 mediated the relationship between child ID status and student-teacher relationship quality, a regression analysis was run for each age 6 child variable that was related both to ID status group and to STRS Total score at $p < .01$, as indicated in Table 2. The three prerequisite conditions for testing for mediation were met for five predictor variables: observed child sustained attention, mother- and teacher-reported behavior problems, and mother- and teacher-reported social skills. For each of these variables, the independent variable (ID status) related significantly to the potential mediator and the outcome (STRS) at $p < .01$. The potential mediator and STRS also correlated significantly at $p < 0.01$. In each of these analyses, group status (ID versus typically developing) was entered in Step 1, the potential mediating variable was entered in Step 2, and STRS Total score was the dependent variable.

Table 3 shows the results of these analyses. Full mediation was found for teacher- and mother-reported behavior problems and teacher- and mother-reported social skills. In each of these four cases, the mediating variable explained additional variance in Step 2, and the beta weight for ID status dropped from significant to non-significant. In addition, Sobel tests were significant for each of these four mediators, indicating that the beta weight for ID status changed significantly when the proposed mediating variable was included. Taken together, these results indicate that child behavior problems and social skills, as perceived by both mothers and teachers, each fully accounted for the status group difference in student-teacher relationship quality scores. Partial mediation was supported for child sustained attention; this variable explained additional variance in Step 2, but the beta weight for ID status remained significant. Table 3 displays these regressions and the Sobel test results, relying on the more conservative Aroian version of the Sobel test (Baron & Kenny, 1986; Preacher & Hayes, 2004).

Relative Contributions of Age 6 Child Variables to Student-Teacher Relationship Quality

To explore further the relative relationships of child domains measured at age 6 to teacher-reported STR quality, we ran a hierarchical regression, entering those child variables that related to STRS at $p = .01$. In Step 1, we entered the child's ID status group. In Step 2 we

entered the observation variables child sustained attention and mother-child conflict. In Step 3 we entered mothers' report of behavior problems and social skills, and in Step 4 we entered teacher's report of behavior problems and social skills.

As shown in Table 4, Steps 1 and 2, the independent observations of the child (ID status, observed child sustained attention, and observed mother-child conflict), accounted for 14.2% of the variance in STRS scores. In Step 3, mother's reports of behavior problems accounted for an additional 11.5% of the variance; social skills did not add significantly. Thus, before taking teacher measures into consideration, 25.7% of the STRS variance was accounted for. Step 4, teacher-reported behavior problems and social skills together accounted for an additional 29.7 of the variance, for a total of 55.4% accounted for.

The beta weights in the Step 4 (final) model indicate that once teacher measures were taken into account, the only variables that contributed significantly were child ID status and the teacher assessments of behavior problems and social skills. In this final model, child ID status and teacher-reported social skills were positive predictors of STR quality, whereas teacher-reported behavior problems was a negative predictor of STR quality. While none of the observed or mother-reported variables were significant in the final model, the teacher-reported measures did indirectly reflect the observational and mother-reported variables, as they were significantly correlated ($r = .25$ to $.58$) with the observations of child sustained attention and mother-child conflict as well as with mother reports of behavior problems and social skills.

Child Domains at age 3 as Mediators of Student-Teacher Relationship Quality

Table 2 shows mean scores for the primary variables assessed at age 3, by status group. Most observation and parent-report measures taken at child age 3 significantly differed by status group. Table 2 also shows the correlation between each of the age 3 variables and STRS total score three years later, at age 6.

