

Early Teacher–Child Relationships and the Trajectory of Children’s School Outcomes through Eighth Grade

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This study followed a sample of 179 children from kindergarten through eighth grade to examine the extent to which kindergarten teachers’ perceptions of their relationships with students predict a range of school outcomes. Kindergarten teachers rated children’s behavior and the quality of the teacher–child relationship. Follow-up data from first through eighth grade were organized by epoch and included academic grades, standardized test scores, work-habit ratings, and discipline records. Relational Negativity in kindergarten, marked by conflict and dependency, was related to academic and behavioral outcomes through eighth grade, particularly for children with high levels of behavior problems in kindergarten and for boys generally. These associations remained significant after controlling for gender, ethnicity, cognitive ability, and behavior ratings. The results have implications for theories of the determinants of school success, the role of adult–child relationships in development, and a range of early intervention and prevention efforts.

INTRODUCTION

Children’s abilities to form and maintain styles and strategies of coping with the social environment in the early school years are important factors in establishing a trajectory of academic and behavioral performance (Entwisle & Hayduk, 1988; Lynch & Cicchetti, 1997; Pianta, Steinberg, & Rollins, 1995). Those children who are able to successfully navigate early social environments in school get off to a better start and continue to profit from their social knowledge and experience as they progress through elementary and middle school. Markers of classroom social adjustment, including emotional regulation, school liking, peer competence, engagement with the school environment, and self-control are linked to children’s success in school (Birch & Ladd, 1997; Kochenderfer & Ladd, 1996; Wentzel, 1996). Furthermore, it is evident that, at least in the primary grades, classroom social adjustment is influenced by adult–child relationships, including teacher–child relationships (see Pianta, 1999). Thus, we suspect that qualities of the teacher–child relationship, even early in a child’s school career, can forecast later problems and successes. The present article examines the extent to which kindergarten teachers’ relationships with their students, as perceived by the teacher, are associated with children’s academic and behavioral outcomes through eighth grade and are, in part, implicated in the early schooling processes that give rise to well-documented stability in children’s academic and behavioral performance (Entwisle & Hayduk, 1988; Kowaleski-Jones & Duncan, 1999).

The work of attachment theorists provides substantial evidence to support the idea that children develop

unique working models of the social world based on their early experiences in relationships with adult caregivers (Bowlby, 1982; Bretherton, 1990; Main & Hesse, 1990; Main, Kaplan, & Cassidy, 1985) that in turn help shape early development and influence children’s school experiences. For example, children with secure attachments to their primary caregiver engage more actively in peer interaction and exploration of the school environment, have higher self-esteem, show a greater capacity for forming friendships, are more popular with peers, and demonstrate less negative emotion and hostile aggression than do their insecurely attached peers (Park & Waters, 1989; Sroufe, 1983; Sroufe, 1988; Verschueren, Marcoen, & Schoefs, 1996). Children with insecure attachments are at risk for lower social competence and self-esteem. They tend to show elevated levels of aggressive and hostile behavior and elicit less contact and more anger from preschool teachers than do securely attached children (Cohn, 1990; Sroufe, 1983; Sroufe, 1988). Thus, early relationships with adults play an important role in the formation of social competencies that often translate into positive adjustment in elementary school classrooms.

Once children enter school, relationships with non-parental adults, specifically child–teacher relationships, become increasingly important to classroom adjustment (Birch & Ladd, 1997; Greenberg, Speltz, & Deklyen, 1993; Howes, Hamilton, & Matheson, 1994; Howes & Matheson, 1992; Lynch & Cicchetti, 1992; Pianta, 1992a; Pianta & Nimetz, 1991; Pianta et al., 1995). Teachers

play an important role in shaping children's experience in school. Beyond the traditional role of teaching academic skills, they are responsible for regulating activity level, communication, and contact with peers (Howes & Hamilton, 1993; Howes, Matheson, & Hamilton, 1994; Pianta, 1997). Teachers also provide behavioral support and teach coping skills to children (Doll, 1996).

From the teacher's perspective, strong, positive relationships with students can provide motivation to spend extra time and energy promoting children's success. In contrast, teacher-child relationships characterized by conflict may lead to frequent attempts to control children's behavior and thus hinder efforts to promote a positive school environment for them. This may be one reason why negative teacher-child relationships are related to efforts to exclude children from the classroom (Pianta et al., 1995).

From a child's perspective, positive relationships with teachers may protect against the poor school performance associated with an unsupportive home environment (Cicchetti & Lynch, 1993). For example, in a sample of maltreated and nonmaltreated children, Lynch and Cicchetti (1992) concluded that as a result of their experience with parents, maltreated children may express a greater desire for closeness to nonparental adults compared with nonmaltreated children. Just as teachers are likely to put more effort into children with whom they have a positive relationship, children who trust and like teachers may be more motivated to succeed. Although there is some evidence to suggest that children feel their relationships with teachers become less positive as they get older (Lynch & Cicchetti, 1997), recent data from a large national survey indicate that, even in adolescence, relationships with teachers are one of the single most common resources for children and may operate as a protective factor against risk for a range of problem outcomes (Resnick et al., 1998).

Thus, from both teachers' and children's perspectives, the emotional connection between adults and children in schools is an important factor in children's school performance. Through the early elementary years there is substantial evidence supporting the link between the quality of teacher-child relationships and children's adaptation. Teacher self-report measures reveal three dimensions of teacher-child relationships: conflict, closeness, and dependency (Ladd & Burgess, 1999; Pianta, 1994; Pianta & Steinberg, 1992). These dimensions are consistent across child age, ethnicity, and socioeconomic status (Saft & Pianta, 2000), are stable from kindergarten to second grade (Birch & Ladd, 1997; Pianta et al., 1995), and map conceptually to children's reports of relationships with teachers (Lynch &

Cicchetti, 1992), as well as to constructs like control and warmth observed in parent-child interactions (Pianta, Nimetz, & Bennett, 1997).

