

Student-Teacher relationships
As predictors of reading comprehension gains in 2nd grade

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ABSTRACT

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The purpose of this study was to examine whether the perceived quality of the student-teacher relationship in second grade predicted reading comprehension gains over the course of one year in a model that included variables known to effect reading comprehension: quality of classroom instruction, social economic status, engagement, and peer relatedness. Reading comprehension gains for 255 second grade students in a high socio-economic school district were obtained in a pre-post fashion from school records over a single academic year. Teachers' rated each student in their class on one occasion in terms of the degree of conflict and closeness in the student-teacher relationship, the quality of peer relatedness, and classroom engagement. The CLASS (Pianta, Paro, & Hamre, 2008), an observation system, was employed to measure several important classroom variables including emotional support, classroom organization, and instructional support, yielding a teacher competence score. Because the 255 students were nested within seven different elementary schools with 14 different teachers, a hierarchical linear model (HLM) was used with classroom engagement as a mediating variable. There were an insufficient number of teachers and elementary schools to use HLM so an alternative model that estimated the overall relationships among the variables and corrected the significance tests for the nesting of the students within classrooms, and

the nesting of the classrooms (teachers) within schools was employed. The hypothesized model fit the data well ($\chi^2 = 9.17, (4), p < .06, RMSEA = .07, CFI = .98$). Significant direct paths were found for student-teacher closeness, peer relatedness, and fall reading scores on classroom engagement. Significant indirect paths were found from student-teacher closeness, peer relatedness, and fall reading scores to reading comprehension gains via classroom engagement. Finally, classroom engagement had a positive direct effect on reading comprehension. Teacher competence and conflict in student-teacher relations were unrelated to reading comprehension gains. Study findings have implications for future educational focus such as improving classroom engagement, fostering close student-teacher-relationships, enhancing peer relatedness, and training teachers. Future research should be conducted with larger and more diverse samples, and examine the student's perception of the student-teacher relationship.

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Chapter 1

How students learn and the variables that significantly impact their learning have inspired a tremendous amount of research over the past century. The factors most influential in learning were identified in Walberg's 1981 review as (a) the quality of the learning environment (psychological environment as reflected by peer relationships, home environment, classroom climate, and exposure to media), (b) the characteristics of the learner (student aptitude as reflected by ability, motivation, and age), and (c) the quantity and quality of classroom instruction. More recent research has highlighted certain variables such as peer relatedness (i.e., peer acceptance), classroom engagement (i.e., classroom participation), and family variables (i.e., SES, maternal education, and ethnicity) that play key roles in academic outcomes (e.g., Buhs, Ladd, & Herald, 2006, Furrer & Skinner, 2003, & Hamre, 2006; Hamre & Pianta, 2005). Educational researchers are also focusing on the quality of the student-teacher relationship as another significant mediating factor for achievement. In fact, researchers examining this variable have shown that the student-teacher relationship significantly impacts (positively and negatively) academic and social outcomes (Birch & Ladd, 1996; Buhs, Ladd, & Herald, 2006; Hamre, 2006; Hamre & Pianta, 2005; Ladd, Birch, & Buhs, 1999).

Recent federal legislation in the United States, specifically The No Child Left Behind (NCLB) Act of 2001 and the Individuals with Disabilities Education Act (IDEA) of 2004, has further intensified the focus on identifying and addressing factors that improve children's academic functioning. This legislation outlines expectations for accountability of student academic outcomes, particularly in the area of reading. The NCLB and IDEA policies have established several important standards that have been applied nationally to address the learning

needs of all students, and to help close the “achievement gap” between low-income and minority students who enter school behind their majority, middle and upper-class, same-age peers. First, the NCLB has made states, school-districts, and schools accountable for students’ learning needs by requiring yearly statewide standardized tests for students in the 3rd through 8th grades to assess how much they have learned. Second, schools are required to hire “highly qualified” teachers. Third, NCLB, which is particularly interested in reading ability, requires the implementation of their “Reading First” initiative to ensure that every child can read by the third grade. Finally, the NCLB and the IDEA demand that schools implement “research based” interventions for under-achieving students, specifically in the area of reading.

Given NCLB’s and IDEA’s emphasis on accountability, highly qualified teachers, reading development, and research based interventions to “close the achievement gap,” examining how reading growth is impacted by the quality of instruction, peer relatedness, engagement, family variables, and the student-teacher relationship would seem pertinent. In addition, if the student-teacher relationship is both socially and academically beneficial as has been reported, it seems to follow that this relationship could be further examined to provide both educators and policymakers with effective strategies to enhance learning. Pianta (1999) makes this argument when he writes, “by focusing on child-teacher relationships as a resource for development, and by harnessing the power of these relationships for the purpose of prevention of problems and enhancement of competencies, it is my hope that school psychologists will be able to play key roles in the reform of and enrichment of school contexts” (p. 6).

Despite all the recent research demonstrating the importance of the student-teacher relationship, there are several gaps that need to be addressed to better understand how this relationship benefits a student’s academic outcomes. First, the student-teacher relationship

research that has examined academic success has failed to be consistent with definitions of “academic outcomes” and methods for measuring academic success. In defining the dependent variable of “academic outcomes,” different researchers consider different variables as measures of success. Consider for example, the following definitions of academic outcomes: (a) grades (Hamre & Pianta, 2001), (b) achievement test scores (Hamre & Pianta, 2005; Hamre & Pianta, 2001; Birch & Ladd, 1997; and Pianta & Steinberg, 1992), (c) retention versus promotion rate (Pianta, Steinberg, & Rollins, 1995; Pianta & Steinberg, 2002), (d) labeling child “at-risk” academically or referring a child for Special Education services versus not labeling/referring (Pianta, Steinberg, & Rollins, 1995; Pianta & Steinberg, 1992), (e) work habits (Hamre & Pianta, 2001; Lynch & Cicchetti, 1992) and (f) behavioral and disciplinary records (Hamre & Pianta, 2005; Hamre & Pianta, 2001, 2005). Because there are many different definitions of academic outcome, it is difficult to compare findings across studies other than to note the direction of relationships.

Second, the majority of studies assessing the potential variables that affect academic outcomes have not assessed academic functioning in a pre-post fashion. Instead the researchers assessed academic functioning on only one occasion, usually a post-test. Wang, Haertel, and Walberg (1993) pointed out that 75% of the research they reviewed was based on studying academic achievement on only one occasion (usually a post test such as examining grades), and only 25% of the research examined learning “over a period of time.” For example, Hamre and Pianta (2005) measured academic success through selected subtests from the Woodcock-Johnson Tests of Cognitive Abilities and Achievement (WJ-III), but they only measured each child’s skills once. These researchers failed to control for initial differences in student achievement and other relevant characteristics prior to beginning the study.

Third, there has been very little research on the impact of family variables on student achievement. Of the research that has examined family variables, the predominant measures examined were SES or maternal education. Most researchers think they are addressing the role of the family by controlling for, or including, maternal education or SES in their models. More studies are needed to "unpack" what role maternal education or SES plays in literacy.

Fourth, many of the researchers have failed to account for the inherent nested variables when students are evaluated in different classrooms across several different schools or even school districts. Research conducted in these situations must use multilevel designs. In these designs, there are several levels including students being nested within classrooms (level 1), classrooms being nested within specific schools (level 2), and schools being nested within specific school districts (level 3). Because students are nested within specific teachers, who are nested within specific schools, with common school policies, procedures, and curriculum, it is likely that student outcomes will not be independent of these multi-level designs and therefore correlations among variables should be expected.

A final problem with the research is that studies examining student-teacher relationships and academic growth in a pre-post fashion have failed to demonstrate that the academic growth is directly related to a single academic year's teacher. Rather than measure academic growth in a single academic year, researchers have measured academic growth over many years while only measuring the student-teacher relationship during a single academic year. For example, a recent longitudinal study by Wu, Hughes, and Kwok (2010) assessed academic growth as it related to student-teacher relationships and other significant variables such as peer relatedness, classroom engagement, and behavior. The researchers assessed 706 elementary students who were recruited into the study when they were in the first grade (Year 1 of the study). These researchers

followed these students for 5 more academic years. During the first year the evaluators examined the students' cognitive abilities. During the second year, each student's academic skills were assessed in order to establish a performance baseline. During the third year, the quality of the teacher-student relationship was measured along with the teachers' perceptions of students' classroom engagement, peer relatedness and behavior. At the time student-teacher relationships were studied, 526 students were in the 3rd grade, 174 students were in the 2nd grade (due to being retained) and 6 students had missing grade information. This research found that a positive student-teacher relationship in year 3 of the study (predominantly 2nd and 3rd grade) predicted significant academic growth over the long term. Although they found significant improvement in the areas of reading, writing, and classroom engagement over several years, it was unclear whether the overall academic gain could be related to the student-teacher relationship that was measured during Year 3 of the study. A criticism of their research was that it only measured the quality of the student-teacher-relationship during one year of the study. In addition, the researchers failed to measure the quality of classroom instruction, another significant contributing variable.

To determine whether the quality of the student-teacher relationship during a single academic year yields significant reading comprehension gains, the current research will measure growth of reading comprehension in a pre-post fashion over a single year. This approach will specifically allow reading comprehension gains to be directly correlated with each teacher's relationship to each student in the same year. This is an important piece of missing information in the research. There has been no research that specifically examined reading comprehension gains in a pre-post fashion during the same year, as it also considered, and controlled for other

significant variables that impact learning such as the quality of instruction, social economic status (SES), engagement, and peer relatedness.

The current study examined whether the quality of a second grader's relationship with his teacher was associated with reading comprehension gains. To accomplish this, the study evaluated the teacher's perception of the student-teacher relationship and its association to each second grade student's Degrees of Reading Power (DRP) scores in the fall and spring. The study also measured the quality of classroom instruction, family variables such as social economic status (SES), each student's classroom engagement, and peer relatedness.

Chapter 2

Literature Review

Decades of research have identified the variables that have the most meaningful impact on academic success. These include *classroom instruction* (Brophy & Good, 1983; Fang, 1996; and Hamre & Pianta, 2005), *family variables* (Hamre & Pianta, 2005; Ladd, Birch, & Buhs, 1999; Risi, Gerhardstein, & Kistner, 2003), *peer acceptance/peer relatedness* (Buhs, Ladd, & Herald, 2006; Chen, Chang, & He, 2003; Flook, Repetti, & Ullman, 2005; Guay, Biovin, & Hodges, 1999; Howes, Hamilton, & Matheson, 1994; Ladd, 1990; Ladd, Birch, & Buhs, 1999; Risi, Gerhardstein, & Kistner, 2003; and Wentzel, 1991; Wentzel, 1998; Wentzel, Caldwell, & Barry, 2004), and student *engagement* (Buhs, Ladd, & Herald, 2006; Buhs & Ladd, 2001; Furrer & Skinner, 2003; Ladd, Birch, & Buhs, 1999; & Wentzel, 1999). The final factor, and focus of this paper, is the quality of the *student-teacher relationship* and its impact on educational outcomes. In this section, each variable will be discussed in detail.

Quality of Instruction

There has been a vast amount of research on the quality of classroom instruction supporting its impact on student academic achievement. A number of studies have demonstrated the impact of the quality of classroom instruction on student academic achievement (Brophy & Good, 1986; Fang, 1996; Hamre & Pianta, 2005, Morrison & Connor, 2002). For example, Fang (1996) pointed out in a review of the educational research that teachers' behaviors, or pedagogical practices affect students' behavior, which in turn impacts students' academic performance. Based on a critical review of the literature, Brophy and Good (1986) reported that teacher behavior, such as classroom management and direct effective instruction, impacts student achievement. More specifically, the authors reported that "how" teachers actively instruct, as

well as communicate with their students about academic tasks, was related to students' achievement. For example, variables such as the quantity and pacing of instruction, clearly defined expectations for their students, teaching appropriate time allocation, effective classroom management (i.e., good preparation, proper installation and enforcement of the classroom rules, general interaction with the students, appropriate level of challenging curriculum, consistent student accountability, and clarity regarding how and when students can get help), and student engaged time promoted academic success. This research also suggested that students learn better when they are engaged in activities that are commensurate in difficulty with their abilities, and when teachers are engaged in "active teaching." In other words, classes in which the students were engaged in organized lessons produced better achievement.

Brophy and Good (1986) also recognized the importance of how teachers provide, or "teach," information to their students. For example, these researchers indicated that teachers who structured their material (i.e., overviews, advance organizers, review objectives, outline, call attention to main idea, summarize as a lesson goes along, etc.) were more effective in achieving academic success. They also reported that achievement was higher when teachers taught material, taught information sequentially, presented material clearly, and were appropriately enthusiastic. Asking appropriate questions was also highlighted as variable for academic success (Brophy & Good, 1986). For example, the authors concluded that how clearly the teacher poses the question, the "cognitive level" of the question, and selecting appropriate respondents will all impact a student's achievement. These authors' literature review also suggested that how the teachers respond to correct responses, how they respond to partly correct responses, and how they react to incorrect responses all play an important role in student achievement.

More recent research further supports the idea that the quality of direct teacher instruction has positive impacts on student achievement (Dolezal, Welsh, Pressley, & Voncent, 2003; Hamre & Pianta, 2005; Torgeson, 2002). These findings are similar to the National Research Council, which suggests three areas of specific focus for teacher instruction that will improve reading growth. These three areas include (a) explicit teaching experiences and practice (i.e., decoding, vocabulary, etc.), (b) more productive classroom time afforded to teaching and learning these skills, and (c) teachers providing adequate support (i.e., scaffolding) as well as feedback regarding a student's reading progress. Morrison and Connor (2002) report that children at risk for reading difficulties at the outset of first grade showed the greatest gains in word-decoding skills when high levels of teacher-directed instruction were present. As will be discussed below, and relevant to this paper, is the importance of direct and effective teacher instruction.

Despite the above reported benefits of positive student-teacher interactions, Hamre and Pianta (2005) reported that there exists great variability within classrooms regarding the amount of time spent providing direct instruction. In fact, quoting several large scale studies, Hamre and Pianta (2005) reported that researcher's observations of specific instruction of academic material ranged from 0% to 70% of classroom time, averaging out to roughly 8 % of observed intervals. Given this extreme variability, the authors conclude that it seemed necessary to better understand whether students who received specific classroom instruction also demonstrated improved academic achievement. In 2008, Pianta, Paro, and Hamre developed the Classroom Assessment Scoring System (CLASS), a sophisticated system that can be used to evaluate several important classroom variables. Specifically, the CLASS examines three major domains of classroom experience such as emotional support, classroom organization, and instructional support and has

been used in many federally funded projects. This system will be described in detail later in the paper.

Hamre and Pianta (2005) found that the quality of classroom instruction impacted academic achievement. In fact, the authors argued that classroom instruction helped to moderate the risk of school failure. For example, when comparing kindergarten children labeled as “at-risk” for academic failure with their “low-risk” peers, the authors reported that high quality instructional support played an important role in closing the achievement “gap” between the two groups. High quality instruction, as Torgeson (2002) and the National Research Council indicated, was defined by the authors when teachers were observed to make frequent and effective use of literacy instruction, provided evaluative feedback, engaged in instructional conversations, and encouraged children to become responsible for their learning.

With the exception of Hamre and Pianta’s research, much of the recent research examining academic achievement has failed to measure quality of academic instruction (Buhs & Ladd, 2001; Buhs, Ladd, & Herald, 2006; Chen, Chang, & He, 2003; Guay, Biovin, & Hodges, 1999; Gullo & Ambrose, 1987; Ladd, Birch, & Buhs, 1999; Risi, Gerhardstein, & Kistner, 2003). Because of the importance of this variable, quality of instruction should be assessed in all studies of achievement. This variable’s import has also been argued by proponents of Response to Intervention’s (RTI) definitions of learning disabilities (Fuchs & Fuchs, 2001; Fuchs, Compton, Fuchs, Paulsen, & Bryant, 2005) as outlined in IDEA 2004. Quality of instruction is routinely measured in instructional studies by applied behavior analysts (Greer, 2002).

Family Variables

A second important variable impacting a student’s educational outcomes is family variables/family background (Hamre & Pianta, 2005; Ladd, Birch, & Buhs, 1999; Risi,

Gerhardstein, & Kistner, 2003). Ladd, Birch, and Buhs (1999a, 1999b) reported that three specific family background characteristics were directly associated with achievement. These three characteristics include the family's socio-economic status (Ladd, Birch, & Buhs, 1999, Study 1 & 2; & Risi, Gerhardstein, & Kistner, 2003), parental education (Hamre & Pianta, 2005; Ladd, Birch, & Buhs, 1999, Study 1 & 2), and family ethnicity (Ladd, Birch, & Buhs, 1999, Study 1 & 2; & Risi, Gerhardstein, & Kistner, 2003).

In a study by Ladd, Birch, and Buhs (1999), family background was found to be directly associated with the quality of the student-teacher relationship. The authors reported that children from nonminority, socioeconomically advantaged families tended to form closer and less conflictual ties with teachers. This relationship, in turn, was significantly related to classroom participation by students and their educational outcomes as measured by the Metropolitan Readiness Test. Moreover, the authors also reported that students with positive student-teacher relationships were also better accepted by peers.

Hamre and Pianta (2005) reported that the students of mothers with lower education levels had lower achievement scores (as measured by selected subtests from the Woodcock-Johnson Psycho-educational Battery – Revised (WJ-R; Woodcock & Johnson, 1989) and were therefore considered at higher functional risk. This finding was moderated by those students who had solid instructional support and positive student-teacher relationships. In other words, students at high academic risk, because their mothers had lower levels of achievement, showed more positive achievement outcomes when provided with solid instructional and emotional (i.e., positive student-teacher relationship) support than when they did not.

Farah, Noble, and Hurt (2007), reporting on their research of the developing brain, found that children of lower SES families performed more poorly on a battery of tasks that measured

language and executive functioning than children of higher SES families. These researchers indicated that the difference between middle SES kindergarten children and lower SES was greater than one standard deviation on language tasks, and by more than two thirds of a standard deviation on executive functioning tasks (i.e., working memory and cognitive control). The authors identified several risk factors for why SES impacts neurocognitive development including inadequate nutrition, lead exposure, and pre-natal substance abuse. In addition, they also suggested that low SES children may be less exposed to important cognitive stimulation (i.e., language, academic materials, museums, etc.) and live more stressful lives than their middle SES peers.

Given the importance of family variables on academic outcomes, the current research needs to control for this variable. Although it would be ideal to explore all of the variables mentioned by Farah, Noble, and Hurt (2007), the list of variables mentioned by the authors have not been adequately researched. Therefore, the current research intends to examine SES factors by measuring whether students are, or are not, receiving a free / reduced lunch, and whether this is correlated with their reading comprehension growth.

