CORRELATES OF CLOSENESS AND CONFLICT IN EARLY ELEMENTARY TEACHER-STUDENT RELATIONSHIPS

by

Mary M. Wolfson

B.S. Ed., Indiana University of Pennsylvania, 1997

Master's Equivalency, University of Pittsburgh, 2001

Submitted to the Graduate Faculty of

School of Education in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2009

UNIVERSITY OF PITTSBURGH

SCHOOL OF EDUCATION

This dissertation was presented

by

Mary M. Wolfson

It was defended on

April 8, 2009

and approved by

Sharon Ritchie, Senior Scientist, Frank Porter Graham Child Development Institute

Stephen Bagnato, Associate Professor of Pediatrics-Medicine, School of Education

Wendell McConnaha, Associate Professor/Clinical Associate Professor, School of Education

Dissertation Advisor: Joan I. Vondra, Associate Professor, School of Education

Correlates of Closeness and Conflict in Early Elementary Teacher-Student Relationships

Mary M. Wolfson, PhD

University of Pittsburgh, 2009

The purpose of this study was to evaluate the joint and collective contributions of student and teacher factors to observed variance in reports of conflict and closeness in first and second grade teacher-student relationships (STR). This study uses two data sets previously collected from elementary schools in the greater Pittsburgh area, to examine the association between child and teacher factors with the relationship qualities of closeness and conflict in early elementary teacher child relationships. Children from each sample were followed from 1st to 2nd grade (N=96 and N=44 respectively), and data were collected from parents and teachers, as well as through direct observation in each academic year. Parents reported on child externalizing behavior using the Child Behavior Checklist (CBCL) (Achenbach, 1981), and sociability using the Buss and Plomin Emotionality Activity Level and Sociabillity Inventory (EAS)(Buss & Plomin, 1984). Teachers reported on the quality of their relationship each participating student using the Student Teacher Relationship Survey (STRS) (Pianta, 2001). Additionally, observations were made of teacher classroom behavior using the Arnett Caregiver interaction scale. Child externalizing behavior and teacher sensitivity, detachment and punitiveness were tested for association with 1st and 2nd grade teacher reported conflict. Child sociability and teacher sensitivity, detachment and punitiveness were tested for association with 1st and 2nd grade teacher reported closeness. These factors were also used to predict change in teacher student

relationship quality between 1st and 2nd grades. Results showed student externalizing behavior to be positively associated with contemporaneous relationship conflict, and teacher detachment and punitiveness to be associated inversely with contemporaneous closeness. Teacher sensitivity and student externalizing behavior interacted when predicting change in relationship conflict. Teacher sensitivity and change in teacher sensitivity both predicted change in relationship closeness. These results both replicate and extend the body of existing research on teacher student relationship quality. The association of child externalizing behavior to relationship conflict was replicated, although the observed effect size was significantly different from pevious findings. The contribution of teacher classroom behavior to the prediction of unique variance in relationship closeness is unique to this study. Additionally, the prediction of change in relationship quality through student and teacher factors, as well as the joint contribution of each is an extension of existing research.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

Early childhood education covers the period of birth to 8 years of age, and includes children in early child care and education settings, as well as those in early elementary education settings (Bredenkamp & Copple 1997). Transitions of infants and toddlers into care, from early care into preschool services, and transitions into elementary school can be of crucial importance (Early, Pianta et al. 1999; Howes, Phillipsen et al. 2000, Pianta, Kraft-Sayre et al. 1999). Sound evidence of the importance of this transition has been provided by The *Abecedarian K-2 Transition Program*. Beginning in 1972, this early childhood intervention experiment randomly assigned at-risk children and their families to 1 of 4 conditions, including the birth-to-five early intervention condition with transition services, quality early childhood program condition without the early intervention, the early intervention condition without the transition services, and those who received none of the mentioned programs. The program had a positive effect on reading (an increase of 1.8 grade levels), and math achievement (an increase of 1.3 grade levels) and reduced grade retention (31% vs. 51%), as measured when students were in 5^{th} grade (Campbell & Ramey 1995). These effects were most pronounced, however, for those who had also been in the early intervention program with the transition services. Students who participated in the early intervention program with transition services obtained the highest standardized scores math and reading at 8 years of age, out of all of the experimental groups (1995).

Other longitudinal, non-experimental studies of transitions to elementary school indicate that students who experience *effective transitions* before school *and* into school, generally possess a positive attitude towards school and subsequently display a steady growth in academic skills (Hamre & Pianta 2001; Ramey & Ramey 1994). Conversely, students who experience *ineffective transitions*, characterized by insufficient familliarization of the student with the new environment and its participants, and/or lack of communication between the previous and current support systems of the child (i.e. the parents and caregivers, or caregivers and teaching staff), are more likely to struggle academically and socially in school (Alexander & Entwisle, 1988; Kagan & Cohen 1997; Ramey 2000). Transition practices to promote success in early elementary should emphasize the establishment of a caring positive relationship with the kindergarten teacher and should work to help the child to adjust socially to the classroom (Hamre & Pianta, 2001; Pianta & Cox 1999). The current research focuses on teacher-student relationship quality in early elementary education settings beyond kindergarten.

2.0 REVIEW OF THE LITERATURE

2.1 Early Childhood

The period of early childhood, birth to 8 years of age, has been identified as a critical window for development, "when children rapidly develop foundational capabilities on which subsequent development builds" (Shonkoff & Phillips, 2000). Of particular interest to this study is the period of 5 to 7 years, when children are transitioning from home to school. This transition typically represents a dramatic shift in the lives of children. According to the United States 2000 Census, 48% of children in America have not attended preschool before beginning kindergarten (US Census Bureau, 2000). Of those that have attended, it is unknown what proportion experienced part-time vs. full-time care. For a significant proportion of children entering kindergarten, their social world consisted of family, home environment, and to a lesser extent, neighborhood up to this point. Upon entering school, children's social world grows exponentially to include strange new adults (teachers, aides, the principal, and school nurse) and peers, all situated in a strange new context with its own unique rules and cultural norms. In this period of development children are establishing themselves in a system that will dominate their lives for a period of at least 12 years.

Just as infancy and toddlerhood are keys to language development (Chomsky, 1965), the period of 5 to 7 years is key to success in school. Indeed, Alexander and Entwisle (Alexander & Entwisle, 1988) observed in their now famous Beginning School Study increasing stability of school achievement patterns and decreasing correlates of school achievement over the first years of school .

2.2 Teacher-Student Relationships

Children's initial success in the context of school can shape their expectations of success or failure for themselves in this environment well into the future. Of particular importance is children's initial success in their relationships with teachers (Pianta & Nimetz, 1991). It is because of the importance of early relationships with teachers that the National Association for the Education of Young Children (NAEYC) identifies as one of its central goals, "helping children achieve their full potential in the context of relationships" (Bredenkamp & Copple, 1997). Children beginning school have relatively fluid views of themselves, and tend to see their worth in terms of other people's reactions to them (Dunn, 1996; Harter, 1996). As authority figures in the classroom context, teachers are important sources of information for children about themselves as students. Children who succeed in establishing positive relationships with their teachers tend to receive positive feedback through interactions with their teacher. They internalize this positive feedback into their views of themselves. Children who are unsuccessful in establishing positive relationships with their teachers, are more likely to either receive limited or negative feedback through interactions with their teacher. They, in turn, internalize this negative feedback into their views of themselves (Pianta, Kraft-Sayre et al. 1999).

Not only do children's early relationships with their teacher inform their views and expectations of themselves, they also shape their expectations of interactions with similar others (Howes, 1999). This collective set of expectations is generally referred to as an "internal working model" of attachment. "According to attachment theory, the child forms internal representations of self and of relationships with others, based on repeated experiences of interaction with an attachment figure" (Howes, 1999, p.681). While the term "attachment figure" is traditionally reserved for parents, teachers in the earliest grades of school are increasingly included in discussion and research of attachment (Howes, 1999; Howes & Ritchie, 2002; Kesner, 2000; Lynch & Cicchetti, 1992; Pianta, 1999).

However, a distinction is made between parents and teachers as attachment figures. Parents are referred to as primary attachment figures, given the primacy and salience of their relationships with their children. Teachers are referred to as secondary attachment figures, given that both their relationships with students form subsequent to those that children form with parents and their interpersonal significance for the child is less. However, they are deemed attachment figures given the extensive contact that young children have with teachers upon entering school, and the role that the teacher has in the young child's life as a provider of physical care and oversight in the school environment (Van Izjerdoorn, Sagi et al. 1992). In the home environment, relationships with parents are children's primary source of information for their internal working models of attachment. Upon entering school, teachers become a secondary source of information for the formation of children's internal working models of relationships or a primary source of information for the formation of internal working models of relationships with teachers (Howes, 1999).

Over time, as children accrue information to incorporate into their internal working models from multiple relationships, certain expectations are either affirmed or negated. Although little is understood about how many working models exist, whether they are integrated, or how changes are made to them, it is conceivable that secondary attachment relationships discordant with previous attachment relationships have the potential to introduce change to children's single internal working model or to add a new model that may or may not interface with the original one (Howes, 1999; Lynch & Cicchetti, 1992). In light of this, and given the belief that children's internal working models become more fixed or increasingly difficult to change across development, children's relationships with teachers in the first years of school would appear to be of importance (Greenberg, Speltz et al. 1993; Mayseles, 2005).

2.3 Measuring Teacher Student Relationship Quality

About 15 years ago, Pianta and Steinberg (Pianta & Steinberg, 1992) identified a dearth of research on early teacher-student relationships as forms of attachment relationships, and a lack of theory regarding the process by which children's relationship models transition from the home to the school context. In response to this shortage, Robert Pianta developed and piloted a unique measure of the teacher-student relationship from an attachment perspective (Pianta 2001; Pianta & Nimetz, 1991). This measure was intended as a tool for data collection on features of teachers' relationships with their students that parallel attachment relationships: the degree of closeness, conflict and dependence. In contrast to some describing teacher-student relationships in terms of attachment (Howes& Ritchie, 2002), this measure was unique in its ability to pare the teacher-student relationship down to three quantifiable qualities.

"Closeness" reflects the degree to which the teacher perceives his or her relationship with a given student as characterized by warmth, affection, and open communication, as well as the degree to which s/he feels that the student uses the teacher as a resource within the classroom. "Conflict" reflects the degree to which the teacher perceives a given relationship with a student as characterized by negativity and strife. "Dependence" is the degree to which the teacher perceives the student as overly reliant on teacher assistance, as well as the degree to which the student responds negatively to separation from the teacher.

While each dimension is not intended to map onto any one particular style of attachment, the amount of closeness, conflict, and/or dependence in a given teacher-student relationship is intended to characterize the degree of child security in the relationship. Closeness reflects greater security, and conflict and dependence reflect lower security. With this measure it became possible to study correlates of teacher-student relationship security, whether associated with the child, the classroom, or the school. Subsequently, multiple positive academic and social outcomes, including academic achievement, effective interactions with peers, and positive work habits, all came to be associated with relationship security and are referred to collectively as indicators of "school adjustment."

2.4 Relationship Quality and Children's School Functioning

Intuitively, it was expected that relational positivity, or closeness, would correspond with positive school adjustment. Beginning in toddlerhood, a 5-year longitudinal study conducted by Howes and Matheson (1992), as part of the *Cost, Quality, and Outcomes Study*, found that children's second grade social competence with peers could be predicted by the concurrent

quality of their relationship with their teacher at 4 years of age (n=307, $R^2\Delta$=.14), as well as the quality of their relationship with their teacher in second grade (n=307, $R^2\Delta$=.37).
This study utilized the overall relationship score (closeness-conflict-dependence) obtained from the STRS, as opposed to the closeness score, to represent positivity.