The majority of research on teacher-child relationships and school outcomes in the early elementary years has focused on children's socioemotional and behavioral adaptation. Birch and Ladd (1997) found that teacher-child conflict correlated positively with school avoidance and negatively with school liking, self-directedness, and cooperation in the classroom. Over time, relationships characterized by high conflict were associated with a decline in children's prosocial behavior as well as gains in peer-perceived aggressive behavior (Birch & Ladd, 1998). Furthermore, teacher reports of conflict in a relationship are correlated with increases in children's problem behaviors and decreases in competence behaviors over time (Pianta et al., 1995). When the teacher-child relationship is characterized by closeness, children show higher levels of overall school adjustment relative to peers scoring at the lower end of the closeness dimension (Birch & Ladd, 1997; Pianta et al., 1995). Additionally, Birch and Ladd (1997) found that high levels of child dependence on the teacher correlated with school adjustment difficulties, including more negative school attitudes and less positive engagement with the school environment. Excessively dependent children are also more likely to be socially withdrawn and aggressive with peers (Howes et al., 1994). Overall, these findings indicate that teacher-child relationships are important correlates of children's social adaptation through second grade.

Academic outcomes have also been investigated in association with teacher-child relationships. Birch and Ladd (1997) found correlations between the quality of teacher-child relationships and academic performance, as assessed by the Metropolitan Readiness Test. Specifically, both closeness and dependency contributed to performance of visual and language skills in kindergarten. Pianta and colleagues (1995) found that kindergarten students for whom academic failure or special education referral were predicted, but who were not actually retained or referred, had more positive relationships with their kindergarten teachers than did students at similar levels of risk who were retained or referred. Furthermore, improvements in teacher-child relationships in kindergarten have been associated with more positive adjustment for children at the end of first grade than that predicted solely on the basis of early kindergarten adjustment (Pianta & Nimetz, 1991). These findings indicate that children's abilities to form warm, trusting, and low-conflict relationships with teachers in the early elementary years are salient markers of children's adaptation to the social environment and, as such, may forecast academic success, at least through

the lower grades, consistent with Entwisle's (Entwisle & Hayduk, 1988) argument on the importance of social adaptation in early elementary school.

Much less is known about associations between teacher-child relationships and children's outcomes in upper elementary and middle school. Despite the suggestion that teacher-child relationships may be more important to elementary school students than to middle school students (Lynch & Cicchetti, 1997), it was expected that, as Entwisle and Hayduk (1988) suggest, children's adaptation to the social context of the early school years, as measured by the quality of teacher-child relationships, would account for a significant portion of children's school performance in upper elementary and middle school. Given the high level of stability in children's academic and behavioral performance, the associations between early social adjustment and later performance were thought to be largely mediated by early performance. This study examined these hypotheses by following a subsample of children originally assessed at school entry to determine the extent to which kindergarten teachers' relationships with children, as perceived by the teachers, would predict academic and behavioral outcomes in lower elementary (grades 1-4), upper elementary (grades 5 and 6), and middle school (grades 7 and 8). Specifically, outcomes included language arts and math grades, standardized test scores, work-habit marks, and disciplinary records. It was hypothesized that children's ability to form and maintain styles of coping with the social environment in early years of schooling, as measured by kindergarten teachers' perceptions of relationships, would maintain moderate associations with outcome measures through eighth grade, and would contribute uniquely to their prediction after controlling for early measures of child intelligence and behavior. It was anticipated that by upper elementary and middle school, these hypothesized associations would be mediated by children's performance in lower elementary school.

With regard to the two outcome domains assessed in this study, it was expected that kindergarten teachers' perceptions of the quality of teacher-child relationships would be more strongly associated with behavioral than with academic outcomes for several reasons. First, the quality of teacher-child relationships is, in part, a measure of social adjustment, and thus behavioral outcomes are more proximal to this predictor. Second, the behavioral outcomes assessed in this study were influenced directly by teachers' perceptions of children. Work-habit scores reflected teachers' subjective experience of children's social adjustment and discipline infractions were typically instigated by teachers' responses to student misbehavior. Children

who are able to form strong and positive relationships with teachers may be more likely to have occasional misbehavior overlooked due to teachers' understanding of their individual experiences and needs, compared with children who have more difficulty forming strong relationships with teachers and are therefore more isolated and less well known. Grades and test scores, on the other hand, are more objective measures and are less likely to be influenced by teacher perceptions, although they are nonetheless open to the influence of the quality of the teacher-child relationship. Based on previous work demonstrating the negative impact of conflict on children's outcomes, however (Amato & Keith, 1991; Campbell, 1994; Cummings, Iannotti, & Zahn-Waxler, 1985), it was expected that teachers' experience of conflict in relationships with children would be a particularly strong indicator of children's later academic and behavioral difficulties.

An additional goal of this study was to investigate possible moderators of the association between early social adjustment and later academic and behavioral performance. Child gender, ethnicity, verbal abilities, and early behavioral problems are consistently identified as reliable predictors of later school problems (e.g., Pianta & McCoy, 1997; Tramontana, Hooper, & Selzer, 1988). Children at risk of school failure may have the most to gain, or lose, through their ability to adapt to the social environment of the classroom. Therefore, it was expected that the association between early teacher-child relationships and later school performance would be strongest for those children who were at the highest risk for academic and behavioral problems. Specifically, it was hypothesized that a greater portion of the variance in the performance of boys, African American students, children with low verbal abilities, and/or children with significant early behavioral problems would be predicted by kindergarten teachers' ratings of relationship quality.