Peer Acceptance / Peer Relatedness

Peer relatedness (i.e., peer group acceptance- /- peer group rejection) and its impact on children's academic adjustment is a third significant variable that influences educational outcomes. Several longitudinal studies focusing on children in elementary school have indicated that peer relationships were both directly (Buhs, Ladd, & Herald, 2006; Risi, Gerhardstein, & Kistner, 2003; Ladd, Birch, & Buhs, 1999) and indirectly (Buhs & Ladd, 2001; Guay, Biovin, & Hodges, 1999) associated with academic competence. Peer group acceptance and peer group rejection is linked to early adjustment, both academically and emotionally (see Ladd, 1999;

Ladd, 2003). For example, high classroom peer acceptance was associated with academic achievement (Buhs & Ladd, 2001; Buhs, Ladd, & Herald, 2006; Chen, Chang, & He, 2003; Ladd, Birch, & Buhs, 1999), greater classroom engagement (Ladd, Birch, & Buhs, 1999), and more prosocial behaviors (Buhs & Ladd, 2006; Chen, Chang, & He, 2003). On the other hand, low classroom peer acceptance has been linked to loneliness and social dissatisfaction (Guay, Boivin, & Hodges, 1999), aggressive behavior (Chen, Chang, & He, 2003), antisocial behavioral styles (Ladd, Birch, & Buhs, 1999), poor classroom participation (Buhs, Ladd, & Herald, 2006), school avoidance (Ladd, Birch, & Buhs, 1999), academic under achievement (Buhs, Ladd, & Herald, 2006; Buhs & Ladd, 2001; Ladd, Birch, & Buhs, 1999), and lower reported levels of school belonging (O'Farrell, Morrison, & Furlong, 2006, Furrer and Skinner, 2003).

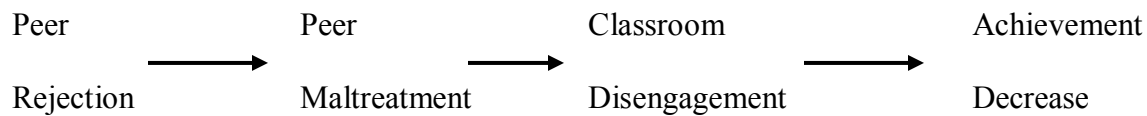
In a closer examination of the research, Guay, Boivin, and Hodges (1999) believed that the quality of a child's social relations within his/her peer group indirectly impacted academic outcomes. These researchers hypothesized that social relations (i.e., peer relatedness) can either encourage or hinder a child's feelings of "connectedness," and thus, their perception of academic competence. To examine their hypothesis, the authors first defined feelings of connectedness as "loneliness." Second, to measure academic achievement, each teacher rated their student's reading, writing, and mathematic skills twice. They were first measured during the spring semester of the study's first year, (Time 1) and were re-assessed a second time two years following the initial assessment (Time 3). Third, peer status was measured using a picture nomination sociometric procedure whereby each child was asked to identify the three (3) most liked (ML) and three (3) least liked (LL) children in the classroom. Finally, each child independently assessed his/her own academic competence and perceived connectedness by completing rating scales. The children's perceptions were also assessed twice: the spring

semester of the study's first year (Time 1) and one year later (Time 2). In their longitudinal study, the researchers found that those students who were more accepted by their peers (measured at Time 1) reported lower levels of "loneliness" (measured at Time 1). In turn, the authors reported that lower reported loneliness concerns (Time 1) were correlated with each student's perception of his academic abilities (Time 2). A similar finding was reported by Flook, Repetti, and Ullman (2005) when they examined middle school children. Therefore, the research suggests that those students who perceived themselves as more connected (i.e., less lonely) also reported having more solid academic skills. Guay, Boivin, and Hodges (1999) also found that those students who reported better academic skills were rated by their teachers (Time 3) as having stronger achievement (reading, writing, and math) skills. In contrast, rejecting peer relationships (i.e., perceived loneliness) resulted in poorer perceived academic competence and thus poorer rated academic performance.

In the Guay, Boivin, and Hodges (1999) research, there were several shortcomings. First, there was no measure of quality of instruction. As the quality of instruction research demonstrates, this is an important variable when looking at academic performance. Second, academic achievement was measured only by teacher's ratings of reading, writing, and math, rather than a more standardized format (i.e., standardized tests or end-of-year grades). Teachers' perceptions of their students' academic competence, is a valid, though less precise measure of achievement than achievement tests, which is not influenced by classroom adjustment. Finally, there was no measure to determine whether the students had developed solid relationships with their teachers, a relationship that is reported to lessen a child's feeling of loneliness.

More recent longitudinal research (Buhs & Ladd, 2001; Buhs, Ladd, & Herald, 2006) has specifically examined peer rejection and its impact on classroom engagement and academic

achievement. Buhs and Ladd (2001), following a model of peer rejection posited by Coie (see Coie, 1990), suggested that academic and social adjustment were mediated by negative peer treatment and classroom participation. More specifically, Buhs and Ladd hypothesized that peer rejection may lead to negative peer treatment and thus a decrease in classroom participation. This decrease can then have negative effects on social and academic adjustment (See below).



The researchers used structural equation modeling to measure their hypothesis. The goodness of fit was adequate for the direct model and it was significantly better for the mediated model. Their findings supported their hypothesis as significant direct paths were found from peer rejection to negative peer treatment, from negative peer treatment to classroom participation, from classroom participation to achievement, and from classroom participation to emotional adjustment.

Buhs and Ladd's research is specifically relevant to this paper as those authors examined kindergarten children rather than middle school children. Prior to Buhs and Ladd's (2001) research, much of the evidence on peer rejection and school adjustment came from research on older children (see Flook, Repetti, & Ullman, 2005, Wentzel, 1999; Wentzel & Caldwell, 1997).

Buhs, Ladd, and Herald (2006) continued their research on peer rejection and its impact on classroom engagement and academic achievement. Building upon the Buhs and Ladd (2001) research, Buhs, Ladd, and Herald structured their research around three tenets. First, they looked to clarify the types of peer maltreatment (i.e., exclusion versus peer abuse) associated with

classroom disengagement. Second, the authors wanted to examine different forms of classroom participation (i.e., decrease in participation versus school avoidance) based on the type of maltreatment. Finally, Buhs, Ladd, and Herald wanted to evaluate the above processes using a longitudinal design (i.e., Kindergarten through 5th).

Buhs, Ladd, and Herald found several important findings. They demonstrated that children who were more accepted in Kindergarten were less likely to be chronically abused and excluded over time. In addition, those children found to be more accepted in Kindergarten evidenced increases in achievement scores. In contrast, Kindergarten ratings of aggression predicted peer abuse and exclusion over time while social withdrawal predicted exclusion. Peer abuse was then linked to residualized school avoidance and suggests that chronically abused peers were likely to demonstrate decreased classroom engagement. Children who were chronically excluded also demonstrated decreased classroom engagement and scored lower on achievement tests. Interestingly, chronic abuse was not found to significantly effect achievement. In sum, higher peer acceptance was indirectly associated with increases in classroom participation, decreases in school avoidance, and increases in achievement.

In examining the peer acceptance research, there were several shortcomings which should be highlighted. First, researchers inconsistently defined academic achievement using different forms of measurement. For example, Risi, Gerhardstein, and Kistner (2003) defined academic achievement as whether a student graduated or was a “dropout” from high school. Guay, Biovin, and Hodges (1999) measured achievement by having teachers rate a child’s academic skills (i.e., reading, writing, and arithmetic) using a Likert scale (e.g., 1 to 5). Other researchers used each child’s grades at the end of the school year (Chen, Chang, & He, 2003), and still other

researchers used standardized achievement measures (Buhs, Ladd, & Herald, 2006; Pianta & Hamre, 2005).

Second, although standardized measures such as the Metropolitan Readiness Test – Second Edition (Nurss & McGauvran, 1986), Wide Range Achievement Test (Wilkenson, 1993), or the Woodcock-Johnson Psychoeducational Battery Revised (Woodcock & Johnson, 1989) have been used (Buhs & Ladd, 2001; Birch & Buhs, 1999; Buhs, Ladd, & Herald, 2006; Hamre & Pianta, 2005), they were only administered once. Although this allowed the examiners to understand each child’s academic readiness, it did not allow them to truly measure academic growth in a pre-post manner.

Based on the above research, peer acceptance/rejection is a critical variable to be measured when predicting academic outcomes. This variable was found to positively impact academic achievement when students felt less lonely (i.e., more accepted) and to negatively impact achievement when students felt lonely (i.e., unaccepted). It was also found to impact classroom engagement which in turn improved academic achievement when students’ participation increased. However, the research conducted had several shortcomings including inconsistently defined achievement variables and no pre-post measures in order to measure academic growth. In addition, the above researchers also failed to measure quality of instruction and family variables, the importance of which has been discussed above. Finally, as will be discussed later, the researchers did not address student-teacher relationships, and the importance they play in academic outcomes.

Teacher Influence on Peer Acceptance

A major focus of the current study is the child’s interpersonal skills. Specifically, the study is interested in how well he or she relates with his or her peers and the quality of the

relationship he or she develops with his teacher. Previous researchers (Howes, Hamilton, & Matheson, 1994) found that children who had developed more emotionally secure attachments with their teachers were more outgoing, socially accepted, and sociable. In addition, these students were less likely to be aggressive in their social interactions. Dependent student-teacher relationships, relationships in which the child clings to the teacher, were marked by students who were more socially withdrawn from, and hostile toward, their peers. In fact, the authors argued that peer acceptance in the classroom was more influenced by the student-teacher relationship than the parent-child relationship.

In a review of the research, Howes, Hamilton, & Matheson (1994) collected longitudinal data on 48 children who entered child care between the ages of 2 and 11 months. Although the study originally started with 72 children, 24 children exited from the study over the three year course of the study due to families moving. Of the 48 children remaining, all entered full-time day care at the average age of 5.4 months and remained in full-time day care throughout the study. The children were initially enrolled in six different day-cares. By the end of the study, the children were observed in 54 different day cares because of their families changing child-care arrangements. The population of the sample as defined by the authors was 2/3 middle class and 1/3 working class with 72% of the children living in two-parent households. The children were predominantly of European-American descent (61%) with 14% African-American, 13% Latino, and 12% Asian American.

Data was collected approximately every six months. The authors used observational measures as well as assessed the teacher-relationship quality by using Walters and Deane's (1985) Attachment Q-Set. Using observations and discussions with day care staff, the authors determined each child's primary day care provider. The child's security and dependency scores

were then obtained by averaging two observers' Q-Set scores based on the child's interactions with his or her primary day care provider. The Q-Set scores were correlated with Walters and Deane's (1985) criterion scores for attachment. Three different scores for security and dependence at three specific developmental periods were then calculated using three different Time scores. Time 1 was defined as the security and dependency scores with each child's original teacher/day care provider. The average age for each child at this developmental time was 16.3 months. Time 2 was defined as the security and dependency scores obtained when the child was two-years old (average age = 22.9 months) and Time 3 was defined as the scores obtained when the child was three (average age = 36.9 months). It is important to note, however, that the security and dependency scores at Time 2 and Time 3 did not represent a child's relationship with a specific teacher because many of the children had relocated and therefore had different day care providers. Rather, these last two time scores can only be said to represent a child's security and dependency at a particular developmental period.

In this same study, behavioral samples were collected by trained observers who took 3 five minute samples of the child interacting with his peers and adults. Each five minute sample was broken down into 15, 20-second intervals whereby the behavior was coded as being present or absent. Coded caregiver / teacher behaviors included positive or negative teacher socialization and positive or negative peer mediation. Peer behaviors, defined by the authors as "observed withdraw", "observed gregarious", "observed hostile aggression", "instrumental aggression", and "complex play" were only collected when the children were four-years old. For a more specific description of each behavior, the reader is referred to the study (p. 256). In addition, teachers' perceptions of each child's ability to relate with his peers were measured by having the teachers complete a Likert scale that assessed 16 dimensions of functioning with peers (Howes, 1988).

From this scale, the authors employed three different composite scores which included difficult, hesitant, and sociable. Finally, four-year old children were interviewed at the end of the study to better determine their “social cognition” and ability to appropriately handle social situations. Based on the interview, the examiners rated each child in the following three categories: 1) positive or friendly enactment, 2) perceived peer acceptance, or 3) positive attributions.

The results of this study indicated that when a “secure” relationship is established between teacher and child at Time 1, that relationship positively predicts competent peer behavior such as interpersonal skills that the authors referred to as “prosocial” behaviors. Examples of prosocial behavior were defined as gregariousness and complex play at time 2 and 3. The secure attachment also negatively predicts two maladaptive behaviors, hostile aggression and withdrawn behavior. Therefore, whether or not a child feels secure in his relationship with his first teacher has a significant impact on his classroom behaviors over time, specifically with his peers. “Dependency” relationships, on the other hand, negatively predicted peer behaviors such as gregariousness and instrumental aggression. Dependency also positively predicted one maladaptive behavior, withdrawal.

In addition, the authors reported that positive mediation, or when teachers physically or verbally established positive peer interactions, predicted peer acceptance scores. Negative teacher mediation, or when teachers disrupted peer play or punished for peer interaction, was negatively related to complex play, enactment, and attributions, and positively related to hostile aggression and withdrawn behavior.

Howes, Hamilton, and Matheson (1994), indicated several limitations in their method of research. For example, given the inconsistency (i.e., different day care providers during Time 2 and Time 3) of each child’s primary day care provider after the child’s first year (Time 1), the

authors were unable to assess individual student-teacher relationships. Instead, the authors were required to collapse dependency and security measurements over a developmental time period. The authors also recognized that their results suggest only an association and not causation. The authors reported that other variables such as the child's sociability, possibly the result of his maternal attachment, could account for the positive relationship between teacher and student.

In another study by the same authors, Howes, Matheson, and Hamilton (1994) further explored peer social competence in relation to the child's maternal attachment and teacher relationship. Based on past research, the authors hypothesized that children who had developed a secure attachment with their mothers would demonstrate more sociable relationships with peers (i.e., peer competence). What they found, however, was that a child's (see below for a description of ages) interpersonal skills were more closely associated with that child's relationship with his teacher than with his mother.

In this study, Howes, Matheson, and Hamilton (1994) examined 84 children and their relationship with peers as a correlate of their maternal attachment. The children in the study were predominantly middle class and all lived in two-parent households. The children were all in day care, but entered at four separate times. The authors defined these four different entry times as "waves." The first wave were those children that entered day care at an average age of 5.4 months (n= 31). The second wave of children (n= 11) entered day care at an average age of 18.7 months. The third wave of children entered at an average age of 32.7 months (n= 42). The fourth wave of children entered at an average age of 40.5 months (n = 10).

Student-teacher relationships were assessed twice, first when the child entered day-care and second at the age of four. As described in the previous study by Howes, Hamilton, and Matheson (1994), the Waters and Deane (1985) Attachment Q-Set was used to measure the

quality of the student-teacher relationship. Mother-child relationships were also measured using the Q-Set as well as observations of the mother-child interaction in Bowlby's "Strange Situation." At 12 months of age, following the Strange Situation, 62% of the children in the study were determined to have a secure attachment, 22% were identified as avoidant, 13% as ambivalent, and 6% as disorganized. The authors reported an unexpected and significant finding. They did not find that a child's social competence was correlated with his maternal attachment. Instead, the child's attachment to his teacher at ages one year and four-years better defined peer outcomes. Thus, the authors were unable to replicate previous studies in which their maternal attachments at 12 months of age were related to preschool interpersonal relations with peers.

To conclude, peer relatedness, as previously discussed, is an important variable influencing a student's academic outcomes. Of significance, peer relatedness, according to research completed by Howes, Hamilton, & Matheson (1994) and Howes, Matheson, & Hamilton (1994), was moderated by children's relationships with their teachers, more so than with their attachment style with their mothers. Therefore, this research underlines the importance of better understanding the student-teacher relationship to better understand both peer relatedness and academic achievement.

More recent research completed by Hughes and Kwok (2006) found additional support that the student-teacher relationship predicted peer acceptance. More specifically, the student-teacher relationship when measured in first grade influenced peer acceptance and classroom engagement in second grade. In other words, early supportive relationships can foster positive social and classroom behaviors. Improvements to their research, such as measuring this behavior in a single academic year, would have controlled for whether the improved peer relatedness and engagement was due to their first grade or second grade teachers. In addition, because the make-

up of the classrooms changed from first to second grade, it is possible that improved peer relatedness could have been the result of different social relationships.

Classroom Engagement

Children who have been described as actively engaged in classroom activities have been found to have more positive academic outcomes (DiPerna, Volpe, & Elliot, 2002; Hughes & Kwok, 2007). Engagement, according to this research consists of many different components including cognitive, emotional, behavioral, and academic engagement. It would follow, as has been argued by these researchers, that those students who engage in more prosocial academic behavior such as listening, waiting to receive instructions, demonstrating appropriate behavior will demonstrate accelerated learning (Greenwood, Horton, & Utley, 2002). In contrast, students who demonstrate poor academic behaviors will not only interrupt their own learning, but may also interrupt the learning of others because their behaviors may interfere with the teacher's ability to teach the curriculum.

However, according to O'Farrell, Morrison, and Furlong (2006), the field has yet to clearly define and assess engagement. One reason posited by these authors for the variation in research has had to do with the differing age-groups that have been studied and the different types of educational engagement required at different levels of schooling (elementary, middle, and high school).

As was stated earlier, students who are more socially related have been found to be more academically motivated and engaged (Connell & Wellborn, 1991; Eccles, Wigfield, & Schiefele, 1998). Researchers have found that those students who feel more accepted are more motivated and active in their classroom activities (Birch & Ladd, 1997; Skinner & Belmont, 1993). Hughes and Kwok (2007), in more recent research, were specifically interested in examining whether

social relatedness (i.e., peer acceptance) impacted academic engagement and in turn academic achievement. The researchers hypothesized that background characteristics (i.e., gender and ethnicity) could predict the quality of the student-teacher and parent-teacher relationships. These relationships, it was believed, have consequences for academic outcomes. Moreover, classroom engagement was defined as a mediating variable that could explain the effect of the relationships on academic achievement. In their study, the researchers examined academic outcomes in a pre-post fashion by administering the Woodcock-Johnson Third Edition (WJ-III), Tests of Achievement (Woodcock & McGrew, 2001) for reading and math to an ethnically and gender diverse group of 443 first grade students. The WJ-III was administered twice, once during each student's first grade year and once during their second grade year. Teachers were asked to complete questionnaires and rating scales in March of each child's first grade year that assessed the relationships (student-teacher and parent-teacher) and student engagement. In the spring of their first grade year, students were interviewed to assess their perception of their teacher's support for children.