Further, building on the idea of discordant attachment relationships, it was theorized that positive relationships with teachers could act in a compensatory manner for children at risk for poor adjustment in school (Baker, Sycarah et al. 2008; Garner & Bajiyyaah, 2008; Howes & Matheson, 1992; Meehan, Hughes et al. 2003; Pianta & Steinberg, 1992). Beginning in kindergarten, a two-year longitudinal study conducted by Pianta & Steinberg (1992) found that children who were predicted to be retained (on the basis of referral for retention of special education services) but were promoted differed from those who were not promoted on teacher-rated closeness of the teacher-student relationship (N=436, t=2.50, *p*=.012). Teacher-student relationships among the promoted students were characterized by more closeness.
Similarly, in a longitudinal study of students in 2nd and 3rd grade, Meehan and colleagues (2003), found that among aggressive children, teacher rated positivity in third-grade teacher-student relationships was associated with lower levels of concurrent aggression, rated by the same teacher ($F\Delta$ (2,134)=23.11, *p*=.00). In a cross-sectional study of students in Kindergarten to 5th grade, Baker and colleagues (2008) found that, among children who demonstrated externalizing behavior, a close relationship with their teacher was associated with better achievement in reading (N=423, $R^2\Delta$=.02).

Based on these findings collectively, we can conclude that positivity in the teacher-student relationship as early as toddlerhood is associated with social competence with peers, reduced risk of academic failure, reduced aggression, and higher academic achievement,

specifically in reading. Collectively, they support the idea that teacher-student relationships characterized by closeness, warmth, and supportiveness may protect students at risk for academic problems on the basis of their referral for special education services and/or their externalizing behavior. Rather than predicting better functioning equally in all students, results reviewed here suggest that relationship closeness is best considered in the context of other child characteristics.

Relational negativity, in contrast, should correspond with poorer adjustment. In some of the same studies mentioned above, it was expected that negativity, or conflict, in the teacher student relationship would be associated with negative school adjustment outcomes (Baker, Sycarah et al. 2008; Hamre & Pianta, 2001; Pianta & Steinberg, 1992). In their longitudinal study of children in Kindergarten and 1st grade, Pianta and Steinberg (1992), reported that the comparison of children who were and were not promoted after being predicted to be retained showed that retained students also experienced more conflict in their relationships with their teachers (N=436, t=2.11, *p*=.035).

In Hamre and Pianta's (2001) longitudinal study of students from Kindergarten through 8th grade, the researchers reported that relational negativity in Kindergarten continued to predict unique variance in standardized tests of achievement through fifth grade, above and beyond child gender, ethnicity, verbal IQ, and problematic behavior (N=179, Lower Elementary $R^2\Delta = .03$, β=-.20; Upper Elementary $R^2\Delta = .30$, β=-.05). Baker and colleagues conducted a cross-sectional study of students from Kindergarten to 5th grade (1992). These authors reported that children with internalizing behavior problems and conflicted relationships with their teachers had poorer work habits ($R^2\Delta$=.02) and poorer class adjustment ($R^2\Delta$=.02) than did similar students with less conflict in their teacher-student relationship.

From these findings, we can conclude that relational negativity in the teacher-student relationship as early as Kindergarten co-varies with lower achievement as far into the future as fifth grade, poorer work habits and classroom adjustment, and higher likelihood of grade retention. In one instance (Baker, Sycarah et al. 2008) teacher-student relationships characterized by negativity and conflict were particularly problematic for students at risk for school problems, as evidenced by a significant interaction effect of internalizing behavior with conflict in the teacher-student relationship.

2.5 Origins of Teacher-Student Relationship Quality

Although it is evident that the teacher-student relationship dimensions of closeness and conflict are predictive of an assortment of "outcomes" in students, much less is known about student and teacher characteristics that may *contribute* to closeness and conflict. Student characteristics of externalizing behavior and sociability have been associated with conflict and closeness in teacher student relationships, respectively. Externalizing behavior demonstrates the most direct association with relationship quality. Specifically, as much as 53% of the variance in teacher reports of conflict in relationships with preschoolers can be attributed to externalizing behavior (Hamre, Pianta et al. 2008). In their cross-sectional study of 3rd, 4th, and 5th graders, Murray and Murray observed that externalizing behavior was positively correlated with conflict (N=99, r=.62, 38% variance). In a Swedish longitudinal study of teacher-student relationship quality with children in 1st to 3rd grade, Henricsson and Rydell (2004) observed that children with acting-out behavior problems had more conflict in their relationships with their teachers than peers with normal behavior (N=95, r= .72, 53% variance). There is clearly evidence for a strong and direct connection between the student externalizing behavior and conflict in teacher-student

relationships as early as preschool, and well into elementary school. Although many of these same studies documented a negative association of externalizing behavior with closeness in the teacher-student relationship, very few studies have identified student characteristics positively associated with closeness, with the possible exception of child gender. Girls consistently tend to have closer teacher-student relationships than boys. Besides gender, only student sociability, the tendency to prefer being with others versus being alone, has been positively associated, in one investigation, with closeness in teacher-student relationships. In a longitudinal study of children from kindergarten to 1st grade, Birch and Ladd (1998) observed a concurrent, positive correlation between sociability and closeness in both kindergarten and first grades (N=199, r=.65 and .35, respectively). This finding has not yet been replicated.

What is known about teacher characteristics associated with conflict and/or closeness is even more limited. Although within-subject classroom effects as modeled through hierarchical linear models have been observed to outweigh relationship factors of both closeness and conflict in predicting school adjustment (N=423, R^2=.23 - .42), rarely have teacher characteristics successfully been related to teacher-student relationship quality (Baker, Sycarah et al. 2008). In one exception to this pattern, Hamre and her colleagues (2008) reported inverse associations between conflict and teacher characteristics, including years of experience, level of education, child-centered views, efficacy beliefs, and a direct association with self-rated depressive symptoms. They found that, collectively, these teacher characteristics predicted relationship conflict as reported by teachers, even after controlling for problematic child behavior. They did not, however, prove informative about relationship closeness.

Teacher sensitivity to student needs has been discussed as a possible teacher characteristic that could promote closeness in teacher-student relationships. Teacher sensitivity has been associated with quality of care in early childhood settings (Howes, 1987), and is delimited as a component of Developmentally Appropriate Practices in early child care and education (Bredenkamp & Copple, 1997).

As a measure of the relationship between teachers and students, the STRS and its subscale scores should be associated with characteristics of both teacher and student. Pianta himself described interpersonal relationships as 'dyadic systems,' and emphasized the importance of examining individual characteristics of both teachers and students linked to relationship quality (1999). However, in the last decade only one student factor has successfully been associated with teacher-student relationship conflict, and neither student nor teacher characteristics have been consistently positively associated with teacher-student relationship closeness. Yet, variance in teacher reports of closeness does indeed appear representative of different teacher-student relationships. In their longitudinal study of relationship quality from 1st through 3rd grades, Hughes and colleagues (1999) observed relatively low correlations between 1st and 2nd grade teachers' ratings of relational closeness (N=116, r=.28), as well as between those of 2nd and 3rd grade teachers' (N=116, r=.24). They concluded that, "the finding that different teachers represent different levels of positivity in their relationships with the same children, underscores the dyadic nature of teacher-student relationships" (p.81).
Similar findings have been reported in several other studies of relationship closeness over time, as summarized in Table 1. The pattern of low stability in teacher ratings of closeness is clear, and observable from pre-kindergarten through 2nd grade. Generally, the longer the period of time between ratings, the lower the correlation.

Contrary to longitudinal data on teacher-student closeness, reports of teacher student relationship conflict are considerably more stable, as depicted in Table 2. In their study of teacher-student relationship quality from Kindergarten to 1st grade, Birch and Ladd (1998) observed relatively high consistency in teacher reports of conflict from one year to the next (N=199, r=.50). They concluded that, "the issue of stability is important to consider because it implies an enduring characteristic or personality trait that resides in the child" (p.942).

Table 1: Correlations Between Teacher-rated Closeness

Study	**N**	**Grades**	**r**
Birch & Ladd, 1998	199	Kindergarten to 1st	.38
Howes, Phillipsen et al., 2000	357	Within Pre-Kindergarten	.40
		Pre-Kindergarten to Kindergarten	.29
Pianta, Steinberg et al., 1995	436	Kindergarten to 2nd	.03
Pianta & Stuhlman, 2004	490	Pre-Kindergarten to Kindergarten	.21
		Kindergarten to 1st	.31
		Average r=	.27

Table 2. Correlations Between Teacher-rated Conflict

Study	N	Grades	r
Howes, Phillipsen et al., 2000	357	Within Pre-Kindergarten	.61
		Pre-Kindergarten to Kindergarten	.47
Pianta, Steinberg et al., 1995	436	Kindergarten to 2nd	.40
Pianta & Stuhlman, 2004	490	Pre-Kindergarten to Kindergarten	.32
		Kindergarten to 1st	.40
		Average r=	.35

Taken together, the evidence of moderate stability in reports of teacher-rated relationship conflict from one teacher to the next, and the stronger association between reports of conflict and student externalizing behavior, suggest that "relationship" conflict as it is assessed by the STRS primarily captures student disruptive behavior, a characteristic of the child. If this is the case, the value of conceptualizing disruptive child behavior in relationship terms can be called into question. In contrast, the observed pattern of instability in teacher-student closeness over time, and the failure of both student and teacher characteristics to contribute directly to observed variance in closeness, suggests that "relationship" closeness as measured by the STRS may truly be a relationship construct. If this is the case, only factors that capture the interaction, or 'goodness of fit,' between teacher and student characteristics should predict closeness.

Thomas and Chess (1977, p.3) coined the term 'goodness of fit', and used it to describe the condition, "when the environment and its expectations and demands are in accord with the organism's own capacities, predicting adaptive functioning."

Similarly, in describing the person x environment model, Ladd (1996, p. 365) stated that, "the origins of early school adjustment lie both in the child and in his or her interpersonal environment." When used to predict school adjustment or other correlates of teacher student relationships, both of these models stipulate that individual (student) characteristics and demands of the environment interact. Therefore, interpretation of the contribution of either student characteristics or demands of the environment alone should be avoided, as "predicting of outcome is possible only from information about temperament and environment, independent of main effects of environment" (Chess & Thomas, 1977).

Examples of "goodness of fit" research relevant to this investigation are reviewed here. Although the first two examples do not directly address teacher-student relationship quality, they depict statistically significant interaction effects between teacher and student characteristics in the prediction of student functioning. In a cross-sectional study of 4th graders (N=193), Lerner and Lerner (1983) found that computed fit scores between self-reported teacher expectations of students and student self-reports of classroom behaviors predicted student outcomes, and teacher rated ability, as well as standardized achievement test scores. These fit scores were derived from teacher and student responses to a similarly worded questionnaire on teacher expectations of student classroom behavior, and students' self-rating of their own classroom behavior (e.g. "I expect my students to remain in their seats at all times" and "I always remain in my seat"). To the extent that students met or exceeded teachers' expectations, there was 'goodness of fit' between the environment and the individual. Based on the presence of this interaction effect the researchers concluded that, "we believe an appropriate inference from our research is that, at a given point in development, neither children's attributes per se nor the demands of their settings are the key predictors of their adaptive functioning" (Lerner & Lerner, 1983, p. 127).