METHODS

Participants

The sample of 179 children was a subset of an original group of 436 children consisting of the entire entering kindergarten class of 1988-1989 in a small city school district. The subsample included only those children who remained in the district through eighth grade. There were no differences between the subsample and the rest of the group in mother's level of education, IQ scores, or gender, $p < .05$. There was, however, a higher percentage of African American students in the subsample than in the group eliminated from the original sample (40% versus 28%), $\chi^2(1, N = 327) =$

5.34, $p < .05$. Parents consented to all aspects of the data collection. Information was also obtained from children's kindergarten teachers ($n = 26$) and school records through eighth grade.

The final sample contained 91 boys and 88 girls. Of these students, 108 (60%) were White and the remaining 71 (40%) were African American. Mother's education, which was only available for 147 of the cases, was distributed as follows: graduate work, 8%; college graduate, 14%; some college, 16%; high school graduate, 35%; some high school, 22%; and no high school, 5%.

The kindergarten teachers in the sample had an average of 10.3 years of teaching experience ($range = 0-20$). There were two African American kindergarten teachers; the remainder were White.

Procedure

All subjects were administered a school screening battery as they entered kindergarten. Among the screening measures were tests of cognitive development. Teacher questionnaires were administered during May of the kindergarten year. Extensive longitudinal academic and behavior data were collected from school records, including math and language arts grades, standardized test scores, work-habit marks, and disciplinary records. Children attended three schools during the time period over which data were collected: lower elementary (kindergarten through fourth grade); upper elementary (fifth and sixth grades); and middle school (seventh and eighth grades). Data were collected in the spring of the children's eighth-grade year, so outcomes for eighth grade include only records from the first semester.

Cognitive development. An estimate of cognitive development at kindergarten entry was obtained through administration of the vocabulary subtest of the Stanford-Binet Intelligence Scale-Revised, Fourth Edition (SB-FE; Thorndike, Hagen, & Sattler, 1986). The first 14 items on this test require the child to name or give the most pertinent detail of a picture. The remaining items ask the child for an oral explanation of each word. According to the test manual, vocabulary is a reliable subtest, $r = .87$, and correlates highly with the composite score, $r = .81$.

Teacher-Child Rating Scale. The Teacher-Child Rating Scale (TCRS; Hightower et al., 1986) was collected from kindergarten teachers in May of that school year. It is a 38-item teacher-reported rating scale of children's classroom behavior. The items load on seven factor-based subscales: conduct problems, learning problems, shy/anxious problems, frustration tolerance, work habits, assertive social skills, and peer sociability. For the purposes of this study, the Behavior Problems

composite, which consists of conduct, learning, and shy/anxious problems, was used. Internal consistency reliabilities on the Behavior Problems composite exceed .90 (Hightower et al., 1986). The TCRS has been employed as an indicator of classroom adjustment, correlating moderately with other behavior checklists, as well as grades and performance on standardized tests (Trickett, McBride-Chang, & Putman, 1994).

Student-Teacher Relationship Scale. Kindergarten teachers also completed the Student-Teacher Relationship Scale (STRS; Pianta, 1992b) in May of that school year. It is a 28-item rating scale, using a Likert-type format, designed to assess teachers' perceptions of their relationship with a particular student. Kindergarten teachers completed a separate STRS for each of the children in their classrooms. The scale was administered at the end of the school year to ensure that teachers had the longest time possible in which to form an impression of their relationship with each child. The items on this scale were based on a previous 16-item version (Pianta & Nimetz, 1991) developed from attachment theory, the attachment Q-set (Waters & Deane, 1985), and a review of literature on teacher-child interactions. The items were written to assess a teacher's feelings and beliefs about her relationship with a student, and her feelings and beliefs about the student's behavior toward her. This scale has been used extensively in studies of preschool- and elementary-age children (e.g., Birch & Ladd, 1997, 1998; Howes & Hamilton, 1992; Howes & Richie, 1999).

In an earlier study consisting of 436 children, a three-factor solution accounted for 60% of the total variance. These three factors were labeled Conflict, Closeness, and Dependency. The Conflict scale accounted for 30.4% of the variance and contained such items as "This child easily becomes angry at me" and "This child and I always seem to be struggling with each other." The coefficient α was .93 for the 12 items with loadings of .40 or greater on this factor. The Closeness factor accounted for 14.1% of the variance. It contained items such as "I share an affectionate, warm relationship with this child," "If upset, this child will seek comfort from me," and "This child spontaneously shares information about him/herself." The α for the 11-item Closeness scale was .86. The four-item Dependency factor accounted for 4.3% of the variance and included items such as "This child is overly dependent on me" and "This child reacts strongly to separation from me." The coefficient α for this scale was .68.

In accordance with hypotheses regarding the importance of the negative components of the teacher-child relationship in predicting later outcomes, the Conflict and Dependency scores were added together to form a Relational Negativity score.

Academic performance. Grades were collected each year, in first through eighth grades. In second grade, math and language arts grades were recorded dichotomously as either "On/Above Level" (2) or "Below Level" (1). In first grade and third through eighth grades, students received standard letter grades (A = 5; B = 4; C = 3; D = 2; F = 1) in math and language arts.

Iowa Test of Basic Skills. School personnel routinely administered the Iowa Test of Basic Skills (ITBS; Hieronymus & Hoover, 1978). Students took the exam in a group format each year in the spring of second through fifth grades. The ITBS is a nationally normed achievement test measuring proficiency in the areas of word analysis, vocabulary, reading, language, work study, mathematics, listening, social studies, science, and writing skills (Hambleton, Hieronymus, & Hoover, 1987). Standard scores for the comprehensive total score were used. The ITBS has internal consistency and equivalent-form reliabilities in the mid-.80s to low .90s for the area and comprehensive scores (Salvia & Ysseldyke, 1985).

Work habits. Work-habit behaviors were recorded by teachers in each grade after kindergarten (1–8). Teachers' reports of predetermined positive and negative descriptors were tallied from report cards. Only behaviors that pertained to the child's work habits in math and language arts were included in these tallies. Although these reports varied by grade, they generally focused on behaviors such as listening, participation, compliance, cooperation, and study habits.