A series of regression analyses was run to determine whether, as with the age 6 variables, there were specific domains of child behavior at age 3 that mediated the relationship between child ID status and student-teacher relationship quality. As shown in Table 2, using $p < .01$ as the criterion, the three prerequisite conditions for mediation were met for five of the age 3 predictor variables: Observed mother-child dyadic pleasure, sustained attention, delay of gratification, and self-regulation, and mother-reported behavior problems. In each regression analysis, ID status (ID versus typically developing) was entered in Step 1, and the potential mediating variable was entered in Step 2. Full mediation was supported for only one variable: self-regulation. In Step 2, self-regulation explained additional variance above and beyond group status differences ($\beta = 0.24$, $p < .025$), and the beta weight for group status dropped from significant ($\beta = -0.31$, $p < .001$) to non-significant ($\beta = -0.17$, $p = ns$) when self-regulation was entered. The Sobel test statistic was significant (Sobel-Aroian test statistic = -2.16 , $p = .03$), indicating that the beta weight for group status dropped significantly when the self-regulation variable was included. Thus, the relationship between children's ID status and age 6 STR quality was fully mediated by children's self-regulation in the lab tasks at age 3.

Partial mediation was supported for age 3 mother-child dyadic pleasure, child delay of gratification, and mother-reported behavior problems. In each of the individual regression analyses, these variables each explained additional variance in Step 2, but the beta weight for ID status remained significant. Child sustained attention at age 3 was not a mediator of the relationship between ID status and STRS score at age 6.

Relative Contributions of Age 3 Child Variables to Student-Teacher Relationship Quality

We examined whether early childhood factors, measured at age 3, predicted STR quality at age 6. Table 2 shows status group differences and correlations with STRS for the age 3 variables. Of these, five child variables related to STRS Total score with $p < .01$: Delay of gratification, self-regulation, sustained attention, mother-child dyadic pleasure, and mother reported behavior problems. To determine the relative contribution and total predictive power of these age 3 variables, we conducted a hierarchical regression on the age 6 STRS, following the same order of entry discussed above for the 6 year data. In Step 1 we entered the child's ID status, which accounted for 10.4% of the variance [$F(1, 111) = 12.95, p < .001, B = -9.58, SE = 2.66, \beta = -0.32, p < .001$]. In Step 2 we entered four observed variables: latency score in the delay of gratification task, observed mother-child dyadic pleasure, observed self-regulation, and observed sustained attention. This step accounted for a significant 9.0% of variance [$F(4, 107) = 2.97, p = .023$]; however, none of the four variables contributed significantly, and ID status also no longer contributed significantly in Step 2. In Step 3 we entered mothers' report of behavior problems (CBCL), which accounted for an additional 4.4% of variance [$F(1, 106) = 6.17, p = .015$]. In the final model, accounting for 23.8% of variance in the STRS, only the beta weight for child behavior problems was significant ($B = -0.30, SE = 0.12, \beta = -0.23, p < .05$).

Discussion

The present study examined the student-teacher relationships of 6-year-old children with and without intellectual disability, and considered early and concurrent child characteristics that might account for differences in student-teacher relationship quality. Our first question asked whether children with intellectual disability (ID) experienced poorer relationships with teachers than did children with typical development. Results indicated that 6-year-old children with ID experienced poorer relationships with their teachers, characterized by more conflict and dependency and less closeness, compared to their typically-developing peers. This finding adds to our knowledge of the many risk factors for school difficulties already known to face children with ID, such as peer rejection, poor social skills, and school behavior problems (Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996; Kopp, Baker, & Brown, 1992; McIntyre et al., 2006).

Second, we examined the extent to which child cognitive, behavioral, and social characteristics at ages 3 and 6 explained the difference in STR quality between children with and without ID. We found that the ID status difference in STR quality was not entirely accounted for by the IQ difference between the two groups. In fact, STR quality was more strongly related to other child characteristics that differentiated the two groups of children, such as behavior problems and social skills. This finding is consistent with related research on the impact on parents of raising a child with ID. This research has found that the elevated behavior problems of children with ID, rather than the presence of a cognitive impairment itself, more strongly accounts for the heightened childrearing stress experienced by these parents (Baker, et al., 2003; Floyd & Gallagher, 1997).