More recently, in a study of 97 socially bold or wary children, Rimm-Kaufman and her colleagues found that teacher sensitivity interacted statistically with child socially bold behavior, such that when more sensitive teachers were paired with bold children, the latter showed disproportionately more self-reliance, less negative behavior and less off-task behavior (Rimm-Kaufman, Early et al. 2002).

Surprisingly, there is only one published investigation taking a "goodness of fit" approach to teacher-student relationship quality as assessed on the STRS. Saft and Pianta (2001) reported that in a cross-sectional study of 840 pre-kindergarten and kindergarten children, teacher-student closeness was predicted by an interaction of teacher and student ethnicity ($R^2\Delta$=.032). Ethnic match accounted for differences in relationship closeness above and beyond individual qualities, including child age, ethnicity, and gender and teacher ethnicity. This limited evidence provides support for using the statistical interaction of teacher and student characteristics to predict unique variance in teacher-student relationship closeness. However, no research tests the interaction of child temperament characteristics, such as sociability, and teacher characteristics known to influence early childhood educational environments, such as sensitivity. The current research is designed to address this question.

3.0 JUSTIFICATION FOR THE STUDY

3.1 Purpose

The purpose of this study was to evaluate the joint and collective contributions of student and teacher factors to observed variance in reports of conflict and closeness in first and second grade teacher-student relationships (STR). Past STR research has focused predominantly on predicting child outcomes based on relationship qualities (Garner & Bajiyyaah, 2008; Hamre & Pianta, 2001; Hughes et al., 1999; Pianta et al., 1995; Pianta & Stuhlman, 2004). In contrast, the current research investigates patterns of association between characteristics of the student and the teacher on the one hand, and teacher reports of closeness and conflict on the other.

In the past, the limited amount of research investigating teacher factors related to STR quality focused on teacher demographic characteristics (relative to their students) as the key variables of interest (Kesner, 2000; Saft & Pianta, 2001). Only a handful of studies have examined teacher behavior in the classroom and its association with STR quality (Hamre et al., 2008, Henrisccon & Rydell, 2004). The proposed investigation extends the current body of knowledge regarding the links between teacher classroom behavior and STR quality, with an emphasis on three behavioral factors known to be of importance to early childhood education: teacher sensitivity, punitiveness, and detachment.

First, this study assesses contemporaneous main and interaction effects of first grade student and teacher behaviors on conflict in their relationship. Student factors consist of externalizing behavior problems, and sociability. Teacher factors consist of teacher classroom behaviors characterized by sensitivity, versus detachment and punitiveness.

Additionally, specific interaction terms of teacher and student factors will be incorporated into the analysis of both relationship conflict and closeness. If the latter truly are reflective of the relationship between teacher and student, and not just indices child characteristics that most teachers find appealing or annoying in the classroom, then significant interaction effects between the relevant teacher and student factors should emerge as correlates of relationship conflict and closeness.

Finally, this study tests the ability of STR quality in first grade to predict relationship quality in second grade. Importantly, these final analyses will consider both direct effects of first grade STR quality and effects that are qualified by second grade child factors, second grade teacher factors, or both.

3.2 Research Questions and Hypotheses

1. Do contemporaneous student and teacher factors each contribute unique variance to 1st grade teacher reports of conflict in the STR (n=70)? Do contemporaneous student and teacher factors each contribute unique variance to 2nd grade teacher reports of conflict in the STR (n=51)? Do interaction effects contribute to each model?

It is hypothesized that only student factors will directly contribute to the variance in contemporaneous teacher reports of conflict. Specifically, contemporaneous student externalizing behavior and gender are both expected to contribute significantly to STR conflict.

Contemporaneous teacher factors, specifically sensitivity, punitiveness, and detachment, are not expected to make direct contributions, and interaction effects between student and teacher factors are not expected to contribute to variance in STR conflict.

The following specific interaction terms will be tested:

Student externalizing behavior x teacher sensitivity

Student externalizing behavior x teacher detachment

Student externalizing behavior x teacher punitiveness

Student gender x teacher punitiveness

2. Are interaction effects of student and teacher factors better contemporaneous predictors of variance than main effects in 1st grade teacher reports of closeness in the STR (n=70)? Are interaction effects of student and teacher factors better contemporaneous predictors of variance than main effects in 2nd grade teacher reports of closeness in the STR (n=51)?

It is hypothesized that interaction effects of teacher and student factors will contribute to the variance in contemporaneous teacher reports of closeness. Neither student factors (sociability and gender), nor teacher factors (sensitivity, detachment, punitiveness) are expected to contribute directly to the contemporaneous prediction of STR closeness. Additionally, two interaction terms reflecting student gender in conjunction with (1) teacher sensitivity and (2) teacher detachment will be tested to explore the possibility of gender differences. However, due to a limited n these analyses will only be considered exploratory.

The following specific interaction terms will be tested:

Student sociability x teacher sensitivity

Student sociability x teacher detachment

Student sociability x teacher punitiveness

Student gender x teacher sensitivity

Student gender x teacher detachment

3. Do teacher reports of conflict in 1st grade, and 2nd grade externalizing behavior alone contribute unique variance to predicting 2nd grade teacher reports of conflict in the STR (n=44)?

It is hypothesized that both 1st grade teacher reports of conflict and 2nd grade student externalizing behavior will be significant predictors of the variance in 2nd grade teacher reports of conflict. It is unclear whether 1st grade STR conflict will provide any unique variance to the prediction of 2nd grade STR conflict. Any student x teacher interaction effects found to predict 1st grade STR conflict will also be tested with 2nd grade data. However, they are not expected to add any predictive value to the 2nd grade model.

4. Do interaction effects of teacher and student factors found to be significant in accounting for 1st grade teacher reports of closeness, also work in predicting 2nd grade closeness(n=44)?

It is hypothesized that teacher reported closeness in 1st grade will not predict teacher reported closeness in 2nd grade. However, interaction effects found to be significant for 1st grade STR closeness are expected to be replicated using 2nd grade data and controlling for 1st grade closeness.

4.0 METHODS

4.1 Study Design

The current study uses two previously collected data sets. All data were collected from elementary schools in the greater Pittsburgh area. Each study employed a short-term, longitudinal design, utilizing observation and survey methods of data collection. The first data set was collected in both public and parochial schools between August 1995 and May 1997, and the second data set was collected in parochial schools between August 2004 and May 2006. In each study, parents and teachers of participating children were surveyed over the course of two academic years, when participating children were in the first and second grades. Each year measures of child sociability, and child problematic behavior were collected from parents, and measures of perceived student-teacher relationship quality were collected from teachers. Additionally, teacher classroom behavior was observed and rated by 2 trained, independent observers each year.

4.2 Sample

The first sample was drawn from a low-income sample recruited from offices of the Women Infant and Children (WIC) Supplemental Nutrition Program (original N=233). Eligibility to participate in the WIC program is based on low-income status, annual gross salary less than $22, 385 for a family of four, or $14, 837 for a single mother and child in 1989, the first year of sample recruitment.

However, only a sub-sample of 61 cases could be used in the present study based on the availability of relevant school and home data. Attrition analyses indicate that the sub-sample utilized in the current study did not differ from the larger sample on the earlier collected variables of demographic risk, maternal IQ, child IQ, child sociability, internalizing behavior problems, and externalizing behavior problems. Table 1 reports the means and standard deviations of the sub-sample and the larger group on each variable. None of the children shared the same teacher/classroom. Children in this sub-sample (sub-sample 1) predominantly attended public schools - 53%. Forty-five percent of the children are ethnic minorities (almost exclusively African American), and 55% are male.

The second sample consisted of children of working class parents from three catholic schools in Southwestern Pennsylvania in the Diocese of Pittsburgh (original N=50). The average proportion of students eligible for free or reduced lunch across these schools was 30%. Eligibility for the National School Lunch Free/Reduced Lunch Program is also based on low-income status, defined as an annual gross salary less than $37,000 for a family of four, or $18,130 for a single mother and child in 2004, the first year of sample recruitment. Complete data were collected on 35 (70%) children from four 1st grade classrooms in the first year of the study, and that number decreased to 29 (53%) from four 2nd grade classrooms in the second year of the study. Three percent of the children are ethnic minorities, and 37% are male.

Table 3: Attrition Analysis

	Full Sample	Sub-Sample
N	140	61
Demographic Risk	1.65 (1.23)	1.43 (1.29)
Maternal IQ	83.30 (13.26)	86.09 (11.02)
Child IQ (z score)	-.16 (.95)	-.25 (.87)
Sociability	20.79 (2.59)	20.48 (2.08)
Internalizing	48.18 (8.67)	47.28 (8.98)
Externalizing	51.21 (9.04)	48.22 (9.09)

4.3 Procedures

When the target children attended 1st and 2nd grades, participating teachers were asked to rate the quality of their relationship with that student. Parents were asked to rate their child that same year on problematic behavior . In the first sample, caregivers identified by the mother at each contact (child ages 3 ½, 5, 7 and/or 8 depending on the age of the child in 2nd grade) as having "an especially close relationship" to the child were also contacted and, when willing, asked to complete a small number of questionnaires on the child. "Alternative caregivers" ranged from the biological father or a father figure to grandparents, from maternal friends to sitters or daycare teachers. In some cases the same alternative caregiver was contacted more than once. In other cases, mothers identified a new "close relationship" at each contact. Alternative caregivers completed a measure on the shyness/sociability of the target child. In the second sample, parents themselves were asked to complete this measure when their child was in 1st or 2nd grade. Finally, classroom observations of teacher behavior were made in 1st and/or 2nd grade by trained observers.

4.4 Measures

Student-Teacher Relationship Quality

Teacher perceptions of their relationship with individual students were measured using the Student-Teacher Relationship Scale (STRS) (Pianta, 2001). This 28-item instrument was designed to assess the teacher's: (1) feelings about the child, (2) beliefs about the child's feelings toward him or her, and (3) observations of the child's behavior in relation to him or her (Pianta and Nimetz 1991).

The likert response scale allows teachers to choose from 5 responses, from 1-'Definitely does not apply' to 5- 'Definitely Applies.' Items were developed on the basis of attachment theory, as it describes secure, avoidant, and resistant patterns of attachment behavior. The STRS yields three sub-scale scores: Closeness, Conflict, and Dependency. Although teachers completed the entire measure, only Closeness and Conflict scores are utilized in the current study. These are the two longest and most frequently studied sub-scales in the literature on teacher-student relationships. Results with the Dependency sub-scale have been either absent or contradictory across studies (Baker, Sycarah et al. 2008; Birch & Ladd, 1998; Pianta & Steinberg, 1992; Hamre & Pianta, 2001; Howes, Phillipsen et al. 2000; Murray & Murray, 2004;)

In a factor analysis reported by Pianta (2001), Closeness accounted for 12.9% of the total variance in STRS scores. Closeness scores represent the degree of warmth in the teacher-student relationship, and also the extent to which the teacher believes that the student is comfortable relying on the teacher for needed help or support, with raw values ranging from 12 to 60. Closeness is assessed through items such as, "This child openly shares with me," and "It is easy to be in tune with this child." Conflict accounted for 29.8% of the variance in total variance in STRS scores. Conflict scores represent the level of discord in the teacher-student relationship and the teacher's sense of efficacy based on his or her inability to effectively impact the behavior of that child in the classroom. Conflict is assessed through items such as, "This child and I always seem to be struggling with each other," and "When this child is in a bad mood I know we're in for a long and difficult day." The STRS is intended for use with students in preschool through third grade, and has been widely used in both large and small scale studies of student-teacher relationships (Hamre & Pianta, 2001; Howes, Phillipsen et al. 2000).