Disciplinary record. The school district maintained detailed records on each student's disciplinary history. Type of infraction and disciplinary action taken were recorded. There was a wide variety of possible infractions ranging from less severe (e.g., unexcused absence) to very severe (e.g., use of weapon or sale of drugs). Of the 1,930 total disciplinary infractions recorded for this sample between first and eighth grade, the most frequent were defiance of school authority (24%), classroom disruption (21%), inflammatory actions (13%), disruption of the educational process (12%), fighting (6%), unexcused absences (6%), disruptive behavior on the school bus (5%), and abusive language (4%). Variables used in this study included the total number of disciplinary infractions students had in each grade and whether or not they were ever suspended.

Data Analysis

Children attended three types of schools. In grades K through 4, they attended lower elementary school; in grades 5 and 6, upper elementary school; and in grades 7 and 8, middle school. All outcome data were composited within these three epochs corresponding to

the type of school attended by the children. With the exception of disciplinary infractions, the composites were created by taking the average of scores for each year they were available. In calculating composite math and reading grades for lower elementary school, second-grade scores were not included because they were represented dichotomously rather than by letter grades and included very little variance. To produce more normal distributions for the total number of disciplinary infractions, a log transformation was completed.

Our first step in the data analysis was to examine bivariate associations between kindergarten teachers' ratings of the quality of their relationship with each child and the child's academic and behavioral performance through eighth grade. Pearson product-moment correlations were calculated between the Closeness, Conflict, and Dependency scales of the STRS and math and language arts grade composites, standardized test scores, work-habit marks, and total number of disciplinary infractions for lower and upper elementary and middle school.

Next, a hierarchical regression procedure was completed for each outcome measure to assess the extent to which teacher ratings of the quality of their relationship with each child in kindergarten contributed uniquely, beyond covariates, as well as the extent to which this association was mediated by performance in that area during the previous epoch (e.g., early elementary). In the first step of each regression, a set of covariates from the kindergarten year was entered into the model, including verbal IQ scores, gender, ethnicity, and teacher ratings of child behavior (TCRS). Relational Negativity scores from the STRS completed in spring of the kindergarten year were entered in the second step. In the third step, interactions between the child-teacher relationship and each of the covariates were entered separately; these were only retained if they added significantly to the model. In the last step, children's previous performance on the dependent variable was entered when applicable to test the mediation hypotheses. In the final model, standardized β values were used to interpret the relative contribution of each predictor. Finally, an identical model was used in a logistic regression to predict probability of suspension in first through eighth grade.

RESULTS

Because of our hypotheses regarding gender differences, as well as significant differences between boys and girls in both predictor and outcome variables that were revealed through a series of ANOVAs, all descriptive and correlational information is presented by gender. Descriptive information on predictor and

outcome measures is presented in Table 1. ANOVAs revealed that kindergarten teachers reported closer and less conflictual relationships with girls than with boys. Girls and boys had equivalent test scores in lower and upper elementary school, but girls consistently had higher letter grades as well as fewer discipline infractions. Girls received significantly more positive work-habit marks in lower elementary school than did boys, but the differences between boys' and girls' work habits in upper elementary and middle school were not significant. There were moderate correlations between kindergarten behavior ratings (TCRS Behavior Problems composite) and ratings of the quality of the teacher-child relationship in kindergarten (STRS): Conflict scale: $r(178) = .63, p < .01$; Closeness scale: $r(178) = -.45, p < .01$; and Dependency scale: $r(178) = .26, p < .01$.

Correlations between the STRS factor scores and student grade and test performance by epoch revealed that teachers' perceptions of high conflict and dependency were significantly related to poor academic outcomes for boys throughout the period from first through eighth grade for which scores were available (see Table 2). For boys, teacher ratings of dependency in kindergarten were more consistently related to academic outcomes in elementary school than in middle school.

High levels of perceived conflict between a teacher and her male students in kindergarten, however, were related to poorer math and reading grades in each epoch. Despite a few significant correlations between teacher ratings of the quality of their relationships with girls and later academic performance, the associations were generally weaker than for the boys in the sample.

Due to the infrequency of disciplinary infractions in lower elementary school, positive work-habit marks served as the best indicator of early behavioral adjustment. In upper elementary and middle school the variability, seriousness, and expected repercussions of disciplinary infractions made them particularly interesting indicators of later behavioral functioning. Both boys and girls who were reported to have high levels of conflict with their kindergarten teachers tended to have fewer positive work-habit marks in elementary school and more discipline infractions in upper elementary school (see Table 3). These associations remained significant for boys in middle school.

An interesting pattern was evident in examining the associations between teacher-perceived closeness and dependency in kindergarten and later behavior outcomes. Boys viewed as dependent in kindergarten re-

Table 1 Mean Scores and SDs on Kindergarten Predictor Variables and Outcome Composites by Epoch and Gender

	Boys		Girls		F value
	M	SD	M	SD	
Kindergarten predictor variables					
Verbal IQ	51.08	7.22	49.85	6.99	1.32
TCRS Behavior Problems	25.06	9.02	22.66	7.86	3.55
STRS					
Closeness	41.99	7.21	45.05	6.51	8.83**
Conflict	24.27	9.86	21.02	9.45	5.07*
Dependency	7.96	3.17	7.82	2.91	.09
Outcome composites (grade levels)					
Math and reading grades					
Lower elementary (1, 3-4)	7.97	1.36	8.35	1.22	3.69
Upper elementary (5-6)	7.11	2.03	7.77	1.63	5.62*
Middle school (7-8)	6.26	2.03	6.98	2.04	5.41*
ITBS scores (grade level)					
Lower elementary (2-4)	108.53	14.30	109.12	12.28	.08
Upper elementary (5)	129.40	20.45	131.16	15.78	.36
No. of positive work habits (grade level)					
Lower elementary (1-4)	8.64	2.04	9.76	1.15	20.27**
Upper elementary (5-6)	1.98	2.11	2.49	2.01	2.68
Middle school (7)	1.10	2.28	1.86	2.85	3.63
No. of disciplinary infractions (grade level)					
Lower elementary (1-4)	.26	.84	.05	.24	5.13*
Upper elementary (5-6)	2.91	4.86	.74	1.87	15.33**
Middle school (7-8)	6.28	9.34	1.98	4.24	15.42**

Note: ITBS = Iowa Test of Basic Skills; STRS = Student-Teacher Relationship Scale; TCRS = Teacher-Child Rating Scale.