Hughes and Kwok (2007) reported several findings that are of import to the current study. First, students who perceived positive relationships with their teachers experienced greater academic gains. Second, the student-teacher and parent-teacher relationships indirectly impacted achievement via classroom engagement. In other words, classroom engagement acted as a mediating variable. Third, relationship and engagement variables predicted second grade achievement after controlling for achievement in the first grade.

There were several limitations to the Hughes and Kwok study. First, although they measured reading growth in a pre-post fashion, they did so over two academic years (first and second grade). Basing the results on data from first and second grade makes it difficult to

decipher whether the overall improvement in reading growth was the result of the relationship with their first or second grade teachers because the researchers only measured the relationship of each student with their first grade teacher. Second, students were selected for this study if they had scored below a determined median on a state-wide standardized assessment of literacy. Therefore, the results may not generalize to average and higher functioning students. A final limitation of the study was that there were no in-classroom observations of classroom instruction.

The research has delineated classroom engagement as an important variable influencing academic outcomes (DiPerna & Elliot, 2000; DiPerna, Volpe, & Elliot, 2002; Greenwood, Horton, & Utley, 2002; Kwok & Hughes, 2007). Important to this study, the research has highlighted that engagement acts as a mediating variable for academic outcomes. Pianta (2006) has specifically commented that engagement is an important factor that maintains the longitudinal effect of the teacher–student relationship quality.

Student-Teacher Relationship

Attachment as a template for the Teacher-Student Relationship

To better understand the student-teacher relationship and its impact on educational functioning, it is useful to understand Attachment Theory and its influence on the parent-child relationship. Attachment is a theoretical framework researchers are using to better understand how children develop positive working relationships with their teachers. Attachment theory, as first described by Bowlby (1962), is a dyadic relationship between the child and his caregiver that impacts how the child learns to navigate his environment, establish interpersonal relations, and develop a sense of personal worth. *Effective* interactions will allow the child to develop a sense of security in the context of relationships and fosters an exploration of the child's

immediate world, both physical and interpersonal (Pianta, 1999). Ainsworth, Blehar, Waters, and Wall (1978) note that the caregiver's responsiveness, emotional availability, and effective communication to the child all play a critical role in developing the child's attachment style. During the child's first attachment, the child constructs an "internal working model" of his relationship where beliefs regarding his worthiness of care and the adults who provide such care and security are formed (Blatt, 1995; Bowlby, 1969). Moreover, Bowlby (1969, 1980) pointed out that early experiences with the caregiver are central in the formation of internal representational models of the self, others, and self-other relationships.

Ainsworth and Wittig (1969) first operationalized Bowlby's concept of attachment. They provided empirical evidence to support three different attachment styles by using a procedure they called the "Strange Situation." In this standardized procedure, children were observed interacting with their mothers prior to, during, and after separation from their mother. The researchers were interested in the child's behavioral responsiveness toward their mother in these situations. It was hypothesized that the child's behaviors prior to, during, and after separation were a reflection of the child's expectation of his parents' availability as an emotional resource and secure base for exploration. In other words, the child's behavior toward their primary caregiver was his strategy for securing physical safety.

From their study, Ainsworth and Witting defined three separate styles of attachment behavior; Type A, Type B, and Type C. Type A children, referred to as having an "avoidant" attachment style, have a tendency to inhibit their emotional responses and therefore present with minimal to no separation distress. It has been suggested that these children have learned through repeated experiences that when they express a need for proximity, their primary caregiver will either physically distance herself or reject the needs of the child. Type B children, referred to as

having “secure” attachments, were described as those with the best mental health. The authors suggested that these children were best able to express their feelings of comfort or anxiety both verbally and nonverbally (i.e., physical proximity to their mother) to their primary caregiver. Type C children, referred to as having an “insecure-ambivalent” attachment, express their needs for physical proximity in an overemphasized manner. The authors hypothesized that these children have developed this strategy as they have learned that their caregiver becomes responsive only when they demonstrate strong bids for closeness. In other words, these mothers can be thought of as inconsistently or minimally available to respond appropriately to their child’s signals (i.e., needs).

Some researchers believe that attachment styles developed during the first 12-18 months of life are relatively stable through middle childhood and may predict a spectrum of social, emotional, and cognitive behaviors during the early elementary school years (Rauh, Ziegenhain, Muller, & Winjnroks, 2000). Other theorists, however, have argued that these stable attachment styles have been observed to present with some plasticity in the face of major life circumstances and/or changes in the primary attachment figure’s behavior (Crittenden & Claussen, 2000; Sroufe, 1983). Moreover, Crittenden and Claussen (2000) suggested that environmental contexts can also play a significant role in fostering attachment styles. In other words, specific contexts may increase the likelihood that certain types of attachment style behaviors/strategies are implemented to adapt appropriately to different environments. These latter authors hypothesized that if the child does not adapt his behaviors and style to the context, then it is likely that developing and implementing only one “working model” of interpersonal relations can be considered maladaptive and lacking in appropriate flexibility. Thus, without the ability to adapt when introduced to a new environment, or change one’s attachment style in light of

environmental circumstances, a single rigid attachment style can be considered “dangerous” to the child’s development.

According to the Crittenden and Claussen (2000), children are exposed to many dangerous environments including child abuse and neglect, physiological risk (i.e., twins attempting to share access to the primary caregiver), maternal depression, and day care (i.e., children may be exposed to irregular caregivers or may have to vie for the attention of a caregiver). Of import, they believe that *children with flexible attachment styles will be more likely to better assimilate to their environments*. This working model becomes relevant as children begin to attend school and spend more time with their teachers and peers than they do at home with their parents.

It would follow then, that children who have developed a particular attachment style with their parents or primary caregivers can develop or implement different attachment styles in novel situations such as school. For those children who enter their early elementary grades at-risk for academic and social problems, this flexibility allows them the opportunity to engage in more secure attachments with their teachers, which in turn allows these children to have their needs met. Developing a secure attachment with an adult other than their primary caregiver such as their teacher can allow for intimate relationships whereby the child / student may learn to regulate emotion (Cassidy, 1994), develop strategies for his behavior (Cassidy, 1994), develop self-esteem (Blatt, 1995; Bowlby, 1969), explore his environment with confidence (Pianta, 1999), establish effective peer relationships (Birch and Ladd, 1996), and perform with better skills on measures of language development, emergent literacy and reading, cognitive development and play, and social interaction with peers and adults (Bus & van IJzendoorn, 1988; Erickson, Sroufe, & Egeland, 1985; Sroufe, 1983, 1989a, 1989b).

In the current literature, significant investigative attention has been paid to young children's attachment styles with their teachers. For example, as stated above, Ainsworth refers to the differing Attachment styles as Type's A,B, and C. Howes and colleagues (Howes & Hamilton, 1992; Howes and Matheson, 1992), focusing predominantly on the teacher student relationship, have identified similar styles. Using attachment theory, Howes and colleagues refer to the differing styles as secure, avoidant, and resistant/ambivalent. Lynch and Cicchetti (1992) identified five features of each child's pattern of relatedness with their teacher they called "emotional quality." They refer to these five types as optimal, deprived, disengaged, confused, and average.

The research clearly suggests that attachment relationships extend beyond the parent-child dyad (Pianta, 1992) and can exist between several individuals in the child's life, including teachers. Attachment research supports Pianta's notion that the student-teacher dyad influences a child's emotional experience in a classroom (Lynch & Cicchetti, 1992), provides structure and guidance for his interpersonal interactions with peers (Howes, Hamilton, & Matheson, 1994), enables the child to feel secure as he explores and masters his environment (Birch & Ladd, 1997; Pianta, 1997), and reinforces the child's self-regulation (Pianta, 1997). See Table 1 for a review of these studies.

Assessing the Quality of the Relationship from the Teacher's Perspective

To evaluate the student-teacher relationship, Pianta and colleagues (Pianta & Steinberg, 1992; Pianta, Steinberg, & Rollins, 1995) developed the Student Teacher Relationship Scale (STRS, Pianta & Nimetz, 1991). In developing the STRS, Pianta and colleagues provided one consistent (i.e., standardized) method for assessing the student-teacher dyad from the teacher's perspective. Pianta and colleagues empirically defined three qualitative features they termed

closeness, conflict, and dependency. The STRS is the only commercially available measure with good psychometric properties for assessing a teacher's perception of his / her relationship with an individual student. In developing this measure, Pianta hypothesized that a positive student-teacher relationship, similar to a positive parent-child relationship, would be correlated with a child's early school experiences, including his academic progress. Significant research has been carried out to validate this measure, including a pilot study in 1991 (Pianta & Nimetz, 1991) and several large-scale national studies (Pianta, 1999).

Pianta originally proposed five dimensions that he believed accounted for a teacher's perception of the relationship (Please refer to Table 1 for a review of these studies). He defined these as Conflict/Anger, Warmth/Closeness, Open Communication, Dependency, and Troubled Feelings. According to Pianta, these dimensions were highly correlated (.40 - .65 range) with kindergarten classroom behavior (Pianta, 1999). Pianta also reported that a teacher's decision to promote or retain a child was correlated with STRS dimensions. For example, Pianta found that teachers who reported a Warmth/Closeness or Open Communication relationship were more likely to promote a child to the next grade. On the other hand, children who were characterized by STRS dimensions of Conflict, Dependency, and Trouble Feelings were retained.

Subsequent research supported a three, rather than a five, dimension factor structure for the STRS. Based on research by Saft (1994) that included more than 1400 students and 200 teachers from a nationally based sample that nearly matched the US census, a three factor solution of Conflict, Closeness, and Dependency was supported and replicated in a 1997 study by Birch and Ladd. Those children with STRS Conflict scores, similar to a Type A attachment (i.e., avoidant), were observed to misbehave, engage in off-task behavior, and demonstrated negative interpersonal skills (Pianta, 1999). Children with STRS Dependency scores, similar to a

Type C attachment (i.e., insecure-ambivalent), were often observed to engage in help-seeking behaviors, remained in close proximity of their teacher, and had poor interpersonal skills. Finally Closeness STRS scores, similar to a Type B attachment (i.e., secure), were correlated with positive interpersonal relations and expected positive levels of involvement with the teacher.

Teachers' Perception of the Relationship and Academic Outcomes

Recent research demonstrates that the student-teacher relationship has a significant impact on academic outcomes, both directly and indirectly. In his book, Pianta (1999) argued that a supportive relationship between early elementary teachers and their students fostered more emotionally healthy and academically oriented children and, if established and maintained, supported and shaped a student's development throughout the early school years and beyond. Research has supported Pianta and found that the quality of the student-teacher relationship helps to foster not only achievement but mediating factors (i.e., motivational and learning related processes) that are important to academic functioning. For example, a positive/effective student-teacher relationship will influence a child's interpersonal competencies with peers (Buhs, Ladd, & Herald, 2006; Guay, Biovin, & Hodges, 1999; Howes, Matheson, & Hamilton, 1994; Ladd, 1990, Ladd, Birch, & Bihs, 1999), classroom behavior / engagement (Buhs, Ladd, & Herald, 2006; Buhs & Ladd, 2001; Furrer & Skinner, 2003; Ladd, Birch, & Buhs, 1999; Pianta, 1999; Pianta, 2002), and academic motivation / mastery orientation (Birch & Ladd, 1996; Guay, Biovin, & Hodges, 1999; Wentzel, 1991; Wentzel, 1997; Wentzel, Caldwell, & Barry, 2004). In addition, other researchers have also pointed out that the quality of the student-teacher relationship is correlated with academic competencies (Birch & Ladd, 1996; Hamre & Pianta, 2005), problem-solving (Crittenden, 1992), emotional regulation (Crittenden, 1992, Skinner, Zimmer-Gembeck, & Connell, 1998), and emotional understanding (Birch & Ladd, 1998;

Connell & Wellborn, 1991, Howes, Matheson, & Hamilton, 1994) above and beyond other variables.

To examine the student-teacher relationship and its impact on a student's academic functioning, Pianta and Steinberg (1992) evaluated several variables including teacher qualities (i.e., teacher attributions, interactions with students, expectations of their students, and attitudes toward their students), student qualities (i.e., child's feelings about their teacher) and instruction time (i.e., the amount of time students were in contact with the teacher and time spent in teacher-directed activities). Pianta and Steinberg examined 436 children and 26 kindergarten teachers in one small city school district. The sample was evenly divided by gender and predominantly white (65%) with 36 percent African American. Teachers averaged 10.3 years of experience, and no mention was made of the teachers' genders.

Teachers filled out the STRS in May of the child's kindergarten year. At the beginning of the kindergarten academic year each child's mother filled out a *Preschool Behavior Rating Scale* (Caldwell and Pianta, 1991), which examined competency, acting out, and internalizing characteristics. In addition, in November and May of the child's kindergarten grade year, and March of the child's first grade year, teachers completed a Teacher-Child Rating Scale (TCRS, Hightower, Work, Cowen, Lotyczewski, Spinell, Guare, & Rohrbeck, 1986), a 38-item scale of children's social, behavioral, and academic competence problems. Each child was also administered two subtests (vocabulary and bead memory) from the Stanford-Binet Intelligence Scale Fourth Edition (SB-IV, Thorndike, Hagen, & Sattler, 1986) during the kindergarten-entry screening process to achieve a general measure of cognitive functioning. One of the outcome variables the examiners were interested in was the number of kindergarten students that were retained based on the teacher's reported quality of her relationship with the student.

This study reported several interesting findings. First, the results from the data analysis indicated that interpersonal student-teacher relationships are conceptually similar to patterns of parent-child relationships. In other words, students who were rated as behavior problems in the home by their mothers also tended to form conflicted relationships with their teachers. Second, student-teacher relationships were positively correlated with child behavior at home and at school. As an example, students rated as having conduct problems by their parents were rated as having a conflicted student-teacher relationship on the STRS (Pianta & Nimetz, 1991). Third, a child's classroom behavior impacted the teacher's impression of the dyadic relationship. Finally, the authors noted that the teachers' attributions of their relationship contributed to the child's adjustments in school. Using grade retention as a marker, the data indicated that students with positive relationships with their teachers were less likely to be retained than were children with similar learning profiles who had less positive relationships with their teacher.

This same finding was replicated by Pianta, Steinberg, and Rollins (1995). To further examine whether the student-teacher relationship aids in student adjustment over the first two years of school, Pianta, Steinberg, and Rollins (1995), using 436 children, examined the student-teacher relationship and its influence on each child's adjustment to school. More specifically, they looked at each child's transition into school (kindergarten) and through the second grade. The mean age of the students in the sample was 5.3 and there was approximately 65% Caucasian, 35% African-American, and less than 1% Asian-American and Hispanic-American. The population was composed of diverse socioeconomic and educational levels of the parents. In addition, there were a large number of students (26%) that lived in a single-parent household. The kindergarten teachers averaged 10.3 years of experience, but ranged from 0 to 20 years. The

first grade teachers averaged 8.3 years, and the second grade teachers averaged 9.1 years of experience. The teachers were predominantly Caucasian and all the teachers were women.

Upon entrance into kindergarten, all students were administered a screening battery that consisted of a cognitive development measure (two subtests from the Stanford-Binet-IV (Thorndike, Hagen, & Sattler, 1986), a language development measure (Fluharty Preschool Speech and Language Screening Test, Fluharty, 1978), a motor development measure (Motor Scales of the McCarthy Scales of Children's Abilities, McCarthy, 1972), and a behavioral adjustment measure (Parents: Early School Behavior Scale, Caldwell & Pianta, 1991); Teachers: Student Teacher Relationship Scale (Pianta & Nimetz, 1991) & Teacher Child Rating Scale (TCRS, Hightower, Work, Cowen, Lotyczewski, Spinell, Guare, & Rohrbeck, 1986). The TCRS measures a child's classroom behaviors and focuses primarily on seven areas including conduct problems, learning problems, shy-anxious problems, frustration tolerance, work habits, assertive social skills, and peer sociability. The parents were also interviewed to obtain demographic information. Classroom adjustment was measured in November and May of each child's kindergarten year, and February of their first grade year. In May of their kindergarten year, the kindergarten teachers filled out the STRS. In April of second grade, classroom adjustment was measured, and the teachers completed a second STRS.

The results from the study indicated that there was a moderate to high correlation between the STRS and the children's classroom adjustment in kindergarten and first grade as measured by the TCRS. Children who were rated more positively on the STRS by their kindergarten teachers were more likely to obtain positive first grade scores on their TCRS than was predicted by the kindergarten TCRS. In other words, children who were rated as having more productive relationships with their teachers were viewed by these teachers as having higher

levels of competence behaviors and lower levels of problem behaviors. Moreover, children with less productive relationships obtained worse scores on their first grade TCRS than was predicted by the kindergarten TCRS scores. These children were also perceived by their teachers as having more problem behaviors and lower competence.

In their study, Pianta, Steinberg, and Rollins defined students to be “at risk” if their predicted probability for poor outcomes (i.e., referral to special education or retention) was greater than 50% ($n = 110$). The indicators that were most highly correlated with identifying those students to be at high risk included poor fine-motor skills, language skills, and general cognitive abilities. Students with a predicted probability less than 50% were considered to be “low risk” ($n = 326$). Again, the researchers found that “high risk” children who had a more positive relationship with their teacher were less likely to be referred or retained. Of the 326 students that were considered “low risk,” 21 were referred or retained. A one-way ANOVA was performed and indicated that these 21 students had higher student-teacher conflict and a less positive student-teacher relationship overall.

The findings from this research suggest that a teacher’s relationship with his or her student is correlated with the child’s school adjustment. A positive relationship with the kindergarten teacher was associated with more positive outcomes such as better behavior and higher levels of competence by the end of first grade. On the other hand, a more conflictual relationship with a kindergarten teacher was associated with worse outcomes including behavioral problems and lower levels of competence. In addition, children who were considered to be at “high risk” for referral or retention, but were not actually referred or retained had significantly more positive relationships with their teachers. On the other hand, students who were predicted to succeed based on the kindergarten screening battery, but were rated as having

more conflicted/negative relationships with their teachers were more likely to be retained. Thus, the researchers pointed out that the positive relationships established between high risk students and adult/teachers can serve to decrease the children's vulnerability and risk for academic and social difficulties.

The authors further reported that there were correlations between those students referred for special education services and their STRS dimensions. For example, the researchers examined those students who were considered "high risk" for academic failure based on screening test scores (including selected cognitive subtest scores), a language measure, motor scales, and behavioral rating scales. If a student was perceived positively by his teacher (i.e., Warmth/Closeness or Open Communication), he was less likely to be referred for Special Education. If a student was perceived negatively by his teacher, the child was more likely to be referred.