The measure has been found to have an internal consistency reliability of 0.85. (Pianta & Nimetz, 1991). Concurrent validity of STRS scores has been established with children's social, behavioral, and academic competencies as rated by the same or other teachers (Birch & Ladd, 1998; Pianta, Steinberg et al. 1995).

Child Shyness and Sociability

Alternative caregivers (Sample 1) or parents (Sample 2) completed the Shyness and Sociability Sub-Scale (10 items) of the *Emotionality, Activity Level, and Sociability Inventory* (Buss and Plomin 1984) to describe the child's level of each. The measure was developed to study temperament in infants and young children, and is appropriate to use for children as young as 1 year old up through adolescence. Examples of sociability descriptors are, "S/he likes to be with people" and "When s/he is with other children, s/he seems to be having a good time". Examples of shyness descriptors are, "S/he tends to be shy" and "s/he takes a long time to warm up to strangers." The likert response scale options range from 1 (not like), to 5 (a lot like). Test-retest reliability has been reported to be 0.75, and internal consistency .83 (Buss & Plomin, 1984). More recently, another pair of researchers analyzed the factor structure of the measure and reported internal consistency to be .74, and test-retest reliability .67 (Boer and Westernberg 1994).

Child Problematic Behavior

Children's behavior problems were rated by the parent, using the *Child Behavior Checklist* (CBCL; Achenbach 1981). The widely used and well validated, 118-item checklist of problematic behavior was designed to provide data in a standardized format that would be useful to practitioners as well as researchers. Items were developed through the use of over 1,000 child psychiatric case histories

and a review of the literature. The measure consists of 118 items which load on 15 “narrow band” clinical factors and 2 “broad band” factors. Because acting out and disruptive behavior problems place children at greater risk for school problems, are more reliably assed, and are the more studied, only the broad-band “Externalizing Behavior” factor is used in the current study (Baker, Sycarah et al. 2008; Hamre, Pianta et al. 2008; Murray & Murray, 2004). The author reported Intra-class correlations above .90 for inter-parent agreement (.985), test-retest reliability at one week (.952), and inter-interviewer reliability (.959). Internal consistency of the measure is above .89.

Teacher Classroom Behaviors

Independantly trained observers rated teacher classroom behaviors after at least 45 minutes of classroom observation using the *Caregiver Interaction Scale* (Arnett 1989). The 26-item global rating system was developed for use in early child care and education settings. It is "designed to produce information related to various socialization practices" (p.547) in the classroom regarding teachers' social and supportive behaviors. Teachers with more education and, in particular, more training in the area of early childhood education score higher on this observational measure (Arnett, 1989). A factor analysis reported by the author produced a four-factor solution, composed of warmth, punitiveness, permissiveness, and detachment. The internal consistency of the warmth, punitiveness and detachment scales was examined. Items observed to intercorrelate poorly with the other items on each scale were omitted, and some were reclassified based on intercorrelation with items on another scale. The resulting re-structured scales had an internal consistency of .85 to .95. For the purposes of the current research sensitivity, punitiveness, and detachment scores were used. Sensitivity scores reflect positive interaction between teacher and students, enthusiasm, and developmental appropriateness. Punitiveness scores reflect hostile interaction between teacher and

students, threatening behavior on the part of the teacher, and harsh criticism. Detachment scores reflect the extent to which the teacher is uninvolved or appears uninterested in children. Scores on the scale show convergent validity with other measures of the classroom environment (Howes et al., 2000) and correlate with observed level of teacher/ caregiver involvement with children, children's social competence (Howes, Phillips, & Whitebook, 1992) and child-caregiver attachment security (Howes & Hamilton, 1992). Inter-rater agreement between raters responses to practice tapes was computed to be above .75.

5.0 RESULTS

Results for the current study are presented in five parts. Part I presents descriptive analyses. First, each sub-sample and the overall sample are described demographically (i.e. race, gender, and school type). Second, means and standard deviations on each variable of interest are reported by sub-sample and compared by t-test. Part II presents inter-correlations of study variables and addresses the co-linearity of key variables. Part III summarizes tests of the first and second hypotheses, predicting variance in contemporaneous conflict and closeness in first and second grades. A series of hierarchical multiple regression analyses were conducted for each relationship quality, grade, and teacher characteristic. Part IV summarizes tests of the third and fourth hypotheses, predicting change in closeness and conflict from first to second grade, using hierarchical multiple regression methodology. Part V addresses the same longitudinal hypotheses, this time using a linear, mixed model methodology.

5.1 Descriptive Analyses

Descriptive analyses were conducted on the demographic qualities of each sub-sample and the overall sample. Frequencies are reported in Table 3 on race, gender, and school type. Sub-sample 1 was a mixed Caucasian (39%) and African American (54%) sample, drawn predominantly from public schools (87%) with slightly more males than females (54%).

Sub-sample 2 was predominantly a Caucasian sample (97%), drawn entirely from catholic schools with slightly more females than males (63%). Overall, the sample was mixed Caucasian (70%) and African American (25%), with nearly equal representation from public (55%) and catholic (45%) schools, as well as each gender (49% male, 51% female). Sub-sample 1 contributed 64% of the cases in the overall sample, while sub-sample 2 contributed 36% of the cases.

Table 4. Sample Background: Demographic Frequencies

	Sub-Sample 1	Sub-Sample 2	Overall
N (%)	61 (.64)	35 (.36)	96
Race			
African American	24 (.39)	0	24 (.25)
Caucasian	33 (.54)	34 (.97)	67 (.70)
Other	4 (.06)	1 (.03)	5 (.05)
Gender			
Male	34 (.56)	13 (.37)	47 (.49)
Female	27 (.44)	22 (.63)	49 (.51)
School Type			
Public	53 (.87)	0	53 (.55)
Catholic	8 (.13)	35 (1.0)	43 (.45)

Due to the observed demographic differences between each of the sub-samples, they were compared for mean differences on each of the variables of interest in the current study. The sample means and standard deviations of each of the variables at each grade level are reported in

Table 5. Results from the t-tests are reported in the same table. Significant differences between the sub-samples emerged on relationship closeness and child externalizing behavior in both 1st and 2nd grade, and relationship conflict and child internalizing behavior in 1st grade only. Differences are summarized below. In order to control for these observed differences, sample was used as a covariate in all subsequent analyses.

Teachers in the parochial school sample reported relationships that were closer than those in Sub-sample 1 in both 1st, $t = -2.72$, $p \leq .001$, and 2nd grades, $t = -2.04$, $p \leq .05$. However, these teachers also reported relationships that were more conflictual than those in the low-income sample, in 1st grade only, $t = -1.97$, $p \leq .05$. Parents in the low income sample reported more child externalizing behavior than their counterparts in the parochial school sample in both 1st, $t = 3.28$, $p < .001$, and 2nd grades, $t = 2.51$, $p \leq .01$. The largest observable differences between the two sub-samples are in teacher behavioral characteristics, specifically teacher punitiveness in 1st grade, $t = -22.30$, $p \leq .001$, and detachment in 1st, $t = -23.86$, $p \leq .001$ and 2nd grades, $t = -14.41$, $p \leq .001$.

The sample differences may be due to systematic differences in teachers related to the observed differences in classroom behavior. On the other hand, teacher behavior differences may, themselves, reflect systematic differences in how the—independently trained—observers from each study rated the behavior of "their" teachers. Although raters from each study were (separately) trained to reliability, inter-rater agreement across studies cannot be assumed. To control for these differences statistically, each of the teacher variables was converted into standardized z scores within the sub-sample.

Table 5. Sample Descriptives: Mean Comparisons on Variables of Interest

	Sub-Sample 1			Sub-Sample 2			t
	Low-income			Parochial Schools			
	Mean	SD	n	Mean	SD	n	
Relationship Conflict (1st)	13.59	(8.62)	54	16.55	(4.25)	34	-1.97*
Relationship Closeness (1st)	37.14	(6.44)	54	41.35	(7.95)	34	-2.72***
Relationship Conflict (2nd)	14.21	(9.47)	23	16.85	(4.30)	27	
Relationship Closeness (2nd)	32.86	(7.81)	23	37.59	(8.38)	27	-2.04*
Child Sociability (Avg.)	7.97	(6.33)	61	5.61	(7.78)	34	
Child Externalizing Behavior (1st)	55.94	(10.81)	56	48.77	(7.44)	31	3.28***
Child Internalizing Behavior (1st)	53.60	(10.15)	56	49.06	(9.36)	31	2.10*
Child Externalizing Behavior (2nd)	55.58	(11.51)	55	49.40	(7.07)	27	2.51**
Child Internalizing Behavior (2nd)	50.60	(8.83)	55	49.03	(11.07)	27	
Teacher Sensitivity (1st)	23.75	(4.14)	38	25.51	(3.10)	35	
Teacher Detachment (1st)	7.44	(2.10)	38	21.40	(2.86)	35	-23.86***
Teacher Punitiveness (1st)	10.65	(3.98)	38	25.94	(.76)	35	-22.30***
Teacher Sensitivity (2nd)	23.15	(5.18)	23	24.11	(5.55)	27	
Teacher Detachment (2nd)	7.82	(2.14)	23	20.00	(3.53)	27	-14.41***
Teacher Punitiveness (2nd)	10.58	(3.20)	23	24.96	(4.42)	27	

Note: *= $p \leq .05$, **=$p \leq .01$, ***=$p \leq .001$

5.2 Inter-correlations

Prior to conducting multiple regression analyses, co-linearity among variables was examined. Results are reported in the inter-correlation matrix in Table 6. Because regression analyses utilize part and partial correlations, co-linearity among predictor variables is problematic in that it can inflate the fit of the overall model while producing no significant changes in R^2, making the interpretation of results difficult. According to Garson (2009), any bivariate correlation above .90 is indicative of co-linearity.

The largest correlation observed was between child externalizing behavior in first and second grades, r=.86, p<.001, n=77. However, these variables do not co-occur in any of the planned regression analyses, and therefore their association is not problematic. It is also noteworthy that the association between relationship closeness in 1st and 2nd grade is somewhat higher than that reported in previously published research , r=.56, *p*<.001, n=43, and is comparable to the association between relationship conflict in 1st and 2nd grade , r=.60, *p*<.001, n=44. The moderately strong stability in relationship closeness between first and second grades may prove problematic in attempts to predict change in Hypotheses 3 and 4.