* $p < .05$; ** $p < .01$.

Table 2 Correlations between STRS Factor Scores and Academic Outcomes by Epoch and Gender

	Lower Elementary (Grades 1–4)	Upper Elementary (Grades 5–6)	Middle School (Grades 7–8)
Math and Language Arts Grades			
Closeness			
Boys	.05	.11	.17
Girls	.19	.10	.15
Conflict			
Boys	-.29**	-.26**	-.22*
Girls	-.22**	-.21*	-.14
Dependency			
Boys	-.30**	-.16	-.18
Girls	-.15	.02	-.01
ITBS			
Closeness			
Boys	-.01	.05	—
Girls	.07	.12	—
Conflict			
Boys	-.29**	-.37**	—
Girls	-.17	-.21	—
Dependency			
Boys	-.25*	-.29*	—
Girls	-.09	-.15	—

Note: ITBS (Iowa Test of Basic Skills) scores were not available for first and sixth through eighth grades. Math and language arts grade composites for lower elementary school are included for first, third, and fourth grades; second grade scores were not available. Middle school math and language arts grade composites include grades through the first half of eighth grade. STRS = Student–Teacher Relationship Scale.

* $p < .05$; ** $p < .01$.

ceived fewer positive work-habit marks from teachers in lower elementary school and continued to have behavioral difficulties in upper elementary and middle school, as evidenced by higher rates of discipline problems. Teachers' ratings of girls' dependency in kindergarten were not significantly related to any later behavioral outcome measures. Girls who had a close relationship with their kindergarten teacher, however, tended to have more positive work habits in lower elementary school, as well as fewer disciplinary problems in upper elementary school. In contrast, kindergarten teacher's perceptions of closeness in their relationships with boys were not related to boy's behavioral adjustment in elementary or middle school.

To test hypotheses regarding the association between negative components of the teacher–child relationship and later school outcomes, the Relational Negativity variable, a composite of Conflict and Dependency, was used in the regression models. The first two sets of regression analyses examined academic outcomes and assessed the predictive power of kinder-

Table 3 Correlations between STRS Factor Scores and Behavioral Outcomes by Epoch and Gender

	Lower Elementary (Grades 1–4)	Upper Elementary (Grades 5–6)	Middle School (Grades 7–8)
Positive Work-Habit Ratings			
Closeness			
Boys	.12	.02	.15
Girls	.32**	.07	.09
Conflict			
Boys	-.39**	-.21	-.24*
Girls	-.50**	-.15	-.20
Dependency			
Boys	-.32**	-.09	-.19
Girls	-.18	.04	-.04
Total No. of Disciplinary Infractions ^a			
Closeness			
Boys	—	-.08	-.03
Girls	—	-.23*	-.16
Conflict			
Boys	—	.43**	.35**
Girls	—	.26*	.16
Dependency			
Boys	—	.25*	.29**
Girls	—	.04	-.02

Note: Due to the infrequency of discipline infractions in lower elementary school, correlations for that epoch were not completed. Log transformations were completed on the total number of discipline infractions in upper elementary and middle school to produce more normal distributions of those variables. STRS = Student–Teacher Relationship Scale.

^aBecause disciplinary infractions were not prevalent in lower elementary school, the correlational data is not given here.

* $p < .05$; ** $p < .01$.

garten teacher's perceptions of Relational Negativity with a child, beyond measures of verbal intelligence and teacher-rated classroom problem behavior. The results of these analyses are presented in Table 4. The amount of variance explained by each successive block of predictors is indicated in the tables by the change in R^2 . The standardized β coefficients presented in this table represent the relative significance of variables within each block and were the values produced in the final analysis, with all variables in the model.

Results predicting language arts and math grades in lower elementary school demonstrated that after covariates, Relational Negativity accounted for a small but significant proportion of variance. Interactions between Relational Negativity and each of the other predictors were not significant; the results were therefore not included in the table. By upper elementary and middle school, Relational Negativity did not explain a significant amount of variance in math and language arts grades, beyond the covariates. Teacher-rated be-

Table 4 Regression Analyses: Predicting Academic Outcomes in Lower Elementary, Upper Elementary, and Middle School from Teacher Ratings of Negativity in Relationships with Children and Earlier Performance

Block	Math and Language Arts Grade Composites						ITBS			
	Lower Elementary (<i>n</i> = 178)		Upper Elementary (<i>n</i> = 177)		Middle School (<i>n</i> = 173)		Lower Elementary (<i>n</i> = 165)		Upper Elementary (<i>n</i> = 149)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
1. Covariates	.22**		.33**		.26**		.36**		.40**	
Gender		.16*		.13*		.14*		.07		.06
Ethnicity		.15		.19**		.15*		.23**		.00
Verbal IQ		.31**		.20**		.20*		.44**		.10*
TCRS Behavior Problems composite		.06		-.04		-.05		.12		-.04
2. Relational Negativity (STRS)	.03**	-.23**	.01	-.01	.00	-.01	.03*	-.20*	.03*	-.05
3. Lower elementary school performance			.12**	.41**	.10**	.37**			.42**	.84**
Total R^2		.25		.45		.36		.39		.85

Note: Standardized β coefficients represent the relative significance of variables within each block and were the values produced in the final analysis, with all variables included in the model. ITBS = Iowa Test of Basic Skills; TCRS = Teacher-Child Rating Scale; STRS = Student-Teacher Relationship Scale.