Finally, the findings also indicated that children in second grade behaved consistently with their histories in kindergarten. In other words, students who had poor relationships with their teachers in kindergarten and presented with poor behavioral and academic competence also displayed these same attributes in second grade. In contrast, students who presented with positive relationships with their teachers in kindergarten and with better academic outcomes (behavioral and competence), also displayed these same behaviors in second grade. These findings suggest that a student's early relationship with his or her teacher is significant in that the outcomes tend to be consistent over time. Moreover, these early relationships are also correlated with child behavioral and academic outcomes, both positive and negative. As the authors suggest, the student-teacher relationship is responsible for school-related behaviors and can help

minimize the negative outcomes for those children considered “high risk” for poor academic outcomes.

Pianta, Steinberg, and Rollins’ (1995) study was one of the first to quantitatively assess the role of the student-teacher relationship on a child’s school adjustment. What they found was that there was a positive correlation between a teacher’s positive perception of her relationship with a particular student and that student’s school outcome. This research, however, only looked at the teacher’s perception, and it neglected to consider the student’s perception of the relationship. The student’s perception of the relationship will be explored later in the paper.

Building on Pianta, Steinberg, and Rollins (1995), Birch and Ladd (1997) furthered the research when they used a sample of 204 kindergarten children and their respective teachers (n = 16) to examine how the quality of the student teacher relationship, as measured by the STRS (Closeness, Conflict, and Dependency), was related to several aspects of academic adjustment. Using four specific subtests from the Metropolitan Readiness Test (MRT, Harcourt Brace Janovich, 1986), the authors examined both visual (i.e., Letter Recognition and Visual Matching) and language skills (i.e., School Language and Listening and Quantitative Language). The children were then asked to complete the Loneliness and Social Dissatisfaction Questionnaire for Young Children (LSDQ, Cassidy & Asher, 1992) as well as the School Liking and School Avoidance Scale (SLAS, an adapted measure from Ladd & Price, 1987). Finally, the teachers were asked to complete the STRS as well as the Teacher Rating of School Adjustment (TRSSA, developed by Birch & Ladd, 1997 during the study).

To determine which relationship style, as measured by the STRS, was most strongly correlated with a child’s academic performance on the Metropolitan Readiness Test (MRT), the authors performed a series of regression analyses. The authors controlled for gender and the

classroom environment (i.e., behaviors in the classroom) by examining four subscales from the Teacher Rating Scale of School Adjustment). Two relationship styles, Closeness and Dependency, accounted for a significant portion of the variance in MRT visual and language skills. Closer examination of the data revealed that children with a Closeness relationship style had better MRT visual and language skills. Those children considered to be less dependent performed higher on the MRT indices than did those exhibiting more Dependency needs. Birch and Ladd also reported that those students defined by a Dependency relationship style, were more likely to feel lonely in school. Children who were rated by their teachers with a Closeness style relationship were reported to like school more than those students who were described with Dependency and Conflict relationships. Finally, children who were described with Dependency and Conflict relationships liked school less than children with less student-teacher conflict and dependency. From their research, Birch and Ladd concluded that the quality of the student-teacher relationship is useful in understanding the associations between the quality of the relationship and a child's adjustment to school both academically and socially.

Hamre and Pianta (2001) also found that a kindergarten teacher's perception of the student, and her or his relationship with that student, predicted certain child outcomes. More importantly, however, the authors indicated that a student's relationship with a non-parental adult is important to his classroom adjustment. Classroom adjustment, as defined by the authors, refers to not only learning academic skills, but regulating activity level, communication skills, and interplay with peers.

Stuhlman and Pianta (2001) examined teachers' narratives about their relationships with their students, and whether these perceptions correlated with students' behaviors and the teachers' behaviors toward their students. The authors hypothesized that a teacher's internal

working model of the relationship with a specific child could be measured using a clinical interview and could predict children's social and emotional performance in the classroom. The Teacher Relationship Interview (TRI), according to Pianta (2001), was developed as an instrument to measure a teacher's internal working model regarding her or his relationship with a specific (i.e., target) child. The TRI consists of 12 standard questions that require teachers to describe their relationships with their target students. The TRI also provides examples of specific times when there were positive and negative interactions. Interviews with the teachers were conducted by trained interviewers who administered the standard 12 questions. Moreover, the interviewers had never before observed the teacher's interaction with his/her students. Each interview was audio taped and transcribed.

Stuhlman and Pianta's study consisted of 29 first grade teachers and 21 kindergarten teachers. The teachers were selected from 30 different elementary schools where children were participating in a National Institute of Child Health and Human Development (NICHD) study. The teachers were not selected based on any specific characteristics, but rather solely on the children who were involved with the NICHD study of Early Child Care. In the study, the mean for years of teaching experience was 13.6 with a range of 1 to 36. The majority of the teachers were Caucasian, with only 2 of the 50 being African-American. Of the 50 children in the study, 49% were male and 51% were female. The majority of the children were Caucasian (88%), 6% were African-American, and 6% were labeled as Other. Overall, there were twenty nine children in the first grade and 21 in the Kindergarten.

All children were observed in either their kindergarten or first grade class in the spring. Classroom observations were conducted using the Classroom Observation System for Kindergarten and Classroom Observation System for First Grade (COS-K & COS- 1; National

Institute for Child Health and Human Development – Study of Early Child Care [NICHD-ECCRN], 1995, 1997). At the time of the observation, teachers filled out background questionnaires and were then invited to participate in an interview that was conducted within one month of the observation. The observation procedures focused on a “target” child and codes were used to index the child’s behaviors, the teacher’s behaviors toward the child, the setting, and classroom level variables. All observations lasted for 3 hours and began at the beginning of the school day. A discrete time sampling method was employed whereby observations were recorded for 10 minutes at six separate times. The examiners observed for 30 seconds and then recorded for 30 seconds. Specific behaviors observed by the recorders included the child’s compliance with teacher requests, noncompliance with teacher request, negative affect, making a request of teacher, or his involvement in a social conversation with teacher. It also consisted of observing the teacher interacting with the child either one-on-one or in a small group, displaying negative affect toward the child, presenting with a positive affect toward the child, and teaching social or academic rules to the child. Global ratings of both the teacher and child were also made, including teacher sensitivity, intrusiveness, and detachment. All were rated on a 7 point Likert scale.

Each transcribed interview was then coded based on seven constructs. Pianta defined the constructs as compliance, achievement, secure base, neutralizing or negative affect, agency, positive affect, and negative affect. Each construct was then assigned a score of 0 to 2, where 0 meant that the teacher had not mentioned the construct during the interview, a 1 meant the teacher only minimally mentioned the construct, and a 2 implied that the interview clearly indicated the construct. Reliability for the coders was assessed for both individual responses to questions as well as responses summed across constructs. Reliability for responses to individual

questions was 81%, and for the summed constructs it ranged from 75% to 84%. These results are low for applied or clinical purposes, but satisfactory for research purposes.

Based on the teachers' responses to the TRI, Stuhlman and Pianta found that teachers were more likely to mention compliance in their narratives about boys, and that less negative affect was mentioned toward a target child considered more self-reliant. Teachers were also more likely to express positive affect in their narratives about children they observed to express more positive affect. For children who were less compliant, teachers reported minimized negative affect and expressed less positive affect in their narratives. Teachers expressed more negative affect toward children who were evidenced to have more negative behavior in the classroom.

Stuhlman and Pianta also examined the teacher's experience and level of education and found that teachers with a Masters degree were less likely to express negative affect. Using Pearson bivariate correlation coefficients, the authors indicated that there was a correlation between the teachers' narratives and their behaviors toward the children. For example, teachers who discussed compliance more often in the narrative were observed to present with fewer positive interactions with the children. At the same time, teachers who verbalized more negative affect were observed to present with more negative behaviors toward that child.

Stuhlman and Pianta's findings indicated several key points. First, teachers tend to mention compliance for boys more often than girls. The authors concluded that this may be because teachers consider boys' misbehavior as much more serious than girls', that girls tend to have better relationships with their kindergarten teachers (i.e., less conflict), and that female teachers view girls more positively than they do boys. Nevertheless, it is important to note that compliance was the only construct for which Stuhlman and Pianta found a significant effect for

gender differences. Second, the teachers' emotional experiences toward the children significantly impacted the relation between the student-teacher interaction in the classroom. For example, teachers who expressed more negative affect toward a child were observed to interact more often and more negatively with that child. What is important to note is that in these cases, it appeared that the teacher's negatively held perceptions (beliefs and expectations) of the dyad were confirmed and reinforced in their interactions. Stuhlman and Pianta also indicated that the child's negative perception of his relationship with the teacher is also supported in his or her negative interactions with the teacher. Thus, both the teacher's and the child's perception of the relationship is fulfilled as he or she both express negative affect toward one another. The child's perception of the relationship will be discussed further below.

What is unclear from the research is whether the teacher's expressed negativity developed prior to the child becoming less compliant or whether the child's behaviors played an active role in contributing to the teacher's negative perceptions and thus negative behaviors. However, it is clear that there exists a correlation between a teacher's negative perceptions, her responses to the child, and the child's behaviors in the classroom.

Hamre and Pianta (2005) further examined the role of the student-teacher relationship and its impact on early academic adaptation. They were interested in examining whether variables such as instructional and emotional support could alter the early trajectories of kindergarten children's academic and social functioning. In other words, the authors examined whether instructional and emotional support in the classroom would help close the gap between those children labeled as "at-risk" for academic failure and their low risk peers.

Hamre and Pianta's (2005) research population was extensive in that it was drawn from the NICHD Study of Early Child Care. The researchers used a large number of students ($n =$

910) from 32 different states, 827 different classrooms, and 295 different public schools. Of the 910 students, 49 percent were female and a large portion of the sample was Caucasian (732 Caucasian, 96 African American, 50 Hispanic, and 39 Other). Although the children in this study had been followed from birth, the initial data for this research was first collected when the children were 54 months of age. A second set of initial data had to be collected when the children were in kindergarten because teacher input was required. The students were evaluated as a follow up when they were in the first grade. Of importance, the authors noted that before they could assess whether emotional and instructional support might moderate for academic failure in the first grade, they had to determine two important factors. The first factor was whether students of varying risk backgrounds were evenly distributed into classrooms of different levels of emotional and instructional support. These authors wanted to establish the “existence of a natural experiment” (p. 958). Second, using an ANCOVA they assessed whether the students’ varying risk backgrounds were associated with academic difficulties in the first grade. One shortcoming of their research was that the authors failed to employ a Hierarchical Linear Model (HLM). An HLM would have allowed them to better analyze their multi-level data. In particular, student outcomes from one classroom (i.e., “nested” students) are more likely to be associated than student outcomes from another classroom. Examining “nested” outcomes is significant as each teacher’s characteristics (e.g., emotional and instructional support) may have helped moderate for each student’s academic outcomes.

The initial data included a test of sustained attention, a Continuous Performance test (CPT*), completed at 54 months; a measure of externalizing behaviors (an Achenbach Teacher Report Form (TRF) completed in kindergarten, (Achenbach, 1991); and a measure of social

* The authors did not provide a specific version. Instead, they referred to the CPT as being based on the young children’s version as reported in Mirsky, Anthony, Duncan, Aheani, and Kellam (1991).

skills and academic competence, a Social Skills Rating System (SSRS) completed in kindergarten, (Gresham & Elliot, 1990). Based on these measures, each child's functional risk status was determined by summing their number of "at-risk" scores. At-risk scores were determined by the following criteria: a) children with scores one standard deviation below the mean for the Social Skills Rating System, b) children who had scores one standard deviation above the mean for omission errors on the attention test, and c) children who had T scores above a 62 on the Achenbach Teacher Report Form (TRF). Based on their scores, children were either labeled as "low functional risk" if they had zero or only one risk, or "high functional risk" if they had two or more risks. In addition to functional risk, the authors also looked at demographic risk. For this, any child whose mother had less than four years of college was identified as "at-risk." Interestingly, the authors did not examine SES as an important "demographic risk."

In addition to functional and demographic assessment, the researchers also assessed several other variables. First, the authors measured achievement skills using subtests from the Woodcock-Johnson Psycho-educational Battery – Revised (WJ-R). The subtests, with the exception of two, were administered at both 54 months of age and during the first grade. Second, Pianta's STRS was administered to assess the teachers' perceptions of their relationship with their students. Third, classroom processes were evaluated using the Classroom Observation System (COS). This system was an enormous improvement over previous, non-normed forms of classroom observation. Based on the observation the classrooms' instructional (low, moderate, and high) and emotional (low, moderate, and high) support were assessed.

Hamre and Pianta (2005) found several important findings. First, children with high demographic risk (i.e., children who had mothers with less than four years of college) and high functional risk (i.e., 2 or more risks) had lower achievement scores at the end of first grade.

Interestingly, there were no significant statistical differences between males and females for this finding. Second, only children in the high functional risk group, and not the demographic risk group, were rated as having higher levels of conflict at the end of first grade. Third, those children with high demographic risk who were in classrooms with moderate and high instructional support had achievement scores commensurate with their low risk peers. In other words, instructional support moderated the demographic risk. In contrast, children with high demographic risk in classrooms with low instructional support performed significantly below their high demographic risk peers. Fourth, children in highly emotional supportive classrooms with high functional risk had similar achievement scores as their low functional risk peers. Conversely, high functional risk children in low or moderately emotionally supportive classrooms had achievement scores below their low functional risk peers. Finally, children with high functional risk, with highly emotional supportive first grade classrooms, had commensurate levels of conflict with teachers as did their low risk functional peers.

In addition to their failure to employ an HLM to better analyze their data, there were several limitations to this research that should be noted. While Hamre and Pianta (2005) clearly demonstrated the importance of instructional and emotional support in moderating both demographic and functional risk, their research failed to examine peer relatedness/acceptance, student engagement, and the student perception of the relationship (this will be discussed in more detail below). Although Hamre & Pianta measured emotional support, they did so via the Classroom Observation System (COS). The COS, which looked at characteristics such as teacher sensitivity, intrusiveness, detachment, positive and negative climate, classroom management, and overcontrol was measured by the examiner's perception and not the teacher's perception. Therefore, the teachers' perceptions of their relationship with their students, with the exception

of their perception of conflict (as measured by the STRS), was missing from this research. Hence, their failure to assess each teacher's attributions about their relationships, peer relatedness, and classroom engagement would have provided a more comprehensive understanding of those variables that impact academic outcomes. A second limitation was that their population set had come from an existing data set, rather than from a data set developed specifically for their research. The researchers pointed out that their sample of students were not highly at risk which makes it difficult for their research to be replicated and generalized to more at-risk students. Finally, the only family variable examined by the authors was maternal education. SES, based on parental occupations, was likely excluded because of the range restriction in their sample.

In sum, the research examining the teacher's perception of the student-teacher relationship demonstrated that teachers, who report closer, less conflictual relationships, have students with better academic outcomes. For example, students of teachers who reported positive relations were less likely to be retained (Pianta & Steinberg, 1992), had more positive classroom behaviors (Pianta, Steinberg, & Rollins, 1995), were less likely to be referred for Special Education services (Pianta, Steinberg, & Rollins, 1995) and had better academic performances on standardized test measures (Birch & Ladd, 1997). Even more impressive was that positive teacher-student relations were found to academically and socially moderate for students considered at risk for demographic risk (Hamre & Pianta, 2005), academic risk (Pianta, Steinberg, & Rollins, 1995), and functional risk (Hamre & Pianta, 2005). At the same time, the research found that teachers who reported negative student-teacher relations had students with poor academic and behavioral outcomes.

This excellent body of research has demonstrated that the student-teacher relationship has an impact on students' academic outcomes. To build on this, researchers could measure the myriad of important variables that have been found to impact academic outcomes in one large study (i.e., peer relatedness, engagement, family variables, teacher instruction, and the student's perception of the relationship) so that their relative importance can be assessed using an HLM model that allows for the an independent analysis of the relative importance of the teacher/classroom, student characteristics, and their interaction, as they predict learning across the 2nd grade year. Second, academic achievement might be better assessed by looking at how much academic growth occurs in key subject areas over the course of the year. Then, the relationship of this growth to the quality of the teacher student relationships can be examined in a model that accounts for all of the other key variables.

Student Perception of the student-teacher relationship

In addition to the teacher's perception of the student-teacher relationship, there is some research that suggests a student's perception of his relationship with his teacher indirectly impacts academic outcomes. For example, students who reported positive relations with their teachers were likely to be more engaged academically (Lynch & Cicchetti, 1992), have better peer relations (Howes, Hamilton, & Matheson, 1994), present with decreased emotional distress (Wentzel, 1996) and have improved mastery orientation (Wentzel, 1994b). Wentzel also reported that students who indicated they had uncaring teachers (i.e., unable to provide nurturance or provide autonomy support), were not highly motivated to behave in prosocial ways. Similar findings were evidenced by Hamre and Pianta (2005) when they pointed out that classrooms with higher levels of emotional support were associated with better academic and emotional outcomes.

Lynch and Cicchetti (1992), interested in the student-teacher relationship, looked specifically at students' perceptions of this dyad. The authors examined how maltreated children (ranging in age from 7 to 13 years) reported their relatedness to their teachers. The authors pointed out the importance of this relationship because the teacher may assume many roles with each particular student, including mentor, disciplinarian, and caretaker. In addition, this relationship may also function as a secondary, or alternative, attachment figure. An analysis of their study found that maltreated students reported more psychological proximity seeking than did non-maltreated students. Moreover, non-maltreated children demonstrated slightly more positive emotional quality with their teachers than did maltreated children. There were no significant findings based on gender. There was an effect with age in which older children reported wanting less psychological proximity with their teachers. This is likely to be a true of most children and highlights the importance of establishing positive student-teacher relationships during the early elementary years.

Maltreated children were significantly less likely to report an optimal relatedness with their teachers as compared with the non-maltreated children. In addition, the data indicated that a child's pattern of relatedness to their mother significantly affected their psychological proximity seeking and emotional quality with their teacher. In other words, children who presented with an optimal relatedness to their mother also demonstrated the most security and positive affect toward their teacher. Their findings also suggested, however, that each child's representational model with their teacher was not based solely on their organization of relatedness with their mother. *This is important because it suggests that maltreated children can develop more positive relationships with their teachers despite a negative and insecure relatedness with their mothers.*

According to Lynch and Cicchetti (1992), maltreated children who do develop a more positive relationship with their teacher may be more likely to engage in school.

Blankemeyer, Flannery, and Vaszonyi (2002) were also interested in the student's perception of the student-teacher relationship. These authors examined whether the student's aggression and social competence (i.e., peer preferred behavior, teacher-preferred behavior, and teacher rated school adjustment) impacted the student's perception of the relationship. What they found was that a student's social competence significantly predicted how he or she perceived the student-teacher relationship. Interestingly, of the three variables that composed social competence, only school adjustment (as measured by teachers completing questions from the Walker-McConnell Scale of Social Competence and School Adjustment, Walker & McConnell, 1995) contributed significantly to the effect. In addition, the authors reported that poor school adjustment was associated with more negatively perceived student-teacher relationships for boys, and that students with aggressive behavior (as rated by the teachers) who were well adjusted at school were not fated for negative student-teacher relationships. One limitation to this research, as suggested by the authors, was that the student-teacher relationship was based on the student's perception and may have been susceptible to bias and error as there were no validated measures of that construct in use at that time.