Table 6. Intercorrelation Matrix

		conf1	conf2	close1	close2	soc	ext1	ext2	int1	int2	zsens1	zdet1	zpun1	zsens2	zdet2	zpun2
conf1	Pearson Correlation	1	.600**	-.184	.010	-.020	.214	.246*	.020	.074	-.155	.204	.113	.000	.032	.141
	Sig. (2-tailed)		.000	.087	.947	.855	.053	.032	.861	.526	.197	.087	.348	.996	.836	.361
	N	88	44	87	44	88	82	76	82	76	71	71	71	44	44	44
conf2	Pearson Correlation		1	-.292	-.314*	-.016	.142	.104	-.086	.031	.533**	.584**	.449*	-.318*	-.005	.082
	Sig. (2-tailed)			.057	.026	.911	.345	.475	.570	.835	.004	.001	.019	.026	.974	.575
	N		50	43	50	50	46	49	46	49	27	27	27	49	49	49
close1	Pearson Correlation			1	.559**	-.039	-.305**	-.299**	-.127	-.250*	-.137	-.402**	-.313**	.512**	.247	.281
	Sig. (2-tailed)				.000	.719	.005	.009	.253	.030	.251	.000	.007	.000	.110	.068
	N			88	43	88	83	75	83	75	72	72	72	43	43	43
close2	Pearson Correlation				1	.289*	-.332*	-.295*	-.080	-.188	.216	.062	.215	.287*	.055	-.102
	Sig. (2-tailed)					.042	.024	.040	.598	.197	.278	.759	.282	.046	.710	.487
	N				50	50	46	49	46	49	27	27	27	49	49	49
soc	Pearson Correlation					1	.135	-.021	-.038	-.152	.125	.250*	.098	.090	-.045	-.093
	Sig. (2-tailed)						.211	.852	.725	.173	.297	.034	.412	.534	.757	.521
	N					95	87	82	87	82	72	72	72	50	50	50
ext1	Pearson Correlation						1	.865**	.563**	.489**	-.081	.091	.094	-.258	-.202	-.189
	Sig. (2-tailed)							.000	.000	.000	.512	.461	.445	.084	.178	.207
	N						87	77	87	77	68	68	68	46	46	46
ext2	Pearson Correlation							1	.438**	.599**	.025	.153	-.002	-.295*	-.113	-.221
	Sig. (2-tailed)								.000	.000	.850	.244	.986	.042	.443	.132
	N							82	77	82	60	60	60	48	48	48
int1	Pearson Correlation								1	.735**	-.094	-.063	-.121	.079	-.085	-.178
	Sig. (2-tailed)									.000	.446	.612	.327	.604	.575	.236
	N								87	77	68	68	68	46	46	46
int2	Pearson Correlation									1	-.009	.078	.004	-.088	.002	-.100
	Sig. (2-tailed)										.946	.555	.978	.550	.988	.499
	N									82	60	60	60	48	48	48
zsens1	Pearson Correlation										1	.359**	.066	-.690**	-.639**	-.860**
	Sig. (2-tailed)											.002	.578	.000	.000	.000
	N										73	73	73	27	27	27
zdet1	Pearson Correlation											1	.415**	-.767**	-.719**	-.959**
	Sig. (2-tailed)												.000	.000	.000	.000
	N											73	73	27	27	27
zpun1	Pearson Correlation												1	-.663**	-.627**	-.811**
	Sig. (2-tailed)													.000	.000	.000
	N												73	27	27	27
zsens2	Pearson Correlation													1	.344*	.048
	Sig. (2-tailed)														.014	.742
	N													50	50	50
zdet2	Pearson Correlation														1	.537**
	Sig. (2-tailed)															.000
	N														50	50
zpun2	Pearson Correlation															1
	Sig. (2-tailed)															
	N															50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

5.3 Contemporaneous Relationship Quality

A series of hierarchical multiple regression analyses was conducted to test the first two hypotheses regarding predictors of contemporaneous relationship conflict and closeness. In each model, sample was entered first as a covariate, followed by the student characteristic of interest (closeness or conflict), then the teacher classroom behavior of interest (sensitivity, detachment, or punitiveness), and finally the interaction term of the teacher and student variables. Both student and teacher variables were converted to z scores, using the sample grand mean and standard deviation of each. The first set of analyses used first grade relationship conflict as the dependant variable. The student characteristic of interest relative to conflict was externalizing behavior, which was paired in three separate models with each teacher classroom behavior. Therefore the interaction term in each model was child externalizing behavior with either sensitivity, detachment, or punitiveness of the teacher. Results appear in Table 7.

When student externalizing behavior (parent report) and teacher sensitivity (observed) were regressed on 1st grade relationship conflict, only student externalizing behavior contributed significantly to the model, $\Delta R^2=.083$, $p\leq.01$. Neither 1st grade teacher sensitivity, nor the interaction between externalizing behavior and teacher sensitivity, were significant.

When student externalizing behavior and teacher detachment were regressed on 1st grade conflict, similar results were observed. The results, summarized in Table 8, show that only child externalizing behavior (parent report) contributed significantly to the model, $\Delta R2=.083$, $p\leq.01$. The same pattern was observed for teacher punitiveness, see Table 9.

Table 7. Regression of Student Externalizing Behavior and Teacher Sensitivity on 1st Grade Conflict (N=67, overall model R = .17, $p \leq .05$)

Variables	B	SE	β	Significance
Model#1				
Sample	3.48	1.62	.256	.035
			ΔR^2=.063	Sig.=.035
Model #2				
Sample	4.78	1.64	.352	.005
Ext. Beh.	2.053	.815	.304	.014
			ΔR^2=.083	Sig.=.014**
Model#3				
Sample	4.66	1.64	.343	.006
Ext. Beh.	1.95	.822	.290	.020
Tchr. Sens.	-.70	.761	-.107	.356
			ΔR^2=.011	Sig.=.356
Model #4				
Sample	6.73	2.56		.011
Ext. Beh.	5.087	1.68	.374	.004
Tchr. Sens	2.06	.827	.306	.015
Ext. x Sens	-.904	.816	-.130	.272
			ΔR^2=.016	Sig.=.272

Table 8. Regression of Student Externalizing Behavior and Teacher Detachment on 1st Grade Conflict (N=67, overall model R = .22, $p \leq .05$)

Variables	B	SE	β	Sig.
Model#1				
Sample	3.48	1.62	.256	.035
			ΔR^2=.065	Sig.=.035
Model #2				
Sample	4.78	1.64	.352	.005
Ext. Beh.	2.05	.815	.304	.014
			ΔR^2=.083	Sig.=.014**
Model#3				
Sample	4.89	1.59	.359	.003
Ext. Beh.	1.95	.794	.289	.017
Tchr. Det.	1.64	.756	.242	.034
			ΔR^2=.058	Sig.=.034
Model #4				
Sample	4.96	1.59	.364	.003
Ext. Beh.	1.95	.791	.288	.016
Tchr. Det.	1.46	.767	.216	.061
Ext. x Det.	.901	.730	.139	.222
			ΔR^2=.019	Sig.=.222

Table 9. Regression of Student Externalizing Behavior and Teacher Punitiveness on 1st Grade Conflict (N=67, overall model R = .15, $p \leq .05$)

Variables	B	SE	β	Sig.
Model#1				
Sample	3.48	1.62	.256	.035
			ΔR^2=.065	Sig.=.035
Model #2				
Sample	4.78	1.64	.352	.005
Ext. Beh.	2.05	.815	.304	.014
			ΔR^2=.083	Sig.=.014**
Model#3				
Sample	4.73	1.65	.348	.006
Ext. Beh.	1.97	.825	.293	.019
Tchr. Pun.	.612	.880	.081	.490
			ΔR^2=.006	Sig.=.490
Model #4				
Sample	4.69	1.66	.345	.006
Ext. Beh.	1.90	.843	.282	.027
Tchr. Pun.	.612	.880	.081	.490
Ext. x Pun.	.446	.920	.057	.629
			ΔR^2=.003	Sig.=.629

The second set of analyses used second grade relationship conflict as the dependant variable. Child externalizing behavior in second grade (parent report), sensitivity, detachment, and punitiveness of the 2nd grade teacher, as well as joint interaction terms of each were used as predictors. Table 10 summarizes the results. This time neither child externalizing behavior, teacher classroom behavior, nor the interaction term contributed to the prediction of relationship conflict. Second grade data, unlike those from first grade, do not support Hypothesis 1.

The final analysis of contemporaneous relationship conflict involved regressing child gender and teacher punitiveness on conflict in both first and second grade. It was hypothesized that child gender would contribute to the model, and that gender and punitiveness would interact. This hypothesis was only partially supported by the results presented in Table 11. Child gender did contribute to the prediction of relationship conflict , $\Delta R2=.083$, $p \leq .05$, although only in second grade . Figure 1 depicts the main effect of gender on 2nd grade relationship conflict. There were no observed interaction effects between child gender and teacher punitiveness in either 1st or 2nd grade.

Figure 1: Main Effect of Gender on 2nd Grade Conflict

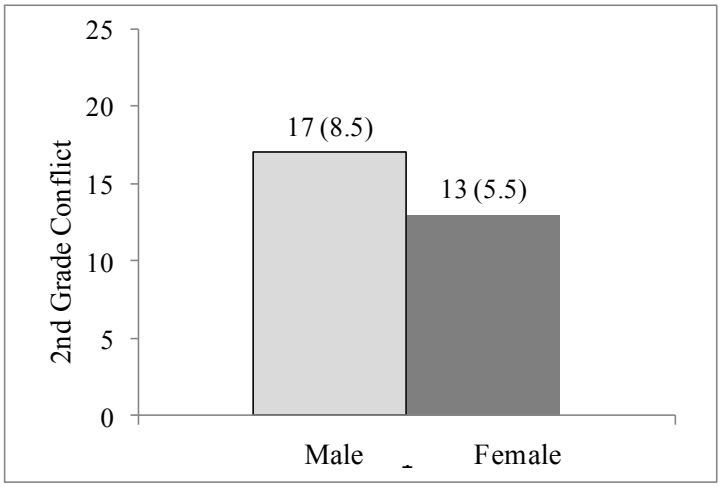


Table 10. Regression of Student Externalizing Behavior and Teacher Sensitivity on 2nd Grade Conflict (N=47, overall model R^2=.21, p≤.05)

Variables	B	SE	β	Sig.
Model#1				
Sample	2.63	2.03	.184	.201
			ΔR^2=.034	Sig.=.201
Model #2				
Sample	3.96	2.18	.277	.075
Ext. Beh.	1.87	1.21	.235	.131
			ΔR^2=.046	Sig.=.131
Model#3				
Sample	3.49	2.12	.244	.107
Ext. Beh.	1.24	1.21	.156	.312
Tchr. Sens.	-2.13	1.04	-.287	.046
			ΔR^2=.077	Sig.=.046
Model #4				
Sample	3.20	2.07	.224	.129
Ext. Beh.	1.18	1.18	.149	.321
Tchr. Sens	-2.03	1.01	-.274	-2.05
Ext. x Sens	-2.19	1.18	-.246	.070
			ΔR^2=.060	Sig.=.070

Table 11. Regression of Student Gender and Teacher Punitiveness on 2nd Grade Conflict (N=47, overall model R^2=.11, p≤.05)

Variables	B	SE	β	Sig.
Model#1				
Sample	2.55	2.06	.177	.001
			ΔR^2=.031	Sig.=.223
Model #2				
Sample	2.94	2.00	.204	.044
Gender	-4.19	2.02	-.289	.044
			ΔR^2=.083	Sig.=.044*
Model#3				
Sample	2.91	2.04	.202	.161
Gender	-4.15	2.07	-.286	.051
Tchr. Pun.	.135	.985	.020	.892
			ΔR^2=.000	Sig.=.892
Model #4				
Sample	2.69	2.10	.187	.206
Gender	-4.11	2.09	-.283	.056
Tchr. Pun.	-1.38	3.12	-.201	.659
Gender x Pun.	1.03	2.01	.235	.609
			ΔR^2=.005	Sig.=.609

The analyses of relationship closeness in first and second grades paralleled those of conflict, with the exception of the student factor. The student factor of interest relative to closeness was sociability. Teacher classroom behaviors remained the same. Student sociability was regressed with teacher sensitivity, followed by detachment, and then punitiveness, on relationship closeness in 1st and 2nd grades. Interaction terms of sociability and each teacher behavior in turn were constructed and added to their respective models. It was hypothesized that only the interaction terms would prove significant.