* $p < .05$; ** $p < .01$.

havior problems (TCRS Behavior Problems composite) did not predict children's math and language arts grades either before or after Relational Negativity was entered into these models.

Analyses predicting composite ITBS scores revealed similar findings. The Relational Negativity scores accounted for a small, but significant, portion of the variance in ITBS test scores in lower elementary school, beyond the covariates (see Table 4). As in the analysis of grades, interactions between teacher-child negativity and each of the other predictors were not significant. Relational Negativity, however, continued to predict unique variance in standardized test scores in upper elementary school, above and beyond the covariates. The addition of lower elementary school performance as a predictor revealed that the variance in upper elementary school standardized test scores explained by kindergarten teachers' ratings of their relationships with children was mediated by children's earlier performance on the ITBS. As in the grade analyses, kindergarten teachers' ratings of child behavior did not account for a significant portion of variance in ITBS scores.

In a series of regression analyses predicting behavioral outcomes through eighth grade, Relational Negativity contributed unique variance into upper elementary and middle school. These results are presented in Table 5 and are organized similarly to those described above. Because discipline infractions were not prevalent in lower elementary school, they were not used as an outcome measure. Therefore, the test for mediation in predicting children's disciplinary performance utilized upper elementary discipline infractions, rather

than lower elementary performance, as the mediating variable, which was used in the rest of the models.

After controlling for gender, ethnicity, verbal IQ, and behavior problem ratings (TCRS Behavior Problems composite), children with more negative relationships with their kindergarten teachers tended to have fewer positive work-habit marks in lower elementary school than did their peers with more positive relationships.

An analysis of interaction terms lent partial support to the hypothesis that relationship quality may be more important in predicting outcomes for students at higher risk of later problems than for those children at low risk. For children in the top third of kindergarten teacher behavior problem ratings, Relational Negativity was a strong predictor of work-habit marks in lower elementary school, $r(178) = -.52$, $p < .001$. The association between Relational Negativity and work-habit ratings was not significant for those children with fewer kindergarten behavior problems. These results were also obtained controlling for the covariates. Examination of standardized β coefficients in the final models revealed that the problem behavior ratings dropped out as significant predictors of work habits when Relational Negativity was added to each model.

Although there was not a main effect for Relational Negativity in predicting work-habit ratings in upper elementary or middle school, the interaction between Relational Negativity and kindergarten teacher-rated behavior problems remained significant in upper elementary school. Once again, there was only a signifi-

Table 5 Regression Analyses: Predicting Behavioral Outcomes in Lower Elementary, Upper Elementary, and Middle School from Teacher Ratings of Negativity in Relationships with Children and Earlier Performance

Block	Positive Work Habits						No. of Disciplinary Infractions ^a			
	Lower Elementary (<i>n</i> = 178)		Upper Elementary (<i>n</i> = 175)		Middle School (<i>n</i> = 170)		Upper Elementary (<i>n</i> = 179)		Middle School (<i>n</i> = 178)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
1. Covariates	.30**		.18**		.20**		.29**		.30**	
Gender		.30**		.04		.11		.01		-.01
Ethnicity		.16*		.11		.11		-.19		-.10
Verbal IQ		.20*		.22*		.23*		-.17		-.17**
TCRS Behavior Problems composite		.50		.24		-.34		-.39		-.13
2. Relational Negativity (STRS)	.05**	.34	.00	.30	.00	-.30	.03*	.06	.01	-.01
3. STRS interactions	.04**		.03*		.00		.05**		.04*	
STRS \times TCRS		-1.11**		-.41		.45		.91**		.17
STRS \times Gender								-.48*		-.10
4. Performance in previous epoch			.11**	.42**	.01	.13			.27**	.66**
Total R^2	.39		.32		.21		.37		.62	

Note: Standardized β coefficients represent the relative significance of variables within each block and were the values produced in the final analyses, with all variables included in the model. Earlier performance reflects children's performance in lower elementary school for work-habit analyses and their upper elementary performance for predicting later disciplinary infractions. STRS = Student-Teacher Relationship Scale; TCRS = Teacher-Child Rating Scale.

^a Because disciplinary infractions were not prevalent in lower elementary school, they were not used as an outcome measure.

* $p < .05$; ** $p < .01$.

cant relationship between teacher-rated Relational Negativity and work-habit ratings for those children in the top third of teacher-rated behavior problems, $r(178) = -.34$, $p < .01$. When lower elementary school work habits were entered into the model predicting upper elementary work habits, however, the Relational Negativity interaction was no longer significant, indicating that the significant association between Relational Negativity and upper elementary performance was mediated by lower elementary school performance.

Relational Negativity in kindergarten also accounted for a significant proportion of variance in the number of disciplinary infractions accumulated by children in upper elementary school, beyond the contribution of all covariates (see Table 5). Consistent with hypotheses and the findings for work-habit outcomes, follow-up analyses revealed that the association between Relational Negativity in kindergarten and later disciplinary problems was strongest for those children with the most behavior problems in kindergarten. Additionally, there was a significant interaction between Relational Negativity and gender in predicting the total number of disciplinary infractions in upper elementary school. Kindergarten teachers' ratings of the quality of the relationship were more strongly associated with boys' upper elementary school disciplinary performance than with that of the girls in the sample. As in

previous analyses, the association between Relational Negativity scores and disciplinary infractions in middle school was mediated by performance in the previous epoch, in this case children's disciplinary record from upper elementary school.

Finally, a logistic regression was completed to predict the likelihood of suspension at any time during grades K-8, using the model presented above. Seventy-seven of the students (43%) were suspended at least once between kindergarten and eighth grade. There was a good model fit on the basis of the covariates alone, $\chi^2(4, N = 176) = 48.45$, $p < .001$. The model was improved significantly with the addition of Relational Negativity, $\chi^2(1, N = 176) = 4.09$, $p < .05$, and the interactions between Relational Negativity and two of the covariates, verbal IQ and kindergarten teacher-rated behavior problems, $\chi^2(2, N = 176) = 13.71$, $p < .01$.