Addressing this limitation, in 2003 Mantzicopoulos & Neuharth-Pritchett developed an assessment tool, the Young Children's Appraisals of Teacher Support (Y-CATS reference), which established that students' perceptions of the student-teacher relationship provide reliable information. Building on this research, Mantzicopoulos (2005) was interested in looking specifically at conflictual student-teacher relationships as they have been found to result in poor school outcomes (Birch & Ladd, 1997; Howes, Hamilton, & Matheson, 1994; Ladd, Birch, &

Buhs, 1999). Moreover, there has been very little research on student-teacher conflict as reported by the child. In his study Mantzicopoulos (2005) found that certain child variables accounted for how students rated their teacher's support. For example, students with problem behaviors reported higher levels of conflict. In contrast, the students with higher scores on the achievement measure Woodcock-Johnson Psychoeducational Battery- Revised (WJ-R) reported lower levels of conflict. Of importance, Mantzicopoulos also found that classroom variables such as instructional practices impacted whether students perceived their teachers as supportive or not. Using the observer ratings, the Classroom Practices Inventory (CPI; Hyson, Hirsh-Pasek, & Rescorla, 1990), developmentally appropriate teacher instruction was evaluated. Classrooms observed as more developmentally appropriate were related to lower student ratings of student-teacher conflict. This finding is not surprising given the importance for quality of instruction.

Although the research has documented that students can be considered valid reporters of the student-teacher relationship, there were several shortcomings to the Mantzicopoulos (2005) study. First, all of the students in the study were disadvantaged, and therefore it is unclear whether the findings will generalize to all populations. Second, there were no pre-post measures. Third, the data collected was only correlational, which does not provide directionality for the findings. In summary, there is a minimal amount of research examining the child's perception of the teacher-student relationship. This is a big gap in the research. Because of the paucity of research and because the evidence that demonstrates that students can adequately assess their perceptions of the relationship in early elementary school is promising but minimal, this area will not be examined in the current research.

Summary and Hypotheses

Few topics in psychology and education have been more thoroughly researched than predictors of student learning. Important factors identified have included the quality of the classroom instruction, family variables, peer relatedness, and classroom engagement. More recently, research has begun to focus on the quality of the student-teacher relationship. Researchers examining this variable have shown that this relationship significantly impacts (positively and negatively) academic and social outcomes (Birch & Ladd, 1996; Buhs, Ladd, & Herald, 2006; Hamre, 2006; Hamre & Pianta, 2005; Ladd, Birch, & Buhs, 1999).

Despite all of the recent research demonstrating the importance of the student-teacher relationship, there are several gaps that need to be addressed to better understand how this relationship benefits a student's academic outcomes. First, the student-teacher relationship research that has examined academic success has failed to be consistent with their definitions of "academic outcomes" and with their methods for measuring academic success. Second, the vast majority of those studies assessing all potential variables affecting academic outcomes have not assessed academic functioning in a pre-post fashion. Third, and specific to this dissertation, there has been no research that specifically measured growth of reading comprehension in a pre-post fashion based on the student-teacher relationship in a single academic year. Moreover, there has been no research that has examined reading comprehension gains in a pre-post fashion while also considering, and controlling for, many of the other significant variables that impact learning such as the quality of the student-teacher relationship, quality of instruction, family variables (i.e., SES), student characteristics (i.e., Special Education, English as a Second Language, etc.), and peer relatedness. Fourth, there has been very little research on the impact of family variables on student achievement. Fifth, the research that has examined student-teacher relationships has not consistently used appropriate statistical methods. Understanding that the variable students are

nested within schools, examining nested factors within school variables requires that Hierarchical Linear Models (HLM) be employed.

Hypotheses

(H1) Teacher competence as measured by the CLASS will be positively related to classroom engagement of each student as rated by the teacher.

(H2) Peer acceptance of each child as rated by his/her teacher will be positively related to classroom engagement as rated by the teacher.

(H3) Student-teacher closeness as rated by the teacher will be positively related to classroom engagement as rated by the teacher.

(H4) Student-teacher conflict as rated by the teacher will be negatively related to classroom engagement as rated by the teacher.

(H5) Classroom engagement as rated by the teacher will be positively related to the gain in reading comprehension experienced by students over the course of one academic year as measured by the Degrees of Reading Power administered by the teacher to the student in the fall and the spring of second grade.

Chapter 3

Method

Participants

Participants were 14 second grade teachers drawn from the Greenwich Connecticut Public Schools as well as their 255 second grade students. Second graders were selected for this study because this was the first year that reading comprehension was measured in a pre-post measure (fall and spring). With the support of the Greenwich Public School Superintendent, the second grade teachers were asked to voluntarily consent to participation (see informed consent in Appendix A). For their participation, each teacher received a \$25.00 gift certificate which was approved by the Greenwich Public School's Business Office. Each elementary school's principal was notified of the research and its purpose by a letter drafted by the Deputy Superintendent. The individual observations of each teacher will not be shared with any district staff including administrators or any personnel who might evaluate each teacher. Consent procedures for students were not required for this study because no student was directly evaluated. Confidentiality of each student has been kept by using identification numbers rather than their names in the data analysis after giving each student a number.

Descriptive statistics for the categorical demographic variables are presented in Table 1. Participating in this study were 255 second grade students attending 14 different elementary classrooms in the Greenwich, CT public school district. These 14 classrooms were located within 7 different elementary schools. Also participating in this study were 14 different white female teachers with ranging years of teaching experience (2 years to 26 years of experience).

An equal number of boys and girls (48.2 % male and 51.2 % female) participated in the study. The majority of students were white (73.7 %). For statistical purposes, the other ethnicities

were combined into one “Other” category (26.3%). Within the sample, there was a very small percentage of English as a Second Language (ESL) students (2.4%), a slightly higher percentage of students receiving Special Education services (6.7%), and a higher percentage receiving a free or reduced lunch fee (9.85%).

Table 1.

Student Demographics

		<u>N</u>	<u>Percent</u>
Gender	Male	123	48.2
	Female	132	51.8
Ethnicity	White	188	73.7
	Other	67	26.3
Special Education	No	238	93.3
	Yes	17	6.7
English as a Second Language	No	249	97.6
	Yes	6	2.4
Free and Reduced Lunch	No	230	90.2
	Yes	25	9.8

Procedure

Teachers were asked to assess their relationship with each of their students (23 questions in a Likert format) on the following variables: peer relatedness skills (6 questions in a Likert

format) and classroom engagement (8 questions in a Likert format) in a 5 minute questionnaire (37 total questions in a Likert format, see Appendix B). Classrooms typically have 22 students so each teacher spent approximately 2 hours completing rating forms. Teachers were asked to complete this rating scale in the last few weeks of March.

To obtain each classroom's level of Emotional Support (ES), Classroom Organization (CO), and Instructional Support (IS), each teacher was observed using the CLASS observation system on one teaching day for a total of 2 hours (four 30 minute observations) by the primary investigator, who had been trained and had reached criterion on this assessment system. The observations took place in the mornings, and at least one of the 30 minute observations took place when reading instruction was given. Observations of the teachers were completed in the spring of the 2010 academic year.

As part of a typical school procedure all student participants were administered a standardized reading assessment by their classroom teacher (Degrees of Reading Power) in the fall and spring. These reading scores as well as each student ethnicity, age, gender, special education classification, English as a Second Language (ESL) classification, and Social Economic Status (SES) measured via Free and Reduced Lunch classification were collected from student files.

Measures

Reading Comprehension. In the fall and spring, each second grader in the Greenwich Public School is administered the Degrees of Reading Power (DRP) test. The DRP specifically measures how well students process or construct meaning from a selection of paragraphs. In the fall the students are administered test form J9 and in the spring they are administered test form

K9[†]. Both forms contain 42 items and have commensurate readability levels. Readability levels are described by the DRP manual as the “most difficult text the student can read with different levels of comprehension” (p. 11). Each child’s comprehension performance on the DRP can be reported in percentages, stanines, or Normal Curve Equivalents (NCEs). For the purpose of this study, raw scores were used to assess each child’s reading comprehension growth (i.e., change) from the fall to the spring.

The internal consistency, or reliability, of the DRP was strong for a group of 514 second graders with an r of 0.91. Test-retest reliability, gathered in the fall of 1998, for grades 4 (0.87), 6 (0.88), and 8 (0.91) demonstrated a high degree of alternate form reliability. Unfortunately, the test-retest reliability was not reported for 2nd grade students. In regard to validity, the authors reported strong construct, content, and criterion-related validity. Some examples include the following: a) correlations between the DRP and the STEP II reading tests (Educational Testing Service, 1971) was moderately high ($r = .88$); b) correlations between the DRP and the New York State Reading Test was $r = .80$; c) the correlations between the DRP and the CAT-77 (CTB/McGraw Hill, 1977) ranged from $r = .77$ to $r = .85$.

Classroom Engagement. Eight (8) items from the classroom engagement portion of the Academic Competence Evaluation Scale (ACES) was administered to each teacher to assess the teacher’s perception of his or her individual student’s classroom *engagement* skills. Items are on a 5-point Likert scale, where 5 represented the highest degree of classroom engagement (i.e., “Always”). This variable was operationalized by calculating the mean of 8 items. An example of an item is “This child participates in class discussions.” or “This child asks questions about tests or projects.” The reliability for this variable was very strong (Engagement = .94) for

[†] The DRP Handbook for the J and K forms recommends that forms with the same number (i.e., J9 and K9) be used in a pre- and posttest manner as they are both parallel in length and difficulty (i.e., readability).

grades K-2. Test-Retest reliability was also very strong (Engagement = .92). To determine the internal structure of the Teacher's ACES, the authors used a Principal Components factor Analysis (PCA). This method found that the factor loadings for the eight Engagement items ranged from .63 to .87. Reporting on several studies, the authors documented strong convergent and discriminant validity. In one study (Fitchburg, 1999), that employed the ACES, the IOWA Test of Basic Skills (ITBS), and the Social Skills Rating System (SSRS), the correlation between Engagement and the ITBS Composite (Reading, Language, and Math) score was .72. In addition, the ACES Engagement correlation with the SSRS Academic Competence was also strong with a score of .72. The Cronbach alpha from this study was very strong at .95.

Peer Acceptance. Six (6) items from the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1983) were administered to each teacher in order to evaluate their perception of each student's Peer Acceptance. Each item is scored on a 4-point Likert scale, where 4 represented the highest degree of perceived acceptance or competence (i.e., "Really True"). An example of an item is "This child has friends to play with." The Subscale score was computed by summing each teacher's scores (totals range from 6 to 24) and dividing by the number of questions (six) in order to determine the mean. Cronbach's alpha from this study was again very strong at .97.

Student-Teacher Relationship. The Conflict (12 items) and Closeness (11 items) subscales from the Student-Teacher Relationship Scale (STRS, Pianta, 2001) were administered to the teachers. Teachers rated on a 5 point Likert scale, where a 5 was considered a "Definitely Applies", their perception of individual relationships they had with their second grade students. An example of a conflict question is "This child and I always seem to be struggling with each other." An example of a closeness questions is "This child values his relationship with me."

According to the test manual, test-retest reliability was solid for both domains: Closeness ($r = .88$) and Conflict ($r = .92$). Internal consistency, using Cronbach's Alpha Method, was high for Conflict ($r = .92$) and Closeness ($r = .86$). Strong evidence for concurrent and predictive validity was also found in relation with behavioral and academic outcomes as reviewed in Chapter 2. Construct validity demonstrated a three-factor solution (i.e., closeness, dependency, and conflict) that accounted for 48.8% of the variance. All scores for conflict (12 items ranging from 1 to 5) and closeness (11 items ranging from 1 to 5) were computed by summing each teacher's scores and dividing by the number of questions (12 for conflict and 11 for closeness) in order to determine the mean. Higher scores for Conflict suggest higher levels of teacher concern while higher mean scores for Closeness would suggest more positively perceived relationships. In contrast, lower Conflict scores would reflect lower levels of teacher concern and lower Closeness scores would indicate less well developed relationships. The Cronbach alpha for Closeness in this study was .86 and the Cronbach Alpha for Conflict was .91.

Teacher Competence. Pianta, Paro, and Hamre's (2008) Classroom Assessment Scoring System (CLASS) was employed to evaluate several important classroom variables. Specifically, the CLASS examines three major domains of classroom experience: 1) Emotional Support (ES), 2) Classroom Organization (CO), and 3) Instructional Support (IS). The Teacher Competence variable was the mean of its three constituent scores/scales (i.e., emotional support, classroom organization and instructional support). Pianta, Paro, and Hamre pointed out that the CLASS does not measure classroom materials, the physical environment of the classroom, or specific curriculum. Instead, the CLASS focuses specifically on the interactions between the teachers and their observed students as well as how the teachers use the materials in their classroom. Within each area there are several specific dimensions of classroom quality (please see Table 2 below)

that were measured individually. In looking at both the broad (ES, CO, IS) and individual dimensions (see below), the CLASS provides a tool that can measure effective teacher-student interactions in a way that is sensitive to important developmental shifts that support academic outcomes.

The CLASS is an instrument that requires a trained observer to observe a classroom for up to two hours. Coding the observed behaviors usually begins at the start of the school day and consists of a minimum of four (4) 30-minute cycles. Each cycle has a 20-minute observation followed by a 10-minute record session. Each observer is provided with an Observation Sheet with the ten specific dimensions to be coded. These included Positive Climate (PC), Negative Climate (NC), Teacher Sensitivity (TS), Regard for Student Perspectives (RSP), Behavior Management (BM), Productivity (PC), Instructional Learning Formats (LF), Concept Development (CD), Quality of Feedback (QF), and Language Modeling (LM). The dimensions are scored using a 7-point Likert scale that ranges from Low (1-2) to Medium (3-5) to High (6-7). Low scores would suggest that the classroom characteristics are not present while High scores would suggest that the classroom characteristics are present. Descriptions of the different dimensions are listed below in Table 2.

Table 2.

Individual Classroom Observation Variables

<u>CONSTRUCT</u>	<u>DESCRIPTION</u>
Positive Climate:	Reflects the emotional connection between the teacher and students.
Negative Climate:	Examines expressed negativity in the classroom.

Teacher Sensitivity:	Considers the teacher's responsiveness to their students' academic and emotional needs.
Regard for Student Perspective	Examines the extent to which the teachers' interactions facilitate the students' interests, motivations, and points of view.
Behavioral Management:	Assesses the teacher's ability to provide clear behavioral expectations as well as implement effective methods.
Productivity:	Considers how well the teacher manages instructional time.
Instructional Learning Format	Assesses how the teacher increases each student's interest and engagement in lessons/activities.
Concept Development:	Rates the strategies the teacher employs to promote children's high order thinking skills and creativity through problem-solving.
Feedback Quality:	Focuses on the quality of verbal evaluation provided to children about their work, comments, and ideas.
Language Modeling:	Examines the quality of the teacher's use of language-stimulation.

To become a "trained" observer, the author attended a two day CLASS observation training program (June 29 - 30, 2009) intended for individuals interested in using the CLASS for research purposes. The two day program focused on the CLASS dimensions, practice coding from watching master-coded videos, and observation reliability tests. More specifically, this evaluator was trained while watching several videotaped segments that had previously been coded by, what the authors referred to, as "master CLASS coders." These master codings provided a standard by which each trainee's accuracy could be judged. Trainee ratings that were

not in agreement with the master coders' ratings suggested a high degree of random error and provided the trainee with areas of additional training needs. Once a trainee had been trained, an on-line reliability test was administered where this evaluator watched and coded specific videotaped classroom segments. Each trainee was required to achieve a "high" inter-rater reliability in order to be able to administer the CLASS for research or evaluative purposes. This author achieved an inter-rater reliability of 84% and was awarded his certificate to administer the CLASS for research purposes on July 9, 2009.

According to the CLASS manual, the information in the technical section of the manual was not normed on its own specific study with its own participants. Instead, the validity and reliability of this measure was drawn from 6 major studies, some of which used the CLASS and some of which used the Classroom Observation System (COS[‡]; NICHD ECCRN, 2002). The COS is important because many of the scales used in the CLASS are similar in nature and scoring to the COS. Using data from 5 of the 6 studies (the 6th study could not be used because there were not enough classrooms), the authors conducted confirmatory factor analyses to determine the degree to which the data matched the theoretical framework of the CLASS. They reported factor loadings that were in the moderate to high range. In addition, each domain had adequate internal consistency across the studies. Similar findings were reported for the COS scales.

The authors did not provide any information regarding the reliability of the CLASS. They did explain the procedures by which observers achieve inter-rater reliability. Using one of the six major studies discussed above, the authors reported on the percentage of classroom observation tapes that had been double-coded (i.e., coded by two observers) and had scores within one point

[‡] The COS was a precursor to the CLASS. It was used in the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD).

of each other. The overall average for the 10 areas (refer to Table 2) observed was reported to be 87.1%.

Dr. Hamre, one of the authors of the CLASS provided this evaluator with additional research studies which have begun to use the CLASS in pilot research versions. Although this information did not lend any new reliability or validity evidence for the CLASS, it did provide additional studies that have employed the CLASS in its research.

Chapter 4

Results

Descriptive Data

Descriptive analysis of each student's DRP scores for the fall, spring, and the difference between the two (i.e., Spring minus Fall scores), are reported below in Table 3. It is important to note that the raw score for the 2nd Grade DRP could be as low as a zero (0) if the student was unable to answer any questions, and as high as a 42 if the student was able to answer all of the questions. Comparing the Fall DRP mean of 22.92 raw score points with the Spring DRP mean of 31.61 raw score points would indicate an overall improvement mean of 8.69 (Change in reading from fall to spring) DRP raw scores. A paired t-test comparing these two means was found to be statistically significant ($t = -25.03$, $df = 254$, $p < .001$) indicating that the degree of improvement in reading comprehension was reliably different from no improvement. In other words, the participants demonstrated, on average, a significant 8.69 raw score improvement over the course of their 2nd grade year. In addition, given the mean spring score of 31.61, on average the 255 2nd graders from the 14 different Greenwich elementary schools were demonstrating solid reading comprehension skills.

Table 3.