Results predicting 1st grade relationship closeness (as reported by the teacher) as the dependant variable appear in Tables 12-13. In support of the hypothesis, child sociability failed to predict 1st grade relationship closeness directly in any of the models. Contrary to the hypothesis, child sociability did not interact with teacher sensitivity to predict relationship closeness. Suprisingly, in these cases teacher (negative) behavior contributed significantly to 1st grade relationship closeness.

The second set of analyses used 2nd grade relationship closeness as the dependant variable. None of the results support the hypothesis that only the interaction between teacher and student characteristics would predict closeness in 1st and 2nd grades. Although child sociability failed to predict closeness in both grades, the association in 2nd grade approached significance, $\Delta R2=.09$, $p\leq.02$. Neither 2nd grade teacher behavior nor interaction effects between child sociability and teacher behavior covaried with 2nd grade closeness. Contrary to conflict, which was predicted solely by child externalizing behavior, the only significant predictors of 1st grade closeness were contemporaneous teacher detachment and punitiveness.

Table 12. Regression of Student Sociability and Teacher Detachment on 1st Grade Relationship Closeness (N=65, overall model R=.27, $p \leq .05$)

Variables	B	SE	β	Sig.
Model#1				
Sample	4.43	1.78	.306	.013
			ΔR^2=.093	Sig.=.013
Model #2				
Sample	4.36	1.77	.301	.016
Soc.	-.179	.849	-.026	.833
			ΔR^2=.001	Sig.=.833
Model#3				
Sample	4.31	1.61	.297	.009
Soc.	.484	.793	.070	.544
Tchr. Det.	-2.99	.800	-.420	.000
			ΔR^2=.167	Sig.=.000***
Model #4				
Sample	4.125	1.62	.284	2.53
Soc.	.565	.797	.081	.481
Tchr. Det	-2.98	.800	-.419	.000
Soc. x Det	-.812	.810	-.111	.320
			ΔR^2=.012	Sig.=.320

Table 13. Regression of Student Sociability and Teacher Punitiveness on 1st Grade Relationship Closeness (N=65, overall model R^2=.20, $p \leq .05$)

Variables	B	SE	β	Sig.
Model#1				
Sample	4.43	1.78	.306	.000
			ΔR^2=.093	Sig.=.013
Model #2				
Sample	4.36	1.77	.301	.016
Soc.	-.179	.849	-.026	.833
			ΔR^2=.001	Sig.=.833
Model#3				
Sample	4.36	1.68	.301	.012
Soc.	-.033	.808	-.005	.968
Tchr. Pun.	-2.61	.933	-.320	.007
			ΔR^2=.102	Sig.=.007**
Model #4				
Sample	4.56	1.70	.315	.009
Soc.	-.224	.844	-.032	.791
Tchr. Pun.	-2.63	.936	-.323	.006
Soc. x Pun.	-.769	.946	-.099	.420
			ΔR^2=.009	Sig.=.420

The final analysis of contemporaneous relationship closeness involved regressing child gender with teacher sensitivity and, separately, detachment on closeness in 1st and 2nd grades. It was hypothesized that, in each grade, child gender would contribute to the prediction of closeness and that, in each model, specific teacher behavior would interact with gender. This hypothesis was only partially supported by the results, summarized in Table 14. In support of the hypothesis, both child gender, $\Delta R2=.089$, $p\leq.01$ and teacher detachment , $\Delta R2=.155$, $p\leq.01$, did covary with closeness in 1st grade. Neither, however, was a significant, contemporaneous predictor of 2nd grade relationship closeness. The main effect of child gender on 1st grade closeness is depicted in Figure 2. Teachers rated their relationships with girls closer than their relaitonships with boys. Furthermore, there were no observed interaction effects between child gender and either teacher punitiveness or detachment in 1st or 2nd grades.

Figure 2: Main Effect of Gender on 1st Grade Closeness

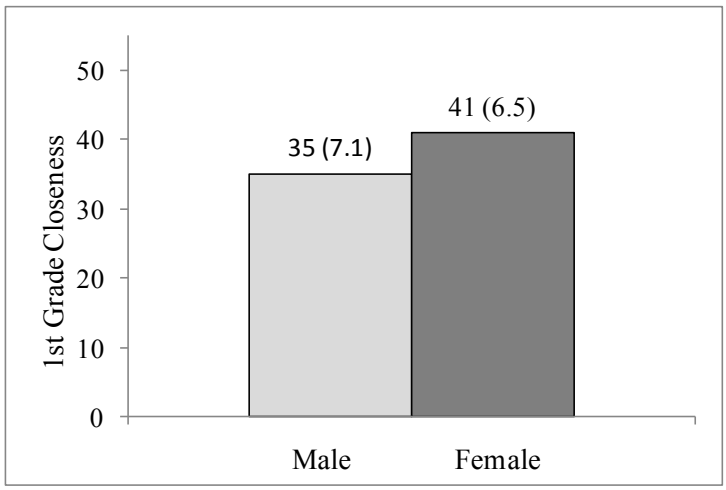


Table 14. Regression of Student Gender and Teacher Detachment on 1st Grade Closeness (N=67, overall model R^2 = .375, $p \leq .05$)

Variables	B	SE	β	Sig.
Model#1				
Sample	5.51	2.66	.358	.002
			ΔR^2=.128	Sig.=.002**
Model #2				
Sample	4.31	1.69	.281	.013
Gender	4.72	1.69	.308	.007
			ΔR^2=.089	Sig.=.007**
Model#3				
Sample	3.82	1.53	.248	.002
Gender	5.03	1.52	.328	.002
Tchr. Det.	-3.08	.752	-.395	.000
			ΔR^2=.155	Sig.=.000***
Model #4				
Sample	3.77	1.54	.245	.017
Gender	5.19	1.55	.338	.001
Tchr. Det	-1.84	2.31	-.236	.429
Gen. x Det	-.861	1.52	-.169	.573
			ΔR^2=.003	Sig.=.573

5.4 Change in Relationship Quality -- Multiple Regression Analyses

A series of hierarchical multiple regression analyses was conducted to predict change in relationship conflict and closeness from 1st to 2nd grade. In each regression model, sub-sample was again used as a covariate to control for differences between the two sub-samples. 2nd grade relationship quality served as the dependant variable. To model change, the 1st grade score corresponding to the 2nd grade relationship quality of interest was entered first. Following this, 2nd grade child characteristics and 2nd grade teacher behavior were entered as predictors.

When change in relationship conflict was modeled, 2nd grade child externalizing behavior and 2nd grade teacher classroom behavior (sensitivity, detachment, or punitiveness) were used as predictors. As in the contemporaneous analyses, child behavior was paired with each teacher behavior individually and an interaction term of child and teacher behavior was computed.

It was hypothesized that child externalizing behavior in 2nd grade would predict change in relationship conflict from 1st to 2nd grade, and that there would be no main effects of teacher behavior, or interaction effects between child and teacher behavior. First, child externalizing behavior and teacher sensitivity were analyzed using the change model. Results are summarized in Table 14. Contrary to the hypothesis, child externalizing behavior in 2nd grade failed to predict unique variance in 2nd grade relationship conflict above and beyond 1st grade relationship conflict. Unlike contemporaneous relationship conflict, which was solely predicted by child externalizing behavior, teacher sensitivity directly predicted change in relationship quality, $\Delta R2=.143, p\leq.001$. Additionally, child externalizing behavior and teacher sensitivity in 2nd grade interacted statistically to predict change in relationship conflict from 1st to 2nd grade, $\Delta R2=.063$, $p\leq.01$). None of the other teacher classroom behaviors were significant predictors of change as either main effects or in interaction with child externalizing behavior.

Table 15. Child Externalizing Behavior and Teacher Sensitivity in 2nd Grade as Predictors of Change in Relationship Conflict from 1st to 2nd (N=44, overall model R^2=.645, $p \leq .05$)

Variables	B	SE	β	Sig.
Model#1				
Sample	3.70	2.11	.267	.087
			ΔR^2=.071	Sig.=.087
Model #2				
Sample	3.89	1.68	.280	.027
Conflict 1	.651	.134	.593	.000
			ΔR^2=.352	Sig.=.000
Model#3				
Sample	4.72	1.85	.340	.015
Conflict 1	.647	.133	.589	.000
Ext. Beh. 2	1.10	1.026	.144	.288
			ΔR^2=.017	Sig.=.288
Model #4				
Sample	3.65	1.53	.262	.023
Conflict 1	.637	.117	.580	.000
Ext. Beh. 2	.096	.941	.013	.919
Tchr. Sens 2	-2.76	.778	-.396	.001
			ΔR^2=.143	Sig.=.001***
Model #5				
Sample	3.63	1.53	.262	.023
Conflict 1	.657	.109	.598	.000
Ext. Beh. 2	.371	.886	.048	.678
Tchr. Sens. 2	8.36	4.47	1.19	.070
Beh.2 x Sens.2	-.203	.081	-1.60	.016
			ΔR^2=.063	Sig.=.016**

When change in relationship closeness was modeled, 2nd grade child sociability and 2nd grade teacher classroom behavior (sensitivity, detachment, and punitiveness) served as predictors. As in the previous analyses, child sociability was paired with each teacher characteristic individually, and an interaction term of the child and teacher characteristic was computed.

It was hypothesized that only the interaction between child and teacher behavior would predict variance in 2nd grade relationship closeness above and beyond 1st grade relationship closeness, and that there would be no significant main effects. None of the results of these analyses were significant. All of the factors failed to predict unique variance in 2nd grade relationship closeness above and beyond 1st grade relationship closeness, which predicted approximately 30% of the variance in the dependant variable, $\Delta R2=.308$, $p \leq .0001$.

5.5 Change in Relationship Quality -- Linear Mixed Models

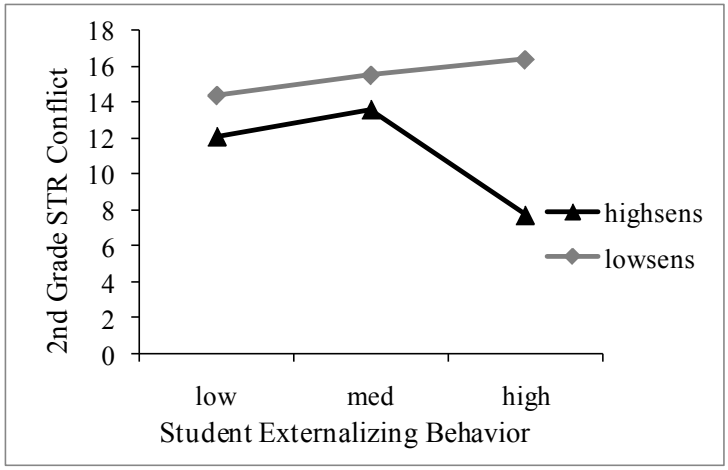
In addition to modeling relationship change with multiple regression analyses, linear mixed models (LMM) were used to model change, by nesting subjects in time. The benefit of this type of analysis over the previous multiple regression analyses, is that LMM models both change within and between subjects, therefore increasing the number of error terms and amount of error that is partialed out of the model. Additionally, LMM has similar power requirements as a multiple regression analyses, requiring approximately 30 cases for the first factor, and 10 cases for each additional factor. This is applied to the highest level of the model, which in this case is children (n=44) nested within two time points. At the highest level of the model there are 88 data points.