In addressing our second research question, we identified several concurrent child characteristics that predicted the quality of children's relationships with teachers. At age 6, the relationship between child intellectual disability and STR quality was fully mediated by each of four concurrent variables: mother- and teacher-reported behavior problems and mother- and teacher-reported social skills. STR quality was also correlated with several other child variables at age 6, including children's observed sustained attention and demandingness at home and observed mother-child conflict in the home. A regression showed that a combination of observed, mother-reported, and teacher-reported child variables at age 6 accounted for 55.4% of the variance in STR quality, with children's

teacher-reported behavior problems, teacher-reported social skills, and ID status contributing significantly in the final model. These findings demonstrate the importance of child characteristics, apart from teacher or classroom factors, in determining the quality of children's relationships with teachers, as these child variables accounted for more than half of the variance in STR quality.

Interestingly, in the final model, child ID status was a significant *positive* predictor of STR quality. In other words, after accounting for differences in child behavior problems, social skills, and other interactional variables, teachers actually related more favorably to children with ID than to typically developing children. This suggests that there may be unexamined teacher or classroom factors that contribute positively to relationships with teachers for children with ID, even more so than for typically developing children. Future research ought to explore whether there are teacher variables that differ for children with and without ID that may account for this protective effect, such as higher training among teachers of children with ID, greater teacher empathy toward children with ID, or closer teacher-parent collaboration.

Our third question assessed whether early child characteristics during the preschool years predicted children's later relationships with teachers at age 6. We found that children's self-regulatory behavior at age 3 fully mediated the relationship between intellectual disability status and children's STR quality at age 6. This result suggests that less optimal early self-regulatory abilities render children with ID less prepared than their peers for the emotional and social challenges of school. In fact, self-regulation may be especially important for children with ID, for whom school is likely to be more frustrating and discouraging given their cognitive and adaptive skill deficits. The basic requirements of the elementary school classroom--such as following rules for appropriate school behavior and learning early academic skills--may be more overwhelming for children with ID, eliciting more negative emotions. Thus, the ability to manage and regulate negative emotions may be even more crucial for children with ID than for typically developing children in determining how they are able to adapt to school and relate to teachers (Baker, et al., under review). In turn, the connection between early self-regulation and later relationships with teachers is consistent with research linking children's emotion regulation skills to other social outcomes, including social competence and entry behavior with peers (Wilson, 1999; Fabes et al., 1999). In this way, our findings also lend support to the idea that self-regulatory deficits, as contributors to later social problems, may be an underlying cause of the concurrent and long-term behavioral problems and psychopathology that disproportionately affect children with ID (Crnic, Baker, Blacher, & Edelbrock, 1998; Crnic, Hoffman, Gaze, & Edelbrock, 2004).

The quality of children's relationships with teachers was also significantly predicted by several other age 3 variables, including children's observed delay of gratification ability, sustained attention, demandingness, and mother-child dyadic pleasure, and mother-reported behavior problems. A regression showed that a combination of observed and mother-reported child characteristics at age 3 accounted for 23.1% of the variance in STR quality, with mother-reported behavior problems contributing significantly to STR quality in the final model. Overall, these findings indicate that some of the behavioral and social characteristics related to children's future relationships with their kindergarten and first grade teachers can be identified as early as age 3. These findings extend previous research linking early parent-child interactions, behavior problems, and self-regulation to later peer relationships, by indicating that these early factors are important in predicting children's later social competence and relationships with teachers as well as with peers (Baker, et al., under review; Fabes et al., 1999; Guralnick, 1999; Wilson, 1999).

Our findings suggest several directions for further research. First, children's early and concurrent interactions with parents predicted the quality of children's relationships with teachers, suggesting that certain aspects of behavior with parents and parent-child interactions may prepare children better for their later interactions with teachers. However, our findings do not establish a causal relationship between parent-child interactions and children's interactions with teachers. Future studies might examine the extent to which children's early interactions with parents shape their later interactions with teachers. Such research might help us to identify which parenting practices, parent behaviors and characteristics of parent-child interactions prepare children to interact positively with their teachers in the early school years, especially among children with ID for whom these relationships with teachers are at risk. Alternatively, such research might also reveal the extent to which stable cognitive, behavioral, or temperamental child characteristics shape children's interactions with both parents and teachers.