DRP Descriptive Analysis

	Mean	SD	Skewness	Kurtosis
Fall DRP	22.92	8.63	-.08	-.65

Spring DRP	31.61	7.98	-.99	.68
Change	8.69	5.54	.21	.24
Teacher Comp.	4.93	1.07	-.82	.10
S-T Closeness	3.87	.64	-.80	.55
S-T Conflict	1.62	.74	1.60	2.00
Peer Accept.	3.47	.67	-1.12	.49
Engagement	3.69	.91	-.38	-.38

Classroom observations of the teacher, examining variables such as emotional support (EO), classroom organization (CO), and instructional support (IS) found that all three variables were highly correlated. The average correlation among the three teacher competence scales is (mean $r = .75$). Therefore, all three scores were collapsed into one overall score referred to here as Teacher Competence. The descriptive analyses for teacher competence are listed above in Table 3. The Mean score of 4.93 (scores can range from a low of 1 to a high of 7, where higher scores would suggest more observed competence) suggests that the teachers were perceived to be competent. In fact, this mean score would fall at the high end of what the authors of the Classroom Assessment Scoring System (CLASS, Pianta, LaParo, & Hamre, 2008) referred to as the Middle Range (scores of 3, 4, or 5). This type of score indicates that the teachers, on average, presented with appropriate emotional support (i.e., positive climate, minimal negative climate, teacher sensitivity, and regard for student perspectives), classroom organization (i.e., behavior management, productivity, and instructional learning formats), and instructional support (i.e., concept development, quality of feedback, and Language modeling).

Each teacher's perceived relationship with his or her students (closeness and conflict), as well as each teacher's observation of his or her students' peer acceptance and engagement within the classroom was also measured. The descriptive analyses for these three variables are reported above in Table 3. On average, teachers described their individual relationships with students as affectionate and warm. This would suggest that the teacher perceived the relationship as a supportive resource (Student-Teacher Relationship Closeness Mean = 3.87). This mean score was derived from a Likert rating scale ranging from 1 to 5 where lower scores would indicate a minimal degree of closeness. On the other hand, teachers on average reported a minimal degree of conflict in their relationships (Student Teacher Relationship Conflict = 1.62). Again, the mean score was derived from a rating scale (1 to 5) where lower scores would indicate minimal negativity. The Student-Teacher Relationship skewness (1.60) was elevated suggesting more teachers' responses fell to the left of the mean, or below the mean suggesting that they reported having minimal negative interactions. Of importance, although this skewness is somewhat elevated, a logarithmic transformation of this variable successfully reduced the skewness to below 1 which is generally considered to be the upper bound of "acceptable" skewness. Moreover, Pearson correlations using both the untransformed (i.e., the original, version of this variable as well as the logarithmically transformed version of this variable with all the other model variables) showed no appreciable difference between the two sets of correlations. Given those findings, in the interest of simplicity and ease of communication it was decided to use the untransformed version of this variable.

The teachers, on average, reported positive Peer Acceptance (Mean = 3.47) meaning that they perceived their students as having friends and getting asked to play. The score was calculated using a likert scale with scores ranging from a 1 to 4. Higher scores would suggest

more positive perceptions of each student's interpersonal skills. Interestingly, an examination of the Peer Acceptance negative skewness score (-1.12) would indicate the majority of teachers' scores were higher than the mean further suggesting the overall perception of positive peer relationships. Engagement measured each child's perceived active participation in classroom instruction. The mean of 3.69 using rating scale scores that ranged from a 1 (never engaged) to a 5 (always engaged) would indicate that teachers believed that their students were positively engaged in classroom instruction.

Table 4: Pearson Correlations – All Study Variables

	Fall DRP	Teacher Compet- ence	Peer Accepta- nce	S-T Conflict	S-T Closene ss	Engage- ment	Reading Gains	Gender	White	Special Ed.	SES
Fall DRP	1	.150	.131	-.078	.117	.450	-.434	.155	.069	-.311	-.158
Teacher Competence	-	1	0.67	.097	.018	.038	-.150	.116	.050	.021	-.109
Peer Acceptance	-	-	1	-.564	.510	.491	.021	.161	-.078	-.243	-.116
S-T Conflict	-	-	-	1	-.382	-.296	-.044	-.166	.034	.170	.175
S-T Closeness	-	-	-	-	1	.648	-.037	.263	.110	-.176	-.063
Engagement	-	-	-	-	-	1	-.033	.152	.132	-.296	-.172
Reading Gains	-	-	-	-	-	-	1	-.081	-.006	-.053	-.051
Gender	-	-	-	-	-	-	-	1	-.041	-.151	.054
White	-	-	-	-	-	-	-	-	1	-.124	-.343
Special Ed.	-	-	-	-	-	-	-	-	-	1	.070
SES	-	-	-	-	-	-	-	-	-	-	1

As outlined by Cohen (1988, p. 83), correlations of $(r=).10$ would be considered “small” effects; correlations of $(r=).30$ would be considered “medium” effects, and correlations of $(r=).50$ would be considered “large” effects. Focusing on just the statistically significant correlations which are also, at a minimum, in the “small-to-medium”-size range $(r=\pm .20)$, and are large enough to be of interest, several substantive conclusions can be drawn.

First, students with higher DRP scores report higher levels of classroom engagement $(r=.450)$, less gain in reading over the course of the school year $(r=-.434)$ and are not in special education $(r=-.311)$. In other words, students with higher DRP (reading comprehension) scores are more likely to engage in appropriate classroom behaviors and are less likely to require special education services. Moreover, students with higher levels of classroom engagement tend not to be in special education $(r=-.296)$.

Second, students with greater peer acceptance are rated by their teachers as having less student-teacher conflict $(r=-.564)$, more student-teacher closeness $(r=.510)$, greater classroom engagement $(r=.491)$, and, again, are not in special education $(r=-.243)$. This finding suggests that students who are more generally accepted by their peers demonstrate better teacher relations, and it supports the research findings that they have more positive academic outcomes (Buhs, Ladd, & Hearld, 2006; Chen, Chang, & He, 2003; Flook, Repetti, & Ullman, 2005; Guay, Biovin, & Hodges, 1999; Howes, Hamilton, & Matheson, 1994; Ladd, 1990; Ladd, Birch, & Buhs, 1999; Risi, Gerhardstein, & Kistner, 2003; and Wentzel, 1991; Wentzel, 1998; Wentzel, Caldwell, & Barry, 2004).

Third, students for whom their teachers reported higher levels of student-teacher conflict have less student-teacher closeness ($r=-.382$) and lower levels of classroom engagement ($r=-.296$). In other words, those students with poor student-teacher relationships were less likely to engage in appropriate classroom behaviors. In turn, students for whom teachers reported higher levels of student-teacher closeness report greater levels of classroom engagement ($r=.648$). This, according to Hughes and Kowk (2007), resulted in a positive increase in academic achievement. Interestingly, the students, who teachers reported had better relationships and were more appropriately engaged, tended to be female ($r=.263$).

In addition to examining the univariate normality of the model variables, the bivariate normality and the linearity of the relationships between the model variables was examined. This was accomplished by comparing the Pearson correlations between the model variables (see Appendix C), which assume bivariate normality and linearity, with their nonparametric counterparts, Spearman rho correlations, which do not make these assumptions. In general, these two sets of correlations were quite similar suggesting that the relationships between the model variables are bivariate normal and linear.

Evaluation of Student-Teacher Closeness and Conflict Scores

To further evaluate student-teacher relationships (i.e., closeness and conflict), the closeness and conflict mean scores from the current evaluation were compared with the closeness and conflict mean scores from two comparable studies (Birch & Ladd, 1997 & 1998). These two studies were chosen as the researchers used the Student-Teacher Relationship Scale (Pianta, 2001) and reported the mean scores. Four independent group t-tests were conducted in which the mean values from the student-teacher closeness and

student-teacher conflict were tested against those of Birch and Ladd, 1997 and 1998. The results (shown below in Table 5) indicate that current student-teacher closeness means are significantly higher than the corresponding means of the Birch and Ladd samples. Similarly, the student-teacher conflict mean was significantly different from (lower) the corresponding student-teacher conflict means of the two Birch and Ladd samples. However, it is important to point out that finding statistically significant differences here was, at least in part, a function of the relatively large samples involved in the comparisons. A better approach would be to provide “effect size” estimates for each of these comparisons. These effect size estimates express the difference between the current study’s means and Birch and Ladd’s means without taking the sample sizes into consideration as do the statistical significance tests.

The difference in the magnitudes of the current means and the Birch and Ladd means can be calibrated using Cohen’s d statistic as an effect size measure. According to Cohen (1988), $d = .20$ is a “small” effect size; $d = .50$ is a “medium” or “moderate” effect size and $d = .80$ would be considered a “large” effect size. In effect size terms, the difference between the current student-teacher closeness mean and the two Birch and Ladd student-teacher closeness means would be considered a “small” effect or difference. With respect to student-teacher conflict, the corresponding effect sizes would be characterized as “small-to-medium”-size differences. So, while the differences between the current means and those of Birch and Ladd’s are statistically significant, in effect size terms, they were not particularly large.

Table 5. Comparison of Closeness and Conflict Means

	DeTeso vs. Birch & Ladd, 1997			DeTeso vs. Birch & Ladd, 1998				
	<u>t</u>	<u>df</u>	<u>P</u>	<u>D</u>	<u>T</u>	<u>Df</u>	<u>P</u>	<u>D</u>
Closeness	2.16	410	P = .03	.20	2.30	452	P = .02	.22
Conflict	4.18	378	P < .001	.40	3.67	365	P < .001	.35

Methodological Considerations and Analytic Options

The study design for this investigation can be characterized as a “multilevel” design. More specifically, it is a “three-level” design in which students are nested within classrooms (teachers), and classrooms (teachers), in turn, are nested within schools. Because students in the same classroom share the same teacher it is likely that their scores on many of the variables under investigation in this study, e.g., student-teacher conflict and closeness, classroom engagement and gain in reading comprehension, will not be statistically independent. Similarly, because teachers within the same school are subject to common school policies and procedures, and perhaps teaching curricula, it is also possible that the teachers’ behaviors are not statistically independent which, in turn, is another factor which would tend to induce correlations among the variables of students within the same schools. The non-independence of the students’ scores is problematic because the most commonly used statistical techniques assume that the “units of analysis”, here, students, are statistically independent. When this is not the case, the statistical significance tests used to evaluate the study’s hypotheses are likely to be in error. Typically, the statistical significance tests reported are too liberal, meaning that more “statistically significant” findings are reported than should be the case.

Over the last twenty years, or so, statisticians and methodologists have developed a number of statistical techniques which accommodate nested data. Among the most

popular of these are “multilevel models” or “random effects models”. However, these techniques typically require reasonable sample sizes at all “levels” of the nesting structure, here, students, teachers and schools. Perhaps the most commonly cited “rule-of-thumb” for “two-level” designs (Kreft & DeLeeuw, 1998) is that thirty level-2 units are advisable with at least thirty level-1 units per level-2 unit. In the context of the current investigation this “30/30” rule would imply that thirty teachers, each with a classroom of thirty students, be available for a multilevel analysis. Like all rules-of-thumb, the “30/30” rule should be viewed, at best, as an approximation of the sample sizes needed to conduct multilevel modeling. Still, it must be recognized that the current study falls short on both counts, i.e., only 14 classrooms (teachers) are available with only 18 students per classroom, on average.

There are two commonly used alternatives to random effects models for accommodating nested designs. The first of these corrects the significance tests for the nesting of the students within classrooms, and the nesting of the classrooms (teachers) within schools. This approach is useful for estimating the “overall” effects of the predictors, here, the effects of the predictors aggregated over all of the classrooms and schools. Studies that adopt this approach to multilevel modeling are not interested in evaluating how these effects vary across either classrooms (teachers) or schools.

The second alternative amounts to incorporating the “grouping” factors, i.e., dummy variables, for classroom (teachers) and schools as additional predictors in a conventional regression model. With the inclusion of these dummy variables, the units of analysis are rendered “conditionally independent” and the usual statistical significance tests for regression coefficients can be used as they are in any regression model in which

statistically independent units of analysis are assumed. Typically, this approach is used with multilevel sampling designs in which there are a small number of higher level sampling units. In this case, it is teachers and/or schools (Snidjers & Bosker, 1999).

Given the available statistical methods for analyzing multilevel data, on what basis should the choice be made? Fundamentally, the choice should be made based on the substantive questions which motivate the study. There are, however, methodological considerations which may inform that choice.

In the context of this study, there are a very small number of schools ($n=7$). Whatever the ultimate modeling choice, these “school effects” will have to be accommodated using dummy variables as outlined in the second alternative discussed above. With respect to the classroom (teacher) effects, this investigation is not interested in examining between-classroom and within-classroom relationships among these variables. Even if that were the case, the number of classrooms ($n=14$) is well below the ($n=30$) recommended “30/30” rule-of-thumb. The seriousness with which the “30/30” rule-of-thumb should be taken notwithstanding, a number of simulation studies have shown that although the “fixed effects”, i.e., the overall regression coefficients, can be accurately estimated with a level-2 sample (classroom) size of 30, the statistical significance tests for the “random effects”, i.e., the variance components, cannot be reliably estimated with a sample of this size (Maas & Hox, 2004; 2005).

The substantive focus in this investigation is on estimating the “overall” relationships among teacher competence, peer acceptance, student-teacher closeness and conflict, classroom engagement and change in reading comprehension. Moreover, these relationships are to be investigated in the context of estimating the particular “causal”

model implied by the hypotheses outlined above and depicted in Figure 1. Given this focus, the hypothesized structural equation model will be estimated using the first alternative multilevel analytic option outlined above.

Model Analyses

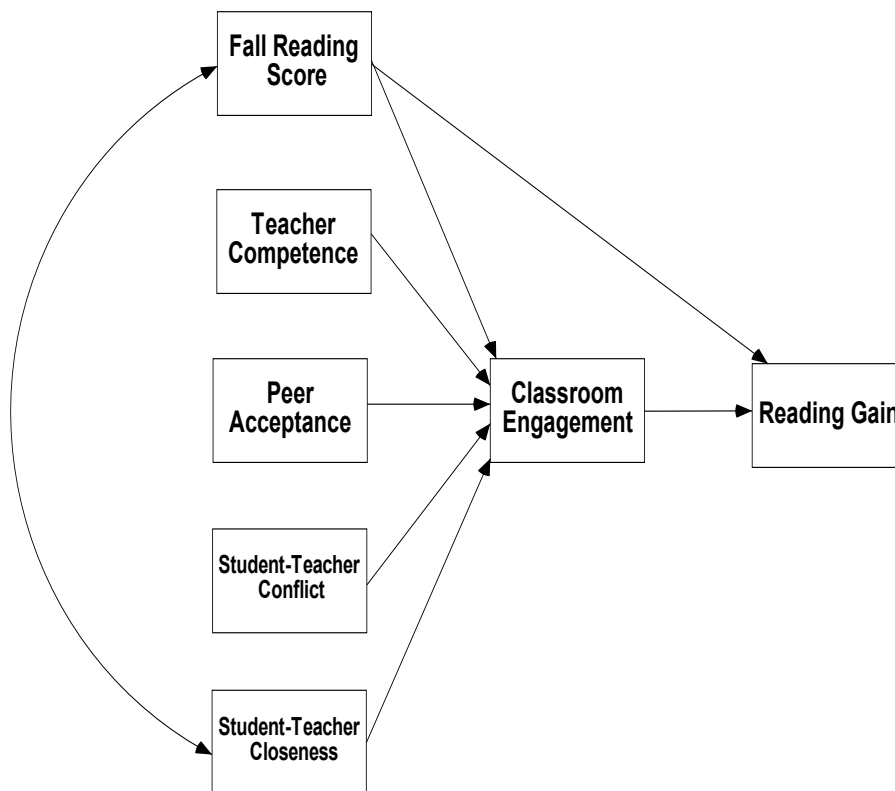


FIGURE 1: MEDIATIONAL ("PATH") MODEL

The structural equation model depicted in Figure 1, including statistical controls for school, gender, race (white v. other), educational placement (special education or not) and social class (free/reduced fee lunch or not), was fit using the structural equation

modeling program MPLUS (Muthen & Muthen, 2007). Maximum likelihood estimation with robust standard errors and a mean-adjusted chi-square test statistic (MLR) were used to accommodate the nested structure of the sample. Although the model estimation terminated normally, the standard errors of the model parameters were flagged as untrustworthy because the model attempted to estimate more parameters than the available number of clusters, i.e., classrooms ($n = 14$), could support.

To resolve this problem, the “core” model variables – the Fall DRP reading comprehension score, teacher competence, peer acceptance, student-teacher conflict, student-teacher closeness, classroom engagement and the change in reading comprehension score were “residualized” as an alternative method for controlling the effects of school membership, gender, race, educational placement and social class (Newcomb & Bentler, 1988; Fletcher, Germano, & Selgrade, 2006). That is to say, each of the core model variables was regressed on the full set of control variables, which, in effect, “subtracted” the variance attributable to these control variables from each of the model variables. Using the now residualized model variables, the mediational model depicted in Figure 2 ran successfully without any warnings concerning the model’s standard errors¹.

¹ Subsequent to residualizing the model variables, Pearson and Spearman correlations were again compared in order to evaluate the normality and linearity assumptions. No substantively meaningful discrepancies were found between these two sets of correlations.

Also, the intraclass correlations for each model variable were examined to determine whether the residualized model variables were conditionally independent thereby obviating the need for a multilevel approach to the analysis of the data. The conditional intraclass correlations were reduced relative to their unconditional counterparts, four of which implied design effects greater than 2.00, a value indicating the need for a multilevel modeling approach to deal with the dependencies in the data (Muthen & Satorra, 1995). However, the design effect implied by one of the conditional intraclass correlations was still well above 2.00, i.e., 2.89, which indicates that even after residualizing the model variables, enough statistical dependency remained in the data to require a multilevel modeling strategy.

The Mediation Model

The fit of the hypothesized mediation model to the data is acceptable based on the model fitting criteria outlined in Kline (2005) ($\chi^2 = 9.17, (4), p < .06, RMSEA = .07, CFI = .98$). The statistically insignificant model chi-square statistic indicates that the model-implied covariances between the variables do not differ significantly from the observed covariances between these same variables. As such, the model “fits” the observed covariance matrix. For the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI) values between .05 and .08 for the former fit index and $> .90$ for the latter fit index suggest a “reasonable” fit of the model to the data. The RMSEA and CFI model fit indices for the hypothesized model are .07 and .98, respectively, and therefore also provide evidence that the hypothesized model fits the data reasonably well.

A second model was run, referred to here as the "augmented" model, that included additional paths from student-teacher closeness and student-teacher conflict to reading gain. The model fit the data trivially better with respect to the conventional model fit statistics (i.e., the Comparative Fit Index (CFI, .99 v. .98) and the Root Mean Square Error of Approximation (RMSEA, .07 v. .06)). However, based on a nested chi-square test ($X^2 = 5.04, df = 2, p = .08$), the model did not fit significantly better than the original model. Therefore, for the purposes of this study, the original model was retained.