For the purposes of interpretation, it is recommended that each independent variable be centered, by subtracting either the grand mean or the group mean from each factor, depending on the level in which the factor occurs; level 1 factors are group mean centered (time point 1 or 2 in this instance), and level 2 factors are grand mean centered (across time points 1 and 2). In the current analyses, all of the factors were grand mean centered.

As in hierarchical regression analyses, the LMM model is built by adding predictors individually and examining the contribution of each to prediction of the dependant variable. Models for these analyses were built by entering the following factors in order: sub-sample, time, child characteristic of interest (externalizing behavior or sociability), time x child characteristic, teacher classroom behavior of interest (sensitivity, detachment, or punitiveness), time x teacher behavior, child characteristic x teacher behavior, and time x child-teacher interaction. Model comparisons were then made after the addition of each factor, utilizing chi-square goodness of fit procedures. If the factor contributed significantly to the model, then it was retained. If the factor failed to contribute significantly to the model, then it was excluded and the next variable was then tested. The contribution of each of the variables of interest are discussed only in terms of the best-fitting model. A cautionary note regarding these analyses needs to be made: the sample size supports analysis of 6 factors, and the largest possible model that could be constructed for each of the change analyses consisted of 8 factors. In the case that the best fitting model exceeds the supported 6 factors, then the results of LMM would not be generalizable to any larger population, and require replication using a larger sample.

The LMM model predicting change in relationship conflict using student externalizing behavior and teacher sensitivity was constructed first. Results appear in Table 16. Utilizing χ^2 goodness of fit tests, Model 6 was determined to be the best fitting model $\chi^{2=}7.60$,df=1. In this model, both child externalizing behavior, β=2.03, t=2.65, p<.01 and teacher sensitivity , β=-1.28, t=-3.27, p≤.01, as well as their interaction term, significantly contributed, β=-1.29, t=-2.80, p≤.01. Figure 4 depicts the interaction between teacher sensitivity and externalizing behavior.

Figure 3: Interaction Effect of Teacher Sensitivity and Externalizing Behavior on Change in Relationship Conflict



Next, the LMM model predicting change in relationship conflict with externalizing behavior and teacher detachment was constructed. Results appear in Table 17. Utilizing χ^2 goodness of fit procedures, Model 4 was determined to be the best fitting model, $\chi^{2=}103.12$, df=1. In this model, only child externalizing behavior, β=2.29, t=2.91, p≤.01, significantly contributed to the prediction of change in relationship conflict, teacher detachment and the detachment by externalizing behavior interaction did not.

Then, the LMM model predicting change in relationship conflict with externalizing behavior and teacher punitiveness was constructed. Results appear in Table 18. Utilizing χ^2 goodness of fit procedures, Model 4 was again determined to be the best fitting model,$\chi^{2=}$104.14,df=1. In this model, only child externalizing behavior, β=2.29, t=2.89, $p \leq .01$, significantly contributed to the prediction of change in relationship conflict, neither teacher punitiveness, nor the interaction of punitiveness with externalizing behavior contributed to the model.

Table 16. LMM Model Comparison -- Predicting Change In Relationship Conflict using Student Externalizing Behavior and Teacher Sensitivity

	K	-2RLL	X^2
Model 1	5	908.96	
Sample			
Time			
Model 2	6	860.83	48.13
Sample			
time			
Ext beh			
Model 3	7	859.01	1.82
Sample			
time			
Ext beh			
Ext beh x time			
Model 4	7	749.06	111.77*
Sample			
time			
Ext beh			
Sens			
Model 5	8	746.57	2.49
Sample			
time			
Ext beh			
Sens			
Sens x time			
Model 6	8	741.46	7.60
Sample			
time			
Ext beh			
Sens			
Ext beh x Sens			

Table 17. LMM Model Comparison -- Predicting Change In Relationship Conflict using Student Externalizing Behavior and Teacher Detachment

	K	-2RLL	X^2
Model 1	5	908.96	
Sample			
Time			
Model 2	6	860.83	48.13
Sample			
time			
Ext beh			
Model 3	7	859.01	1.82
Sample			
time			
Ext beh			
Ext beh x time			
Model 4	7	757.71	103.12*
Sample			
time			
Ext beh			
Det			
Model 5	8	754.30	3.41
Sample			
time			
Ext beh			
Sens			
Det x time			
Model 6	8	756.84	-2.54
Sample			
time			
Ext beh			
Det			
Ext beh x Det			

Table 18. LMM Model Comparison -- Predicting Change In Relationship Conflict using Student Externalizing Behavior and Teacher Punitiveness

	K	-2RLL	X^2
Model 1	5	908.96	
Sample			
Time			
Model 2	6	860.83	48.13
Sample			
time			
Ext beh			
Model 3	7	859.01	1.82
Sample			
time			
Ext beh			
Ext beh x time			
Model 4	7	756.69	104.14
Sample			
time			
Ext beh			
Pun			
Model 5	8	754.15	2.54*
Sample			
time			
Ext beh			
Pun			
Pun x time			
Model 6	8	755.97	-1.82
Sample			
time			
Ext beh			
Pun			
Ext beh x Sens			

In general, results fail to confirm the hypothesis about change in relationship conflict from 1st to 2nd grade. Child externalizing behavior reported by the parent predicts change in teacher-reported conflict from 1st to 2nd grade, but observed teacher sensitivity in the classroom also predicts change in conflict. Additionally, the interaction between teacher sensitivity and student externalizing behavior was significant.

Turning to relationship closeness, the first LMM model predicting change in closeness was constructed with child sociability and teacher sensitivity. Results appear in Table 19. Utilizing χ^2 goodness of fit procedures, Model 5 was determined to be the best fitting model $\chi^{2=}8.30$,df=1. Child sociability failed to predict change in this model, while teacher sensitivity, β=-2.12, t=-2.64, $p \leq .001$, and change in teacher sensitivity, β=3.38, t=2.43, $p \leq .01$ both predicted change in closeness. The second LMM model predicting change in closeness was constructed with child sociability and teacher detachment. Results appear in Table 20. Utilizing χ^2 goodness of fit procedures, Model 5 was determined to be the best fitting model, $\chi^{2=}7.41$,df=1. In this model only teacher detachment predicts change in relationship closeness, β=-3.54, t=-4.40, $p \leq .001$. The final LMM model predicting change in relationship closeness was constructed with child sociability and teacher punitiveness. Results appear in Table 21. Utilizing χ^2 goodness of fit procedures, Model 4 was determined to be the best fitting model $\chi^{2=}106.20$,df=1. However, neither child sociability, nor teacher punitiveness predicts change in this model.

Overall, results for change in relationship closeness fail to support the hypothesis. There are no significant interaction effects between student and teacher factors. The only significant predictors of change in closeness are teacher factors - detached classroom behavior, sensitive classroom behavior, and change in teacher sensitivity over time.

Table 19: LMM Model Comparison -- Predicting Change In Relationship Closeness with Student Sociability and Teacher Sensitivity

	K	-2RLL	X^2
Model 1	5	921.06	
Sample			
Time			
Model 2	6	850.86	70.2
Sample			
time			
Soc			
Model 3	7	845.33	5.53
Sample			
time			
Soc			
Soc x time			
Model 4	7	754.97	90.36
Sample			
time			
Soc			
Sens			
Model 5	8	746.67	8.30*
Sample			
time			
Ext beh			
Sens			
Sens x time			
Model 6	8	752.11	-5.44
Sample			
time			
Ext beh			
Sens			
Ext beh x Sens			

Table 20: Model Comparison Predicting Change In Relationship Closeness with Student Sociability and Teacher Detachment

	K	-2RLL	X^2
Model 1	5	921.06	
Sample			
Time			
Model 2	6	850.86	70.2
Sample			
time			
Soc			
Model 3	7	845.33	5.53
Sample			
time			
Soc			
Soc x time			
Model 4	7	741.992	103.33
Sample			
time			
Soc			
Det			
Model 5	8	734.579	7.41*
Sample			
time			
Ext beh			
Det			
Det x time			
Model 6	8	741.16	-6.58
Sample			
time			
Ext beh			
Det			
Ext beh x Det			

Table 21: Model Comparison Predicting Change In Relationship Closeness with Student Sociability and Teacher Punitiveness

	K	-2RLL	X^2
Model 1	5	921.06	
Sample			
Time			
Model 2	6	850.86	70.2
Sample			
time			
Soc			
Model 3	7	845.33	5.53
Sample			
time			
Soc			
Soc x time			
Model 4	7	735.86	109.47*
Sample			
time			
Soc			
Pun			
Model 5	8	732.64	3.22
Sample			
time			
Ext beh			
Pun			
Pun x time			
Model 6	8	731.98	.66
Sample			
time			
Ext beh			
Pun			
Ext beh x Pun			

6.0 DISCUSSION

The current study was designed to identify correlates of contemporaneous teacher-student relationship quality in the early elementary school years, as well as factors that predict change in relationship quality over time. The individual and joint contributions of student and teacher factors to variance reported by teachers in relationship closeness and conflict were studied.

6.1 Contemporaneous Associations

Analyses revealed modest associations of both student and teacher factors with teacher-rated 1st-grade relationship closeness and conflict. However, there were no contemporaneous associations with closeness or conflict in 2nd grade. The lack of significance of the 2nd grade associations may be due to the combination of small effect sizes and a smaller number of participants (N=44). It is likely that the power of the test of 2nd grade associations was reduced below a critical level.

In accordance with previous research and this study's first hypothesis, 1st-grade relationship ***conflict*** was positively associated only with student externalizing behavior. Students reported by parents as exhibiting more externalizing behavior were in relationships described by their 1st–grade teachers as more conflicted. This is one of the most consistent findings in teacher-student relationship research (Hamre & Pianta, 2008, Henricsson & Rydell, 2004, Murray & Murray, 2004).

Hamre and Pianta (2008) and Murray and Murray (2004) found that student externalizing behavior as rated by the teacher was associated positively and relatively strongly with concurrent relationship conflict, also reported by the teacher, r=.72 and .62 respectively. Each of the student samples in these studies was of pre-school to early elementary age, low income, of minority race, and/or had identified behavior problems. Similarly, the sample for the current study consisted of early elementary aged children from low-income to working-class families. However, the current research utilized parent reports of child behavior problems, rather than teacher reports, in order to avoid common source variance issues (i.e., using a single source for information about both predictor and criterion variables). Presumably as a consequence, the association observed between parent-reported child externalizing behavior and teacher report of conflict proved much lower (r=.28, N=68), a significant difference, $z=-4.92$, $p<.001$ and $z=-2.85$, $p=.001$ respectively. On the one hand, the current research eliminated common source variance, which can artificially increase the association between two factors. On the other hand, the behavior reported by parent versus teacher is likely to be genuinely different, due to differences in the home and school settings.

In an attempt to address this possibility, Henricsson and Rydell (2004) used ratings of child externalizing behavior from a previous teacher, as opposed to the teacher rating the relationship (2004). Their findings were similar to Hamre and Pianta (2008) and Murray & Murray (2004), r = .72, N=95. These findings imply that the latter explanation—real differences in how disruptive the behavior of the child is experienced at school versus home—is more plausible.

Ideally, an assessment of the association between child externalizing behavior and teacher-student relationship conflict would incorporate reports from ***alternative*** reporters within the school environment (a trained observer should be one of them), but would also standardize or center variables to control for rater differences.

This helps answer the question as to why the association between externalizing behavior and relationship conflict was significantly different (smaller) from previous research, but it does not address why none of the teacher classroom behaviors was associated with conflict, or why there was no statistical interaction between student and teacher variables.