Further examination revealed that, as in earlier analyses, having high levels of Relational Negativity with a kindergarten teacher was a more influential predictor of later outcomes for children in the top third of kindergarten behavior problem ratings. Thus, for children who were in the bottom two thirds of behavior problem ratings in kindergarten, suspended and nonsuspended children had similar levels of Relational Negativity in kindergarten. However, there was a significant difference between suspended and nonsus-

pendent children's Relational Negativity scores within the group of children with the most kindergarten behavior problems, $F(1, 60) = 5.23, p < .05$. Kindergarten teachers of suspended children within this group reported more negative relationships than did teachers of nonsuspended students.

In contrast to the hypotheses, Relational Negativity was a more influential predictor of suspension outcomes for children with above-average verbal IQ scores than for those with below-average IQ scores. The majority of children who had IQ scores below the mean (58%) were suspended regardless of their kindergarten teacher's perceptions about the level of negativity in the teacher-child relationship. There was no significant difference between the level of Relational Negativity in kindergarten for suspended and nonsuspended children in this low-IQ group, $F(1, 89) = 1.48, p = .23$. Within the group of children with above-average IQ, however, those who were suspended (30%) tended to have more negativity in their relationship with kindergarten teachers than did their nonsuspended peers, $F(1, 87) = 24.74, p < .001$. In the final logistic regression model, 49 of the 77 suspended students (63.64%) were correctly identified.

DISCUSSION

The results suggest that early teacher-child relationships, as experienced and described in kindergarten by teachers, are unique predictors of academic and behavioral outcomes in early elementary school, with mediated effects through eighth grade. Kindergarten teachers' reports of negativity in relation to students uniquely predicted student grades, standardized test scores, and work habits through lower elementary school. Relational Negativity continued to uniquely predict behavioral outcomes into upper elementary and middle school, particularly for those students at greatest risk of behavior difficulties—specifically those with early behavior problems and boys generally. However, further tests revealed that the associations between Relational Negativity and behavior outcomes in upper elementary and middle school were mediated by children's earlier performance in those domains. The results have implications for theories of the determinants of school success, the role of adult-child relationships in development, and a range of early intervention and prevention efforts.

As suggested by Entwisle and Hayduk (1988), this study provides evidence that beyond cognitive functioning and classroom behavior, children's ability to form relationships with their teachers forecasts later academic and behavioral adjustment in school. More specifically, negativity in teacher-child relationships,

marked by conflict and overdependency, emerged as a significant predictor of a wide range of academic and behavioral outcomes, even when controlling for other early indicators of these outcomes. This finding is consistent with a series of studies (Birch & Ladd, 1997; Howes et al., 1994; Pianta & Nimetz, 1991; Pianta et al., 1995).

Particularly for boys, kindergarten teachers' perceptions of conflict and overdependency were significantly correlated with academic outcomes throughout elementary school and into middle school. This finding linking social processes in kindergarten with later academic competence is consistent with other work (Birch & Ladd, 1997; Pianta & Nimetz, 1991; Pianta et al., 1995) and suggests that the quality of child-teacher relationships may reflect the extent to which children are able to engage the instructional resources present in classrooms (Entwisle & Hayduk, 1988). In the present study, Relational Negativity predicted standardized test scores in upper elementary school, but, as hypothesized, this association was mediated by children's performance on these tests in lower elementary school, again suggesting the importance of social processes in the early school years. It is also interesting to note that there were no significant associations between teacher-rated behavior and either measure of academic outcome, indicating that negativity in the teacher-child relationship was a more salient marker of the socioemotional processes involved in academic performance than was a teacher-rated measure of the child's misbehavior.

As hypothesized, this study suggests that the quality of teacher-child relationships is a stronger predictor of behavioral than of academic outcomes. Relational Negativity accounted for greater increments of explained variance for the behavioral outcomes than for the academic outcomes. Although previous work established associations between teacher-child relationships and socioemotional and behavioral functioning through second grade (Birch & Ladd, 1997; Howes et al., 1994; Pianta et al., 1995), the present study provides evidence of prediction for much longer term behavioral outcomes. Zero-order correlations suggested that negative relational styles appear to be especially strong predictors of subsequent disciplinary problems for boys. In regressions controlling for main effects of gender, ethnicity, verbal cognitive abilities, and problem behaviors, teacher-child Relational Negativity added significantly to the prediction of disciplinary performance in upper elementary school and middle school, although the findings for middle school outcomes suggest that this association was moderated by other factors, as discussed below. It is important to note that these findings do not per-

tain simply to an accumulation of minor infractions, as Relational Negativity scores also added to the prediction of suspension, a relatively severe penalty.

In support of the literature suggesting that ethnicity, gender, and verbal abilities play a role in increasing a child's risk for problems in school (e.g., Pianta & McCoy, 1997; Tramontana et al., 1988), within this sample, boys, African American students, and children with low verbal intelligence scores in kindergarten were more likely to have academic and behavioral problems through eighth grade. Most of these associations between risk factors and outcomes in upper elementary and middle school were mediated by children's standing on corresponding outcomes in lower elementary school.

As noted earlier, however, one goal of this study was to examine the hypothesis that teachers' relationships with children may be particularly important in predicting outcomes for children at the highest risk of school failure, following the general hypothesis that vulnerable children will be more influenced by experience in school contexts (see Entwisle & Alexander, 1998). The results lend some support to this hypothesis. Although there was no evidence of moderation in the analyses of academic outcomes, in the models predicting behavior outcomes (work-habit ratings, disciplinary infractions, and chance of suspension), the interaction between teachers' ratings of problem behavior in kindergarten and their ratings of Relational Negativity was consistently significant. Follow-up analyses suggested that the level of negativity in children's relationships with kindergarten teachers was a stronger predictor of work-habit ratings and disciplinary infractions for the children that teachers also rated as having the highest levels of problem behavior. Children rated as having fewer behavior problems in kindergarten did well irrespective of the level of negativity in their relationship with their kindergarten teacher. The results suggest that those children who, despite significant behavior problems, were able to develop relationships with kindergarten teachers marked by low levels of negativity, were in turn more likely to avoid future behavioral difficulties than were their peers who had high negativity ratings.