As seen in Figure 2, there are three statistically significant effects on the mediator, classroom engagement. The first of these effects is the path from the Fall DRP reading comprehension score to classroom engagement ($\beta = .35, p < .05$). This moderately strong,

positive effect indicates that students with higher DRP scores at the beginning of the second grade report higher levels of classroom engagement during the school year. Secondly, there is a modest positive effect from peer acceptance to classroom engagement ($\beta = .19, p < .05$), indicating that students with higher scores on the peer acceptance measure report higher levels of classroom engagement. Finally, there is a moderately strong, positive effect of student-teacher closeness on classroom engagement ($\beta = .51, p < .05$), and this indicates that students whose teachers rate them as relatively high on this measure report greater levels of classroom engagement. Teacher competence and student-teacher conflict are not significantly related to classroom engagement (both, $p > .05$).

With respect to students' gain in reading comprehension over the course of the school year, there is a statistically significant, moderately strong, negative relationship ($\beta = -.53, p < .05$) between these students' Fall DRP scores and the degree of improvement in reading comprehension over this same time interval. This finding is not surprising because students whose Fall DRP scores are higher than those of their peers may be expected to not improve as much as students with lower Fall DRP scores. In more substantive terms, students with lower scores have more "room" for improvement. From a methodological perspective, the inclusion of the Fall DRP score permits an assessment of the effects of the other model predictors on change in reading uncontaminated by the relationships between these predictors and the T1 (Fall) reading score. More specifically, the change in reading score is composed of both the T1 (Fall) reading score and the change from that score, i.e., [T2 (Spring) – T1 (Fall)]. By statistically controlling for the

T1 (Fall) reading score, the estimated relationships between the other model variables and change per se can be interpreted less ambiguously.

Classroom engagement also exhibits a statistically significant, albeit modest, positive relationship to reading gain ($\beta = .15, p < .05$). That is, students whose teachers rate them as more engaged in the educational process report more improvement in reading comprehension than do students who are rated as less engaged.

Effects Decomposition Analysis

Note that Figure 2 presents only the (standardized) direct effect of each model variable on those model variables hypothesized to be affected by it. For classroom engagement, these effects are all direct effects. This is not, however, the case for the ultimate dependent variable, reading gain. For this outcome variable, only the Fall DRP reading comprehension score is hypothesized to directly impact reading gain. As discussed above, students with higher reading comprehension scores at the beginning of the school year are expected to exhibit less improvement in reading comprehension over the school year because they began the school year at a higher level of reading comprehension.

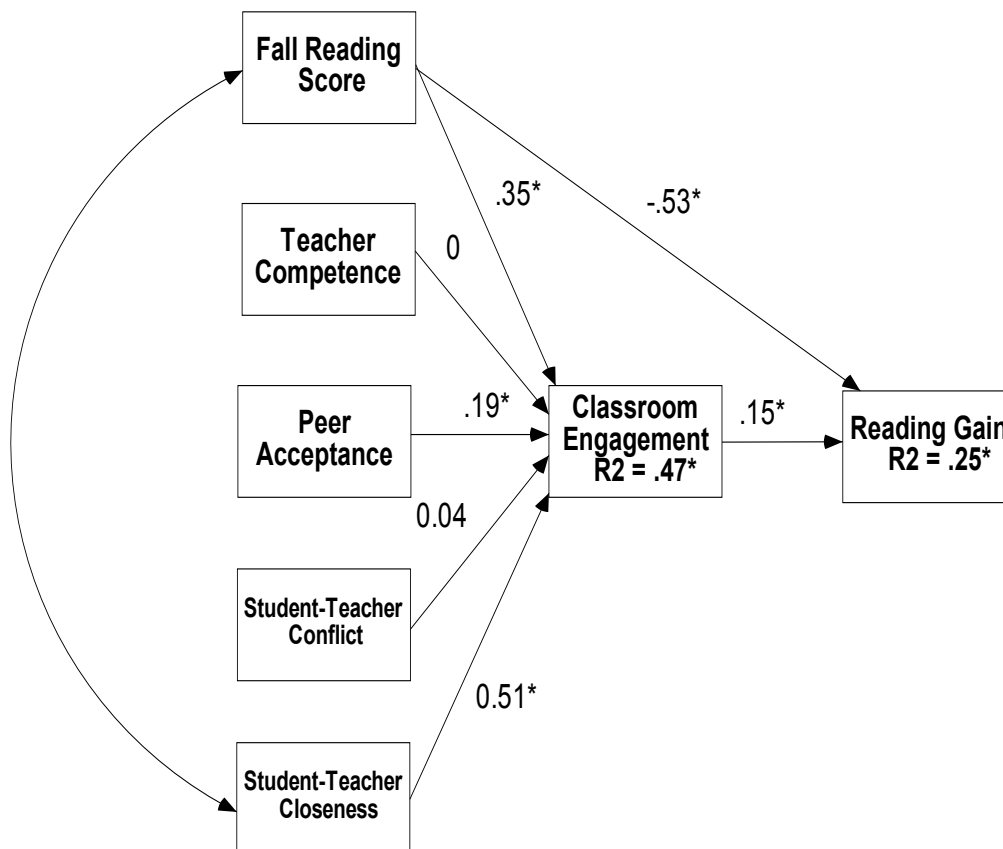


FIGURE 2: MEDIATIONAL ("PATH") MODEL

(with controls for school, gender, race,
education status and ses)
* $p < .05$

In addition, the Fall DRP reading score is hypothesized to have an indirect effect on reading gain via classroom engagement, the mediator, precisely because “better” students, as measured by the Fall DRP score, which can be interpreted as a proxy for academic motivation and/or academic achievement, are expected to be more engaged during the school year. In turn, engagement should foster greater improvements in reading. As seen in Table 4 below, both the direct and indirect effects of the Fall DRP

score are statistically significant at $p \leq .05$ or very nearly so. The sum of the direct and indirect effects of the Fall DRP (and all other model variables) defines the ‘total’ effect of this variable on reading gain. This total effect is also statistically significant.

Table 6: Effects Decomposition (Standardized Effects)

<u>Dependent</u>	<u>Predictor</u>	<u>Total Effect</u>	<u>Direct Effect</u>	<u>Indirect Effect</u>
Classroom Engagement	Fall DRP	.35*	.35*	--
	Teacher Competence	.00	.00	--
	Peer Acceptance	.19*	.19*	--
	Student-Teacher Conflict	.04	.04	--
	Student-Teacher Closeness	.51*	.51*	--
Reading Gain	Fall DRP	-.48*	-.53*	.05**
	Teacher Competence	.01	--	.01
	Peer Acceptance	.03*	--	.03*
	Student-Teacher Conflict	.01	--	.01
	Student-Teacher Closeness	.07*	--	.07*
	Classroom Engagement	.15*	.15*	--

* $p < .05$ ** $p < .10$

Note also that the effects of the other model variables, i.e., teacher competence, peer acceptance, student teacher conflict and student teacher closeness, were hypothesized not only to directly affect classroom engagement, but also to indirectly affect reading gain via their effects on classroom engagement. As seen in Table 6, peer acceptance and student-teacher closeness have statistically significant indirect effects on reading gain via classroom engagement.

Taken together, the statistically significant, indirect effects identify the substantive “mechanisms” by which three of the five model variables – the Fall DRP score as a proxy for academic motivation and/or achievement, peer acceptance and student-teacher closeness - “pay off” in terms of improvements in reading comprehension over the course of the academic year. Because these indirect effects are standardized their magnitudes can be directly compared. Visual inspection of these indirect effects in Table 6 indicates that the strongest of these mediated effects is associated with student-teacher closeness (.07), followed by the Fall DRP reading comprehension score as a proxy for academic motivation and/or achievement (.05), and then peer acceptance (.03). By directly promoting greater classroom engagement these three variables indirectly contribute to the improvements in reading comprehension in this sample of second graders.

Chapter 5

Discussion

The purpose of this study was to measure reading comprehension gains in second grade students. This study examined specific variables (i.e., student-teacher relationship, peer relatedness, classroom instruction, student variables, and classroom engagement) that have been noted in the research to have an important impact on academic outcomes. The reading comprehension gains and other variables were measured in a single academic year employing a pre-post assessment of reading comprehension, and a single measurement of the other variables. The 255 second grade students from Greenwich CT were from seven different elementary schools and had fourteen different teachers. Therefore, a hierarchical linear model was used to test the different hypotheses about which variables had the greatest impact (direct and indirect) on reading comprehension. The study found the following: 1) student-teacher closeness, peer relatedness, and fall reading scores all had direct effects on classroom engagement; 2) student-teacher closeness, peer relatedness, and fall reading scores had positive indirect effects on reading comprehension gains via classroom engagement; and 3) classroom engagement had a positive direct effect on reading comprehension. As reported in Figure 2 immediately above, [R2=] 25% of the variation in reading gain is “explained” by the predictors.

The direct effects of a positive student-teacher relationship, peer relatedness, and initial reading comprehension scores on classroom engagement not only have empirical support (Birch & Ladd, 1997; Howes, Hamilton, Matheson, 1994; Hughes & Kwok, 2006; Hughes & Kwok, 2007; Wu, Hughes, & Kwok, 2010) but they make sense

conceptually. Students who have positive attachments to their teacher are more likely to experience a sense of belonging and academic competence. In turn, these perceptions may motivate students to work hard to meet classroom (behavioral and curriculum) expectations (Furrer & Skinner, 2003). Students with positive peer relations demonstrated more prosocial behaviors (Buhs & Ladd, 2001; Buhs & Ladd, 2006; Chen, Chang, & He, 2003). Positive social interactions in the classroom, it has been hypothesized (Repetti & Ullman, 2005; Wentzel, 1998), are likely to play a role in shaping a student's academic self-concept. Consider the non-accepted student who may be excluded from group activities or receive negative feedback about their abilities. These students may come to label themselves as "stupid," develop negative attitudes about school, and therefore lack the motivation and confidence to engage in classroom activities. Finally, those students who achieved higher reading comprehension scores in the fall (time 1) were also found to have a direct positive impact on engagement. Students who achieved higher reading comprehension scores in the fall are more likely to engage in prosocial behaviors as well as be perceived as engaging in more positive classroom behaviors.

Positive student-teacher relationships (i.e., closeness), peer relatedness, and fall reading comprehension scores were also found to have indirect effects on reading comprehension gains via engagement as a mediating variable. This finding has also been supported in previous research (Hamre & Pianta, 2005; Wu, Hughes, & Kwok, 2010). Simply stated, by improving classroom engagement, these three variables increase reading comprehension gains. Of these three variables, the student-teacher relationship had the most significant direct effect on engagement and the most significant indirect effect on reading comprehension. This would suggest that the student-teacher

relationship, more than the other variables, resulted in improved reading gains. Moreover, this research demonstrates the need to foster and improve student-teacher relationships to improve literacy (Pianta, 2006).

Finally classroom engagement had a direct positive effect on reading comprehension gains and was found to be a significant mediating variable for other important variables. This finding also supported previous research (Greenwood, Horton, & Utley, 2002). Of significance, Greenwood, Horton, and Utley (2002) reported that engagement, defined as academic responding, increased through the second grade and then leveled off through the child's fifth grade year. Thus, teachers who encouraged and supported academic engagement during the early elementary school years were more likely to demonstrate improved academic outcomes. Helping school districts and their teachers implement strategies that support classroom engagement was strongly indicated from the research. The current study's finding that engagement is an important variable that directly impacts literacy gains, but also mediates the impact of other variables (positive student-teacher relationships, peer relatedness, and fall reading skills) provides ample evidence that engagement should be considered as an area of focus for academic institutions, particularly in the elementary school years.

As interesting as what directly or indirectly improved reading comprehension gains, were the variables found to have no effect. First, student-teacher conflict, hypothesized to have a negative impact on academic outcomes (Birch & Ladd, 1997; Hamre & Pianta, 2001; Ladd, Birch, & Buhs, 1999), was not indicated as a variable that had a positive or negative impact. This finding, however, was likely due to the way that the current study was structured differently than previous studies. For example, Birch and

Ladd (1997) only measured academic skills once and therefore their results do not provide any measure of academic “gain” as a result of the student-teacher relationship. Moreover, more recent researchers (Hughes & Kwok, 2007) have studied the impact of academic outcomes over several years. Because the current research examined the impact of reading comprehension gains over a single year in a pre-post fashion, it not only adequately assessed academic “gains,” it was not subject to several different student-teacher relationships (not including the one that was measured) that could also impact the academic outcomes. Another possible explanation for why student teacher conflict did not indicate a positive or negative impact was the significantly lower conflict scores reported by the teachers in this study as compared with previously published studies.

Second, classroom instruction, believed to play a significant role in academic outcomes, was not measured to be a significant variable. Classroom observations of classroom instruction (i.e., classroom organization, emotional support, and instruction support), referred to as teacher competence in the current study, revealed that all of the teachers were rated at the high end of the “competent” range. One explanation for this was the type of teacher who volunteered to participate in this study. In other words, the teachers who participated may have been more confident in their abilities to deliver instruction and organize their classroom. This factor, in turn, may have had an impact on the low levels of student-teacher conflict reported above.

The current research is the first study to evaluate the effect of independent variables on reading comprehension gains in a single academic year. Of significance, the findings not only support past research, but provide direct evidence that the student-teacher relationship, peer relatedness, and classroom engagement all play a significant

role in improving a second grader's reading comprehension gains in a single year. Prior longitudinal research that has found that the quality of an early student-teacher relationship influences academic outcomes over several years might be questioned because of the inability to account for differences in the teacher year to year. The current study attempted to control for this by examining academic gains in a single year. Therefore, this study can account for the student-teacher relationship in a single year and is not influenced by relationships developed in subsequent academic years.

Limitations

There were several limitations with the current research. This was a convenience sample and therefore it was not representative of diverse ethnic or income groups. For example, the 255 students from the Greenwich Connecticut public schools were predominantly white (73.7%), had a minimal percentage of students with free and reduced fee lunch (9.85%), and an even smaller number of students who were not native English speakers (2.4%). These factors reduced variability within the sample and limit the generalizability of the findings.

A second issue with the student sample was the total number of students ($n = 255$). Because this study had nested variables (i.e., students nested within their classrooms and classrooms nested within different schools), statistically the data had to be analyzed using a multi-level design. These designs require a significant number of total subjects (i.e., students, teachers, and schools). This study fell short of those numbers and therefore an alternative structural equation model had to be employed.

The predominantly white, upper class sample of students selected was also found to begin their second grade year with solid reading comprehension skills (mean for fall

reading = 22.92 out of 42 with a Standard Deviation of 8.63). This would suggest that on average, the second grade students in the specific classrooms were entering the school year with reading skills that were on grade-level and commensurate with same age peers. These average reading skills (fall DRP) enable them to more efficiently access the curriculum, participate effectively in literacy instruction, and therefore engage in classroom instruction. In other words, as the data from this study suggested, stronger fall DRP scores directly affected classroom engagement and indirectly affected reading comprehension gains.

Hart and Risly's (1995) research found that a family's Social Economic Status (SES) had a significant impact on a student's vocabulary growth by the age of three. In turn, by the time the children in their research were age 9, vocabulary growth at age 3 was strongly associated with their reading comprehension as measured by standardized assessment. Thus, the fall DRP scores in the current research may be explained in part by the economically advantaged environment in which the research was conducted.

A second sample limitation to this study had to do with the use of teacher volunteers. This limited the number of teachers (and thus classrooms) and it may have biased the type of teacher who was willing to participate. Teachers who were more confident in their abilities, more experienced in their years, and who were not apprehensive about an evaluator coming in to their classroom to do two hours of observation, likely volunteered. Therefore, it is possible that the teachers participating in this study were more competent (i.e., classroom organization, emotional support, and instructional support) than the average second grade teacher, inadvertently controlling for disparities in competence that might impact reading comprehension gains. In addition,

the teachers who volunteered may have been more likely to respond favorably to the rating scales that they completed on each student (i.e., student-teacher relationship, peer relatedness, and classroom engagement).

A final limitation of the current study was the several unmeasured variables. First Hamre and Pianta (2005) found that maternal education had an impact on academic outcomes but maternal education was not examined. Even if it were assessed in this sample a restriction in range would likely be found as Greenwich is a highly educated community. A second missing variable was the student's perception of the student-teacher relationship. Prior research, however has not found ample evidence to support that students are valid reporters. Third, teacher variables such as years of experience and ethnicity were not included in the overall analysis, although they might contribute to understanding the student-teacher relationship if there is sufficient variability in teacher background. Finally, while peer relatedness was rated by the teacher, it would have been useful to examine social relatedness based on the students' perceptions.

Implications for Practice

Previous research and researchers have provided strategies to increase positive classroom engagement as well as improve the student-teacher relationship. Although the findings from this research supports focusing more educational effort on these areas, replication of the findings is needed with a more ethnically and financially diverse population.

Greenwood, Horton, and Utley (2002) stated that too many students still engaged in behaviors other than directly reading, writing, talking about academics, or manipulating academic tasks. In other words, the authors believed that too many

classrooms still have students sitting and looking at the teacher while she lectures rather than engaging in hands-on activities. To remediate this, the authors suggested that teachers need to increase group work and independent work. To do this, the authors reported that less time needs to be spent in entire class discussions where students raise their hands and are called on. In fact, the authors believed that this type of instruction was the least effective in promoting academic engagement. Instead, the authors believed that the most beneficial strategies for increasing academic engagement included using worksheets, technology / media, and workbooks. More specifically, they suggested that the most effective strategies were evidenced when the teachers had the students work independently, or were taught in a one-on-one situation. Small groups were found to be less effective, and large groups were the least effective.

Specific academic activities that were found to negatively impact engagement included transitions, lectures, and cleaning up / putting away activities. Therefore, improving how quickly students transition into and out of activities (i.e., classroom organization), reducing the time of whole group lecture, and encouraging more independent and small group work should help improve classroom engagement. Completely eliminating large group instruction from education may be an unobtainable goal. As such, devising strategies that improve whole group instruction is an area that future researchers can examine to help improve the educational process. One important strategy that might be implemented would be encouraging large group discussions where a significant amount of time is spent focusing on and clarifying student knowledge.

Academic engagement may also be fostered through good pedagogy. For example, Pianto, La Paro, and Hamre (2008) in their CLASS manual discussed the

importance of regarding each student's perspective. More specifically, teacher behaviors that can foster student flexibility, autonomy, and expression of ideas / perspectives are considered are important variables that improve learning. Examples of those important behaviors include listening carefully, supporting and encouraging students' ideas, providing classroom opportunities that involve students in a meaningful manner, and making appropriate decisions that enable students to be as autonomous as possible within the context of structured lessons.