Further, the present study focused on child characteristics that affect the student-teacher relationship. Future research also ought to examine characteristics of teachers that might influence their relationships with students with ID, such as their attitudes and attributions regarding children's cognitive delay or behavior problems, expectations for these students, and strategies for managing classroom behavior. In particular, teachers' expectations regarding children's behavioral and academic preparedness may play an important role in the quality of the relationships they establish with students. A national survey of over 3,500 kindergarten teachers revealed that nearly half of kindergarteners were rated by their teachers as experiencing difficulties with their adjustment to school, suggesting that there is a substantial gap between teachers' expectations of their students and the actual competence of these children. This discrepancy, which is likely to be even greater for children with ID, may hinder teachers' ability to form positive relationships with these students (Rimm-Kaufman, Pianta, & Cox, 2000). Other factors that warrant examination include teachers' training in special education, knowledge about developmental disabilities, and experience in working with children with ID or behavior problems. In our sample, over half of the children with ID were in regular education classrooms; thus, there is likely to be great variation in their teachers' specific training and experience in educating children with disabilities. In fact, related research suggests that teachers with less overall teaching experience have students who encounter more problems with the transition to kindergarten (Pianta, Cox, Taylor, & Early, 1999). Thus, it is likely that teachers' specific experience teaching children with ID will also affect their students' school adjustment.

This research has several implications for intervention. First, our findings underscore the importance of early intervention efforts aimed at reducing child behavior problems and building social skills among children with ID prior to school entry, in order to equip children for positive student-teacher interactions. Our findings also suggest that children with poor self-regulation ought to be identified early in childhood and provided with interventions to develop their repertoire of adaptive coping strategies and skills for regulating emotions, so that they are better able to regulate their emotions independently once they enter school. Developers of parenting programs also ought to focus on promoting positive parent-child interactions as a stepping stone for later positive interactions with teachers. Improved social skills and self-regulation, reduced behavior problems, and positive interactions with parents may lead to enhanced relationships with teachers, and may also improve children's long-term school outcomes and psychological adjustment.

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Table 1

Demographics by ID Status Group at Child Age 6 (n = 140)

	Typically Developing (n = 82)	Intellectual disability (n = 58)	χ^2 or <i>t</i>
Children			
Mean Age (SD)			
Gender (% boys)	59.8	67.2	$\chi^2 = 0.82$
Race (% Caucasian)	61.0	55.2	$\chi^2 = 0.47$
Stanford-Binet Score at Age 5 (Mean, SD)	104.3 (11.6)	60.9 (14.5)	$t = 18.87^{***}$
VABS Composite Score (M, SD)	103.9 (16.7)	61.8 (10.5)	$t = 18.27^{***}$
Child Grade: % in Kindergarten (vs. 1 st grade)	65.5	74.4	$\chi^2 = 0.18$
Parent and family			
Marital Status (% married)	87.8	73.7	$\chi^2 = 4.55^*$
Mother's Education (% 4-yr college degree)	58.5	28.1	$\chi^2 = 12.56^{***}$
Mother's Employment (% employed)	64.6	47.4	$\chi^2 = 4.10^*$
Mothers' Mean Age in Years (SD)	37.5 (5.8)	36.7 (6.8)	$t = 0.71$
Father's Education (% 4-yr college degree)	69.5	57.9	$\chi^2 = 1.99$
Father's Employment (% employed)	91.9	93.2	$\chi^2 = .06$
Fathers' Mean Age in Years (SD)	39.5 (6.4)	40.5 (6.8)	$t = -0.84$
Family Annual Income (% > \$50K)	74.4	54.4	$\chi^2 = 6.01^*$
Classroom			
Mean Class Size (SD)	19.2 (5.7)	15.1 (6.1)	$t = 3.98^{***}$
% of Children in a Special Education Classroom	0	46.6	$\chi^2 = 46.80^{***}$

*
 $p < .05$ **
 $p < .01$ ***
 $p < .001$.