The interaction between Relational Negativity in kindergarten and ethnicity was not a significant predictor of any of the outcomes measured in this study, despite the fact that the teachers within this sample tended to report higher levels of negativity in their relationships with African American students than in their relationships with White students. Because all but two of the kindergarten teachers in this sample were White, it was not possible to examine differences in the association between teacher-child rela-

tionship quality and later outcomes based on matches between teacher and child ethnicity. There is some evidence, however, to suggest that this is an area that deserves attention in future work, as ethnic match between teacher and child appears to be associated with more positive relationships (Saft & Pianta, 2000).

In contrast to hypotheses, Relational Negativity was a better predictor of suspension for children with above-average than for those with below-average verbal IQ scores. This unexpected finding may be related, in part, to the fact that so many children with below-average verbal IQ scores were suspended at some point between first and eighth grade, making it difficult for Relational Negativity in kindergarten to have the sensitivity necessary to distinguish between suspended and nonsuspended children. This finding also provides evidence that, even for children for whom generally positive school performance is predicted, the kindergarten teacher-child relationship is an important indicator of early social adaptation and a marker of later behavioral outcomes.

The results of this study have important implications for early intervention efforts. Lochman and colleagues (1995) suggest that the most useful markers for prevention programs are those that measure processes amenable to intervention. These markers may measure processes that directly cause negative outcomes, or they may indicate complex processes that mediate the development of problem behaviors (Cicchetti & Richters, 1993; Rutter, 1990). The current study provides strong, preliminary evidence that the quality of teacher-child relationships is one such early marker of later academic and behavioral difficulties, available as early as kindergarten. Preventive intervention programs that build supportive teacher-child relationships for all children, as well as interventions targeted at improving specific teacher-child relationships (Pianta, 1999), may hold promise for enhancing school outcomes by means of their influence on the social aspects of schooling emphasized by Entwisle and Hayduk (1988) and others (e.g., Birch & Ladd, 1997; Howes et al., 1994; Pianta et al., 1995). Additionally, the results of this study suggest possible means for identifying the targets of these intervention efforts. Children who not only have poor relationships with their teachers but also have significant teacher-rated behavior problems in the early years of schooling appear to be a particular group that may benefit.

It is possible to speculate briefly on processes that account for why the relationships that children develop with their teachers early in school forecast such a wide range of long-term school outcomes. Recent observational studies of kindergarten classrooms indicate that teachers' sensitive behavior toward chil-

dren (e.g., responding in a timely fashion, anticipation of student needs and emotions), as well as the frequency of teacher feedback to the child, provide strong supports for children's academic and social competence in the classroom setting (Bryant, Clifford, & Feinberg, 1991; Meyer, Waldrop, Hastings, & Linn, 1993; Pianta, Laparo, Payne, Cox, & Bradley, 2000) across a wide range of child characteristics. Thus, the extent to which children can access the instructional and socialization resources of the classroom environment may be in part predicated on teacher-child interactions and, over time, relationships, a possibility that is consistent with Entwisle and Hayduk's (1988) view of the classroom as a social context.

One of the most notable limitations of this study was the absence of repeated measures of the teacher-child relationship as children progressed through school. Future work in this area would benefit greatly from such data. Additionally, the amount of variance in school outcomes explained by kindergarten measures of teacher-child relationships in this study was relatively small. The regression models constituted relatively strict tests, however, controlling for cognitive ability and behavior ratings completed by the same teacher who rated relationship quality, at the same time. Furthermore, regression models predicted outcomes over an 8-year period. Thus, although the overall amount of variance explained is small, the significant findings indicate that attention to the impact of teacher-child relationship quality is warranted.

As others have articulated (e.g., Birch and Ladd, 1998), understanding of teacher-child relationships and their influence on child development also requires a focus on children's perceptions of relationships with teachers. This study did not consider how children's attitudes toward their teachers affected their school experiences. Birch's (1997) examination of children's perceptions of the relationship reports correlations with teachers' ratings ranging from .29 to .71, suggesting a fair degree of concordance in perceptions. Recently, Essex and Armstrong (1999) have explored young children's perceptions of their relationships with teachers by using a puppet interview format. Additionally, Lynch and Cicchetti (1992) have demonstrated that children's perceptions, particularly as they get older, are valuable indicators of relationship quality. Thus, future research should attempt to include input from children.

In summary, these findings suggest that the association between the quality of early teacher-child relationships and later school performance can be both strong and persistent. The association is apparent in both academic and social spheres of school performance. Negative relational styles, marked by high

conflict and dependency, appear to be especially important in the prediction of later school outcomes. This study also suggests that boys and girls may benefit differently from particular aspects of teacher-child relationships; boys with low levels of conflict and dependency with kindergarten teachers had better long-term outcomes, whereas girls with close relationships in kindergarten had fewer behavioral difficulties in later years. Lastly, these findings provide evidence that children with significant behavior problems in the early years of school, who are nevertheless able to form relationships with teachers that are low in conflict and dependency, may be less likely to have continuing behavior problems compared with their peers who, despite similar levels of behavior problems, are less able to adapt to the social environment of the classroom. Although the findings of this study were correlational, not causal, it is clear that the processes related to the development and influences of teacher-child relationships are important components of children's success in school. These relational processes can be considered an essential component of the school environment, and may provide a useful focus for research, intervention, and prevention in pathways of risk and school outcomes.

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