Improving the student-teacher relationship, given its robust impact as noted throughout the research as well as in the current study, should be an area of focus for teachers, school administrators, and school districts. Hamre and Pianta (2006) believed that improving this relationship should begin with developing a "caring community." They indicated that this is more difficult in the middle and high school years simply because of the way the schools are structured (i.e., students have many different teachers and therefore do not have the same opportunity to establish positive / caring relationships with their individual teachers).

Regardless of the difficulties, Hamre and Pianta (2006) provide many different strategies to improve the relationship. To enhance the quality of the student-teacher relationship on a school-wide level, the authors suggested that school personnel should organize nonacademic extra-curricular activities. Examples might include activities like school-wide field days where both teachers and students participate. A second suggestion offered by the authors included having the students and teachers eat lunch together. A third example included having specific teachers act as advisors which could not only reduce the amount of time students were pulled from their classes, but would increase the

amount of time students spend with their teachers. Another possibility would be to encourage parents or other paraprofessionals to push in to the classrooms allowing for more small group instruction and individual time between teacher and student. A final thought proposed by the authors included having administrators model supportive relationships with their teaching staff. In other words, teachers who perceive that their administrators are genuinely interested and supportive may communicate these same caring behaviors to their students.

To improve the relationship at the classroom level, Hamre and Pianta (2006) offered many suggestions to improve classroom practices. Their first suggestion included having the teachers directly educate their students about social and emotional skills. The authors hypothesized that this would allow the students an opportunity to openly discuss their feelings. Situations like this can be considered an important foundation for not only fostering an open and positive student-teacher relationships but in developing a classroom climate that is perceived as supportive and caring. In addition, educational opportunities such as this can provide other important skills by increasing social conversations. First, it can improve a student's emotional vocabulary. Second, it may help some students begin to understand the correlation between their basic emotions and personal experiences. Finally, it may not only elicit educational opportunities, but it may provide these students with the confidence that they can manage their emotions.

The researchers have also argued that providing the teachers with direct instruction on strategies and techniques will help them develop more supportive relationships with all the children in their classrooms (Hamre & Pianta, 2006). A specific strategy offered by the authors included encouraging the teachers to engage in frequent

social conversations with their students. As an example, teachers can engage their students in conversations about their lives outside of school. Of importance, however, is that the teachers show genuine interest in their students' responses by listening intently, asking additional questions, and even remembering key information that can be asked again in a follow-up conversation. Providing teachers with explicit instruction on how to engage in skills such as reflective listening would improve the child's sense that his teacher cared about what he was communicating. Another important area of focus might be helping teachers understand that making themselves available for students who are experiencing difficulties (i.e., academic, family, etc.) will allow these students to feel that their needs are understood. Although teachers should not be expected to have the appropriate skills (i.e., training) to provide direct therapeutic counseling, they can offer an opportunity for a student to discuss his or her problems with an adult. A third, and significant, technique teachers can learn is the importance of demonstrating regard for a student's perspective and ideas. This is important because it is a skill that the teacher can implement during the academic day by actively facilitating opportunities for students to openly share their opinions and thoughts.

All of these skills are significant in that they allow for what Pianta and Hamre (2001) refer to as "Banking Time." Banking time is emotional collateral that is collected and deposited in the teacher's "bank." This collateral can be used (i.e., withdrawn) during stressful times or behavioral challenging times with specific students. The manner in which collateral is deposited is a technique developed by the authors where the teachers try to establish "positive" student-teacher moments whereby the teacher is the listener and the follower rather than the leader. In other words, the student is allowed to choose

the activity and the occurrence of the activity. While engaging in the activity the teacher's verbalizations are neutral and convey a sense of safety so that the student will feel comfortable enough to expand his or her explorations. If positive moments are established, these moments can be "banked" and saved for more difficult relationship moments. In addition to Pianta and Hamre's (2001) banking time technique from their Students, Teachers and Relationship Support (STARS) system, the authors also indicated that there are other interventions specifically designed to promote positive interactions (Hamre & Pianta, 2006).

Directions for Future Research

Although the current research found evidence that supported several important variables that directly (i.e., engagement) or indirectly (i.e., student-teacher relationship and peer relatedness) affected reading comprehension gains, there were several limitations that should be examined going forward. Future research that eliminates, or specifically examines, the limitations noted earlier will provide a more comprehensive understanding of the specific variables that impact reading comprehension. First, attention should be paid to ensuring that a larger number of students and teachers from a more ethnically diverse population be procured. In addition, it would be advantageous to require the teachers to participate so that the possibility of only having specific teachers, who may be more experienced, volunteer is removed. In other words, increasing the number of teachers in the study will likely allow for measurable differences on teacher behaviors measured by the CLASS (classroom organization, emotional support, and instructional support). Greater variability in teacher competence would likely be related to greater variability in teacher ratings of closeness, conflict, and engagement. In

addition, increasing the ethnicity and SES diversity in the population would also increase the range of students who have been exposed to a significant amount of language at an early age.

Second, examining the student's perception of the student-teacher relationship as well as peer relatedness will provide important perceptions from the students whose academic skills are being followed. Because there is a paucity of existing research that supports that students are valid and consistent reporters, developing measures, both qualitative and quantitative, that would allow for these variables to be examined would seem warranted. For example, not only should tools such as the Young Children's Appraisals of Teacher Support (Y-CATS reference) by Mantzicopoulos & Neuharth-Pritchett (2003) be further examined, but qualitative measures such as clinical interviews should be developed.

Third, with the exception of this study, current research examining academic gains has done so by studying performance over several academic years. As has been pointed out, this does not account for the relationship that the student develops with different teachers over the years. Therefore, examining academic gains over several years while measuring the student-teacher relationships developed over these same years would seem to be an appropriate direction to consider.

The current study measured specific variables that have been found to impact academic outcomes and used them to examine their specific impact on reading comprehension gains over a second grade student's academic year. As has been previously discussed, variables such as a positive student-teacher relationship and peer relatedness have been found to have a significant indirect effect on those gains. Acting as

the catalyst, or mechanism, by which the other variables indirectly affected reading comprehension gains was classroom engagement. Not surprisingly, classroom engagement was found to have a direct effect on reading comprehension gains. Future research that expands on these variables will help to inform practitioners and researchers of the most important variables in improving reading comprehension. This information can then be used educationally to train both teachers and administrators in order to develop the most productive classroom and school-wide practices.

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APPENDIX A

Teachers College, Columbia University

INFORMED CONSENT

DESCRIPTION OF THE RESEARCH: You are invited to participate in a research study that will examine specific variables that are known to impact reading comprehension growth. These factors include peer relatedness (i.e., peer acceptance), mastery orientation (i.e., self-motivation), classroom engagement (i.e., classroom participation), family variables (i.e., SES), classroom characteristics (i.e., classroom instruction), and characteristics of each teacher's relationship with their students. The information gathered from the research will be used to better inform and educate those professionals teaching reading comprehension in elementary schools. More specifically, it may be beneficial in helping us better understand the achievement gap and provide more informed interventions.

You will be asked to voluntarily participate in my research in exchange for a \$25 American Express gift certificate. Your participation would involve the following: 1) Filling out a 4 minute questionnaire on each of your students that examines your relationship with each student, each student's peer relatedness, and each student's classroom engagement (You will have 3 – 4 weeks to complete these rating scales on your own time. I will collect the rating scales once they have been completed.); 2) Allowing me to spend two hours on one pre-established morning completing a classroom observation using CLASS a research instrument developed for use in federal studies. ***PLEASE understand that your responses to the questionnaire will remain completely confidential and that my observations will be used only for research purposes. It will NOT be shared with any district staff (including administrators) or personnel. Therefore, the observations cannot be used as evaluative information.***

The research will be conducted by me, Jeffrey A. DeTeso, Ed.M., school psychologist at Greenwich High School (GHS) and Ph.D. Candidate at Teacher College, Columbia University. To review, the observation will be conducted in your classroom and the rating scales will be completed on your own time.

RISKS AND BENEFITS: One possible risk to the teachers is that they may worry that the principal investigator (a) may be judging them while observing in the classroom and (b) may discuss their performance with administrators or others within the district. Their concerns should be allayed for several reasons. First, the Primary Investigator (PI) does not work at any of the teachers' schools and therefore does not have any professional contact with any of the teachers' principals or colleagues. Second, after speaking with two elementary school administrators (who spoke directly with their second grade teachers) and three elementary school psychologists (who also spoke with their second grade teachers), the PI learned that a holding a preliminary meeting with all of the volunteering teachers where teacher questions and concerns can be discussed would help allay anxieties regarding confidentiality and information being leaked to evaluators. Third, this evaluator will also provide all volunteering teachers with a written summary of the findings. Finally, the PI will also provide any teacher with concerns with his High

School evaluator's name and number (Lorraine Termini, (203) 625-8090) to discuss his reputation or to express their concerns.

Possible benefits include scientifically research based strategies that will improve reading comprehension. These strategies, in turn, work in tandem with 2004 Revised IDEA as well as NCLB. In addition, said strategies may help improve the achievement gap in reading.

Although I encourage you to complete this questionnaire, you are free not to do so. You can discontinue your participation in this research at any time and your responses will be destroyed. If you agree to participate in this project, please sign the assent letter below, return it to me and keep a copy of the participant rights letter for your records. I will provide you with the questionnaire.

PAYMENTS: You will receive a \$25.00 American Express gift certificate as payment for your participation.

DATA STORAGE TO PROTECT CONFIDENTIALITY: Teachers' names will not be saved on any formal document – only a handwritten list until data in their school is collected. Each teacher will be assigned a code that indicates the school and their teacher number within the school. This is also part of the code for their students (school number, teacher number, student number). The classroom observations forms and the student ratings forms will all be coded for identification. Only the student forms will have names so the teacher knows which child is being rated. The PI will cut the name off the rating form, leaving only the code, as soon as the teacher completes rating everyone in his/her class. The teacher's will see that the PI is leaving the rating event with only coded forms. Similarly when the PI comes into the teacher's classroom to observe, the observational coding form only contains the teacher's code number, not his/her name. Like the data for students, the data from this form will be entered into the data file using the code number alone.

TIME INVOLVEMENT: Your direct participation (completing rating scale) will take approximately two (2) hours. You will also be observed in your classroom for two hours.

HOW WILL RESULTS BE USED: The results of the study will be used for my dissertation and perhaps educational purposes.

If you find anything in this Informed Consent upsetting, you can talk to me, or to my advisor at Teacher College, Columbia University. Her name is Marla Brassard, Ph.D., and can be reached at (212) 678-3368. I can be reached by e-mail at Jeff_Deteso@greenwich.k12.ct.us or by phone at (203) 625-8020.

Jeffrey A DeTeso, Ed.M
School Psychologist
Ph. D. Candidate
Primary Investigator

PARTICIPANT'S RIGHTS

Principal Investigator: Jeffrey DeTeso, Ed.M.

Research Title: Teacher / Student relationships as predictors of reading comprehension gains in 2nd grade.

- I have read and discussed the Research Description with the researcher. I have had the opportunity to ask questions about the purposes and procedures regarding this study.
- My participation in research is voluntary. I may refuse to participate or withdraw from participation at any time without jeopardy to future medical care, employment, student status or other entitlements.
- The researcher may withdraw me from the research at his/her professional discretion.
- If, during the course of the study, significant new information that has been developed becomes available which may relate to my willingness to continue to participate, the investigator will provide this information to me.
- Any information derived from the research project that personally identifies me will not be voluntarily released or disclosed without my separate consent, except as specifically required by law.
- If at any time I have any questions regarding the research or my participation, I can contact the investigator, who will answer my questions. The investigator's phone number is (203) 625-8020.
- If at any time I have comments, or concerns regarding the conduct of the research or questions about my rights as a research subject, I should contact the Teachers College, Columbia University Institutional Review Board /IRB. The phone number for the IRB is (212) 678-4105. Or, I can write to the IRB at Teachers College, Columbia University, 525 W. 120th Street, New York, NY, 10027, Box 151.
- I should receive a copy of the Research Description and this Participant's Rights document.
- If video and/or audio taping is part of this research, I () consent to be audio/video taped. I () do NOT consent to being video/audio taped. The written, video and/or audio taped materials will be viewed only by the principal investigator and members of the research team.
- Written, video and/or audio taped materials () may be viewed in an educational setting outside the research

() may NOT be viewed in an educational setting outside the research.
- My signature means that I agree to participate in this study.

Participant's signature: _____ Date: ____/____/____

Name: _____

APPENDIX B

Student Name: _____

M / F Special Ed: Y / N

Teacher Name: _____

Years Teaching: _____

1 = Definitely Does Not Apply
2 = Does Not Really Apply
3 = Neutral, Not sure
4 = Applies Somewhat
5 = Definitely Applies

Relationship:

- | | | | | | |
|---|---|---|---|---|---|
| 1) I share an affectionate, warm relationship with this child. | 1 | 2 | 3 | 4 | 5 |
| 2) The child and I always seem to be struggling with each other. | 1 | 2 | 3 | 4 | 5 |
| 3) If upset, this child will seek comfort with me. | 1 | 2 | 3 | 4 | 5 |
| 4) This child is uncomfortable with physical affection or touch with me. | 1 | 2 | 3 | 4 | 5 |
| 5) This child values his/her relationship with me. | 1 | 2 | 3 | 4 | 5 |
| 6) When I praise the child, he/she beams with pride. | 1 | 2 | 3 | 4 | 5 |
| 7) This child spontaneously shares information about himself/herself. | 1 | 2 | 3 | 4 | 5 |
| 8) This child easily becomes angry with me. | 1 | 2 | 3 | 4 | 5 |
| 9) This child tries to please me. | 1 | 2 | 3 | 4 | 5 |
| 10) It is easy to be in tune with what this child is feeling. | 1 | 2 | 3 | 4 | 5 |
| 11) This child feels that I treat him/her unfairly. | 1 | 2 | 3 | 4 | 5 |
| 12) This child sees me as a source of punishment and criticism. | 1 | 2 | 3 | 4 | 5 |
| 13) This child remains angry or is resistant after being disciplined. | 1 | 2 | 3 | 4 | 5 |
| 14) When this child is misbehaving, he/she responds well to my look or tone of voice. | 1 | 2 | 3 | 4 | 5 |
| 15) Dealing with this child drains my energy. | 1 | 2 | 3 | 4 | 5 |
| 16) I've noticed this child copying my behavior or ways of doing things. | 1 | 2 | 3 | 4 | 5 |
| 17) When this child is in a bad mood, I know we're in for a long and difficult day. | 1 | 2 | 3 | 4 | 5 |
| 18) This child's feelings towards me can be unpredictable or can change suddenly. | 1 | 2 | 3 | 4 | 5 |
| 19) Despite my best efforts, I'm uncomfortable with how this child and I get along. | 1 | 2 | 3 | 4 | 5 |
| 20) This child whines or cries when he/she wants something from me. | 1 | 2 | 3 | 4 | 5 |
| 21) This child is sneaky and manipulative with me. | 1 | 2 | 3 | 4 | 5 |
| 22) This child openly shares his/her feelings and experiences with me. | 1 | 2 | 3 | 4 | 5 |
| 23) My interactions with this child make me feel effective and confident. | 1 | 2 | 3 | 4 | 5 |

Peer Acceptance

- | | Not Very
True | Sort of
True | Pretty
True | Really
True |
|--|------------------|-----------------|----------------|----------------|
| 24) This child has friends to play with. | 1 | 2 | 3 | 4 |
| 25) Other children share with this child. | 1 | 2 | 3 | 4 |
| 26) This child has friends to play games with. | 1 | 2 | 3 | 4 |
| 27) This child has friends on the playground. | 1 | 2 | 3 | 4 |
| 28) This child gets asked to play by others. | 1 | 2 | 3 | 4 |
| 29) Other children sit next to this child. | 1 | 2 | 3 | 4 |

Engagement

- | | Never | Seldom | Sometimes | Often | Always |
|--|-------|--------|-----------|-------|--------|
| 30) This child speaks in class when called upon. | 1 | 2 | 3 | 4 | 5 |
| 31) This child asks questions about tests or projects. | 1 | 2 | 3 | 4 | 5 |
| 32) This child participates in class discussions. | 1 | 2 | 3 | 4 | 5 |
| 33) This child volunteers answers to questions. | 1 | 2 | 3 | 4 | 5 |
| 34) This child assumes leadership in group situations. | 1 | 2 | 3 | 4 | 5 |
| 35) This child volunteers to read aloud. | 1 | 2 | 3 | 4 | 5 |
| 36) This child initiates conversations appropriately. | 1 | 2 | 3 | 4 | 5 |
| 37) This child asks questions when confused. | 1 | 2 | 3 | 4 | 5 |

Appendix C

Pearson Correlations Using the Transformed and Untransformed Versions of Peer Acceptance and Student-Teacher Conflict with All Other Model Variables

Correlations

		PEER ACCEPTA NCE	REVERSE _SCORED _LOG_ TRANSFO RMED_ RE- REVERSE _SCORED _PEER ACCEPTA NCE	STUDENT- TEACHER RELATIONSHI P: CONFLICT	LOG TRANSFORM ED STUDENT- TEACHER RELATIONSHI P: CONFLICT
Fall DRP	Pearson Correlation	.131	.150	-.078	-.112
	Sig. (2-tailed)	.037	.017	.213	.074
	N	255	255	255	255
Gender	Pearson Correlation	.161	.144	-.166	-.169
	Sig. (2-tailed)	.010	.021	.008	.007
	N	255	255	255	255
WHITE	Pearson Correlation	-.078	-.055	.034	.020
	Sig. (2-tailed)	.213	.386	.588	.750
	N	255	255	255	255
ESL	Pearson Correlation	.005	.012	-.002	-.020
	Sig. (2-tailed)	.937	.845	.976	.749
	N	255	255	255	255
Sped	Pearson Correlation	-.243	-.233	.170	.184
	Sig. (2-tailed)	.000	.000	.007	.003
	N	255	255	255	255
FreeRed	Pearson Correlation	-.116	-.118	.175	.168
	Sig. (2-tailed)	.064	.060	.005	.007
	N	255	255	255	255
TEACHER COMPETENCE COMPOSITE	Pearson Correlation	.067	.064	.097	.129
	Sig. (2-tailed)	.284	.312	.124	.040
	N	255	255	255	255
STUDENT-TEACHER RELATIONSHIP: CLOSENESS	Pearson Correlation	.510	.504	-.382	-.389
	Sig. (2-tailed)	.000	.000	.000	.000
	N	255	255	255	255
ENGAGEMENT	Pearson Correlation	.491	.493	-.296	-.321
	Sig. (2-tailed)	.000	.000	.000	.000
	N	255	255	255	255
CHANGE IN READING FROM FALL TO SPRING	Pearson Correlation	.021	.006	-.044	-.034
	Sig. (2-tailed)	.733	.925	.488	.583
	N	255	255	255	255