Table 2

Descriptive Statistics: STRS Scores at Age 6 and Child Predictor Variables at Ages 3 and 6: Means (S.D.) by ID Status Group and Correlations with STRS Total Score

	Typically Developing at age 6 (<i>n</i> = 82)	Intellectual disability at age 6 (<i>n</i> = 58)	<i>t</i>	<i>r</i> with STRS Total
Student-Teacher Relationship at age 6				
STRS Total	121.0 (12.1)	112.6 (13.3)	<i>t</i> = 3.88***	--
STRS Conflict	17.9 (7.3)	21.3 (7.8)	<i>t</i> = -2.66**	-0.90***
STRS Closeness	45.8 (5.5)	42.3 (7.5)	<i>t</i> = 3.02**	0.75***
STRS Dependency	9.0 (3.1)	10.5 (3.4)	<i>t</i> = -2.72**	-0.43***
Predictor Variables at Age 6				
Stanford-Binet IQ score (age 5)	104.3 (11.6)	60.9 (14.5)	<i>t</i> = 18.87***	0.34***
Obs. Child Sustained Attention	4.0 (0.6)	3.5 (0.8)	<i>t</i> = 4.54***	0.27**
Obs. Child Lively/Active Behavior	3.5 (0.6)	3.4 (0.8)	<i>t</i> = 0.24	<0.01
Obs. Child Demandingness	1.4 (0.4)	1.8 (0.7)	<i>t</i> = 3.28**	-0.21*
Obs. Mother-Child Dyadic Pleasure	1.7 (0.6)	1.5 (0.5)	<i>t</i> = 2.20*	0.15
Obs. Mother-Child Dyadic Conflict	1.1 (0.2)	1.3 (0.4)	<i>t</i> = -2.31*	-0.28***
Mother: Behavior Problems	50.7 (9.0)	58.2 (9.4)	<i>t</i> = -4.72***	-0.45***
Teacher: Behavior Problems	48.1 (10.1)	59.6 (7.7)	<i>t</i> = -7.60***	-0.70***
Mother: Social Skills	101.2 (16.2)	82.1 (18.2)	<i>t</i> = 6.42***	0.32***
Teacher: Social Skills	103.2 (13.1)	88.6 (13.9)	<i>t</i> = 6.27***	0.67***
Predictor Variables at Age 3				
	(<i>n</i> = 82)	(<i>n</i> = 41)		
Obs. Delay of Gratification (in seconds)	124.6 (67.3)	62.5 (74.1)	<i>t</i> = 4.52***	0.30***
Obs. Self-Regulation	3.8 (0.4)	3.1 (0.6)	<i>t</i> = 6.59***	0.34***
Obs. Sustained Attention	4.5 (0.6)	3.5 (1.0)	<i>t</i> = 6.01***	0.29***
Obs. Lively/Active Behavior	3.3 (0.5)	3.7 (0.7)	<i>t</i> = -2.73**	-0.16
Obs. Demandingness	1.3 (0.4)	1.9 (0.9)	<i>t</i> = -4.42***	-0.18*
Obs. Mother-Child Dyadic Pleasure	1.9 (0.6)	1.5 (0.4)	<i>t</i> = 3.65***	0.27**
Obs. Mother-Child Dyadic Conflict	1.1 (0.3)	1.2 (0.4)	<i>t</i> = -1.66	-0.17
Mother: Behavior Problems	50.2 (10.1)	57.6 (11.0)	<i>t</i> = -3.71***	-0.33***

*
p < .05

**
p < .01

p < .001.

Table 3

Age 6 Variables as Mediators of the Relationship between ID Status & STRS Total Score

	Mean Sq.	df	Unstand. beta (SE)	Stand. beta	Sobel statistic
<i>1. Mother-reported behavior problems as a mediator:</i>					
Step 1:	1847	1, 134			
ID Status Group (ID vs. typically developing)			-7.47 (2.16)	-0.29***	
Step 2:	2490	1, 133			-3.36***
ID Status Group			-3.50 (2.15)	-0.13	
Mother: Behavior Problems			-0.53 (0.11)	-0.40***	
<i>2. Teacher-reported behavior problems as a mediator:</i>					
Step 1:	2287	1, 137			
ID Status Group			-8.23 (2.17)	-0.31***	
Step 2:	6030	1, 136			-5.99***
ID Status Group			2.35 (1.90)	0.09	
Teacher: Behavior Problems			-0.92 (0.09)	-0.75***	
<i>3. Mother-reported social skills as a mediator:</i>					
Step 1:	1847	1, 134			
ID Status Group			-7.47 (2.16)	-0.29***	
Step 2:	1388	1, 133			-2.31***
ID Status Group			-4.53 (2.42)	-0.17	
Mother: Social Skills			0.15 (0.06)	0.23*	
<i>4. Teacher-reported social skills as a mediator:</i>					
Step 1:	2185	1, 136			
ID Status Group			-8.06 (2.17)	-0.30***	
Step 2:	5296	1, 135			-5.20***
ID Status Group			0.45 (1.94)	0.02	
Teacher: Social Skills			0.58 (0.06)	0.68***	
<i>5. Child Sustained Attention:</i>					
Step 1:	2086	1, 133			

	Mean Sq.	df	Unstand. beta (SE)	Stand. beta	Sobel statistic
ID Status Group			-8.03 (2.19)	-0.30***	
Step 2:	1377	1, 132			-1.85†
ID Status Group			6.24 (2.33)	-0.24**	
Obs. Child Sustained Attention			3.28 (1.57)	0.18*	

Note. For regression 1, $R^2 = 0.082$ for Step 1; $\Delta R^2 = 0.140$ for Step 2 ($ps \leq 0.001$). For regression 2, $R^2 = 0.095$ for Step 1 ($p < .001$); $\Delta R^2 = 0.406$ for Step 2 ($p < .001$). For regression 3, $R^2 = 0.092$ for Step 1 ($p < .001$); $\Delta R^2 = 0.354$ for Step 2 ($p < .001$). For regression 4, $R^2 = 0.082$, $p = .001$ for Step 1; $\Delta R^2 = 0.041$ for Step 2, $p = 0.013$. For regression 5, $R^2 = 0.092$, $p < .001$ for Step 1; $\Delta R^2 = 0.029$ for Step 2, $p = 0.038$.

†
 $p < .10$
*
 $p < .05$
**
 $p < .01$

 $p < .001$.

Table 4

Regression on STRS Total Score (age 6) of Observation, Mother-Report, and Teacher-Report Variables at Age 6

	Mean square	df	Unstand. beta (SE)	Stand. beta
Step 1:	1687	1, 127		
ID Status Group (ID vs. typically developing)			-7.35 (2.23)	-0.28 **
Step 2:	1014	2, 125		
ID Status Group			-4.93 (2.36)	-0.19 *
Obs. Child Sustained Attention			2.20 (1.66)	0.13
Obs. Mother-Child Conflict			-7.59 (3.53)	-0.19 *
Step 3:	1100	2, 123		
ID Status Group			-1.25 (2.50')	-0.05
Obs. Child Sustained Attention			1.75 (1.56)	0.10
Obs. Mother-Child Conflict			-6.37 (3.32)	-0.18 *
Mother: Behavior Problems			-0.44 (0.12)	-0.34 ***
Mother: Social Skills			0.04 (0.07)	0.06
Step 4:	1699	2, 121		
ID Status Group			4.27 (2.06)	0.16 *
Obs. Child Sustained Attention			-0.19 (1.24)	0.01
Obs. Mother-Child Conflict			-4.23 (2.61)	-0.11
Mother: Behavior Problems			-0.04 (0.11)	-0.03
Mother: Social Skills			-0.04 (0.05)	-0.05
Teacher: Behavior Problems			-0.65 (0.13)	-0.53 ***
Teacher: Social Skills			0.25 (0.09)	0.30 **

Note. $R^2 = 0.079$ for Step 1 ($p = 0.001$); $\Delta R^2 = 0.063$ for Step 2 ($p = 0.012$); $\Delta R^2 = 0.115$ for Step 3 ($p < 0.001$); $\Delta R^2 = 0.297$ for Step 4 ($p < 0.001$).

* $p < .05$

** $p < .01$

*** $p < .001$.