It stands to reason that more punitive teachers might have more conflicted relationships with their students, or that the joint combination of a punitive teacher and disruptive student would be associated with relationship quality. Why then did this and previous research fail to detect teacher contributions and/or joint student-teacher contributions to relationship conflict?

The data indicate that the majority of teachers, whether their behavior is sensitive, detached or punitive, experience more conflict with children who have higher levels of externalizing behavior. Classroom disruption may be a (if not ***the***) primary disciplinary target of most teachers, evoking conflict fairly uniformly across the board. If minimizing conflict is a goal, teachers may need more training in dealing with disruptive student behavior without introducing or escalating negative affect in the teacher-student interaction. Anecdotally, frustration, exasperation, and anger were relatively common affective responses by teachers to repeated student disruptions.

With respect to 1st grade relationship ***closeness***, the current findings contribute new information to the body of research on teacher-reported relationship quality. Looking beyond the standard research focus on student gender and externalizing behavior, this investigation tested

whether positively toned teacher and student factors, such as sensitive teacher behavior and sociable child temperament, correlate with relationship closeness. It was hypothesized that teacher sensitivity, and the joint contribution of both teacher and student factors would also significantly predict contemporaneous relationship closeness.

Contrary to Hypothesis 2, there were no direct associations of either positive teacher or student factors with contemporaneous closeness, nor did any interaction effects between child and teacher factors emerge. Instead, ***negative*** teacher factors--detachment and punitiveness--were inversely associated with teacher reported 1st-grade closeness.
Teachers who were observed to behave in a more detached, or punitive manner reported less relationship closeness with their students, r=.40 and .31 respectively. Child sociability was not associated with relationship closeness as had been expected.

There are a small number of studies that have reported associations between child sociability and teacher-student relationship closeness (Birch & Ladd, 1998; Howes et al., 2000; Pianta & Stuhlman, 2004). Birch and Ladd (1998) reported that child ***sociability with peers***, as rated by the teacher, correlated with the same teacher's report of relationship closeness in Kindergarten, r=.65 and 1st grade, r=.35, N=199, among children from low- to middle-income families. In contrast, child sociability is conceived in the present investigation as a facet of the child's temperament, rated by the parents/caregivers. Again there is the dual possibility that general sociability witnessed by parents and sociability with peers at school represent two related, but distinct constructs, ***or*** that the association observed in previous research is inflated due to common source variance, as both sociability with peers and relationship closeness were reported by the teacher. In an effort to address this possibility, Pianta and Stuhlman (2004) reported that among a diverse sample of children from the National Institute of Child Health and

Human Development (NICHD) study of early child care, child ***social competence***, as rated by the 1st grade teacher, correlated moderately with the same teacher's report of relationship closeness, r=.56, N=490, whereas observed social competence correlated more modestly with contemporaneous teacher reports of closeness in 1st grade, r=.31, N=490, a significant reduction, z=4.78,p<.0001. Additionally, Howes and colleagues (2000) reported that child sociability in the classroom, as rated by the child's preschool teacher, only modestly correlated with the Kindergarten teacher's report of relationship closeness, r=.23, N=357, among a diverse sample of children from the Cost Quality and Outcomes Study.

This is a significant reduction in the association between the two factors when an impartial observer reported on child sociability, z=2.71, p=.006. In other words, the more proximal the source of the child sociability report to the source who reported on closeness, the stronger the association between the two variables; the strongest associations were observed when the same teacher reported on both relationship quality and child sociability, it was significantly reduced when an impartial classroom observer reported on child sociability, and even further reduced when different teachers in different classrooms reported on child sociability and relationship closeness. These variable results suggest that there are real differences in child behavior between settings. However, the correlational difference between reported and observed child sociability with contemporaneous teacher reports of closeness indicate that the problem of common source variance is also relevant. Finally, in the Birch and Ladd study, the association between child sociability and relationship closeness in 1st grade is significantly weaker than in kindergarten. With decreasing emphasis on social interaction and cooperation from kindergarten to subsequent grades, there may be a true pattern of decreasing association between child sociability and teacher-perceived closeness.

Nevertheless, the question remains why negative teacher classroom behaviors – punitiveness and detachment – were the only factors associated with reported relationship closeness, albeit inversely. Regardless of the level of child sociability reported by the parent, teachers who appeared punitive (seemed critical of children, were prohibitive, and spoke with irritation or hostility) or detached (seemed distant and uninterested in the activities of the children) tended to report less closeness in their relationships with students. Perhaps not surprisingly, the association between punitive and detached classroom behavior in the current study (scored by the same observers) is moderately srong, r= 53, N=50.

Not all teachers who behave in a detached manner also act punitively towards their students, but approximately 28% of the variance in teacher punitiveness can be predicted by detachment. Both types of negative behavior on the part of the teacher would tend to prevent closeness in relationships with students.

It is noteworthy that the only factor associated with teacher-reported relationship conflict was student behavior, whereas the only factors associated with teacher-reported relationship closeness were teacher behaviors. This may be due to functional avoidnce on the part of both the teacher and the student. Teachers who encounter students noticeably disruptive to their classroom and not attempt to create positive relationships to those students, writing them off as "bad students," functionally avoiding any attempt at establishing a close relationship with them in anticipation of failure to do so, due to the students' difficult nature. Students who encounter punitive or detached teachers may not try to get close to these teachers, writing them off as "bad teachers," functionally avoiding any attempt at establishing a close relationship with the teacher in anticipation of failure to do so, due to the teahcer's difficult nature. Each is an attempt to protect oneself from relationship failure.

A methodological explanation for the pattern of associations found lies in the connection Achenbach (1981) reported between family income level and child behavior problems, namely, that children from low-income families are described as higher in behavior problems and lower in social competence. There may be more meaningful variation in this working-class and low-income sample in various behavior problems than in social competence related to sociability, leading to significant associations for the former (with negative relationship qualities) but not the latter (with positive relationship qualities).

Unlike previous work on student-teacher relationships, analyses were also conducted to test whether student gender statistically moderates the association of teacher punitiveness with conflict, or teacher detachment and sensitivity with closeness. It does not. There were no interaction effects observed between child gender and teacher detachment, sensitivity or punitiveness for relationship quality. As in previous research, gender was directly associated with relationship closeness in 1st grade (more for girls) and relationship conflict in 2nd grade (more for boys). In their study of low- to middle-income children from kindergarten to 1st grade, Birch and Ladd (1998) found the same patterns in 1st grade. Howes and colleagues (2000) found that among students in a diverse sample, kindergarten teachers reported significantly more closeness with girls than boys. In a predominantly African American sample of students in Kindergarten to 5th grade, Kesner (2000) reported that gender had a main effect on both conflict and closeness, in the same pattern just summarized (i.e., more closeness with girls, and more conflict with boys).

Regardless of the child's gender, the associations in the current study between teacher classroom behavior and child behavior were the same, and regardless of the teachers' classroom behavior the associations between gender and relationship quality were the same. It is likely that

the association between gender and relationship quality is actually an association between child behavior, which is commonly confounded with gender, and relationship quality. Although associations between child gender and behavior were not tested, previous research has amply documented them (Achenbach, 1981; Birch & Ladd, 1997; Patterson et al., 1990, Turner, 1991). The associations between child gender and relationship quality appear to parallel associations between child gender and behavior in early elementary school: higher activity level and disruptiveness among boys, more pro-social and teacher-oriented behavior among girls.

6.2 Associations with Relationship Change

A second purpose of the current study was to identify student and teacher factors, but especially interaction terms representing the joint contribution of each, that help explain ***change*** in relationship quality over time. These analyses begin to address the 'goodness of fit' between teacher and student. Due to the known limitations of the sample (systematic differences related to type of school, sample size), as well as the known theoretical limitations of hierarchical regression analyses, which were employed in the analyses of hypotheses 1 and 2, the change hypotheses (3 and 4) were analyzed with linear mixed modeling in addition to hierarchical regression analyses.

The prediction of change in relationship ***conflict*** between 1st and 2nd grade was analyzed first. It was hypothesized that, much like contemporaneous relationship conflict, only contemporaneous student externalizing behavior would contribute significantly to the model predicting change in conflict. Change in relationship conflict from 1st to 2nd grade was, in fact, predicted by student externalizing behavior.

Students' externalizing behavior in 2nd grade, was positively associated with relationship conflict in 2nd grade, after controlling for conflict in 1st grade, indicating that students' concurrent behavior is a more salient predictor of relationship conflict in 2nd grade than previous conflict, despite the moderate stability of relationship conflict over time, r=.60, N=44.

There was also, however, a main effect of teacher sensitivity; the more sensitive the 2nd grade teachers' classroom behaviors, the less conflict was reported in the 2nd grade teacher-student relationship. The fact that both a teacher and student factor contributed to predicting 2nd grade relationship conflict, above and beyond previous conflict, suggests that while an existing relationship model, or previous relationships, may influence subsequent ones, each relationship is in fact unique.

The unanticipated interaction between teacher sensitivity and student externalizing behavior for 2nd-grade relationship conflict further contributes to this conclusion. More sensitive teachers tended to rate their relationships with more disruptive students as less conflicted than did less sensitive teachers. Although the interaction between teacher and student factors failed to contribute to the model of contemporaneous relationship conflict variance, the interaction between teacher and student factors was a significant predictor of ***change*** in relationship conflict. This difference may be due to the fact that change analyses control for previous relationship quality. In other words, a snapshot of relationship conflict at any given point in time relates to student disruptiveness only, but increases or decreases in what might be termed "ambient" relationship conflict for a given student require information about both the student, the teacher, and the combination of characteristics they represent.

If, as attachment theorists argue, the student and teacher bring to the classroom an existing model of relationships (Sroufe & Fleeson, 1988), their current behaviors have a real, but limited, impact on this new relationship. But if the child's prior relationship quality is statistically taken into account (i.e. partialed out from the statistical prediction), then there is more "room" to find associations between relationship quality and the statistical interaction representing the "fit" between student and current teacher.

Taking this reasoning further, if the ***teacher's*** relationship model is taken into account, there should be even more "room" to find associations between current teacher and child behavior. This is an obvious direction for future research on the topic.

The prediction of change in relationship ***closeness*** from 1st to 2nd grade was even more discrepant from hypotheses. It was hypothesized that, similar to contemporaneous relationship closeness, neither teacher nor student factors alone would predict unique variance in change, but that the interaction between the two would. Contrary to the hypothesis, 2nd-grade teacher detachment and sensitivity directly predicted change in relationship closeness. Additionally, change in teacher sensitivity from 1st to 2nd grade was a significant predictor of change in relationship closeness. Both findings mirror the contribution of 2nd-grade information—in this case entirely teacher-based—to increases or decreases in "ambient" relationship quality just as was reported for relationship conflict. Whereas changes in conflict reflected BOTH teacher and student factors, changes in closeness were unrelated to the one child variable tested, sociability.

Contrary to predictions, closeness in the teacher-student relationship seems to be less related to "fit" between the teacher and the student than conflict. Apparently, changes in closeness are better predicted by teacher behavior than that of the student. Possibly due to the more idiosyncratic nature of what student behavior teachers find appealing.

That is, teacher's views of student classroom behaviors may vary dependant on the teacher's classroom structure and her expectations of the student in that environment. This pattern may account for the failure of previous relationship closeness to predict closeness in subsequent relationships. Therefore, assessing teacher differences may produce more meaningful results than continuing to assess student behavior.

It is quite possible that, as discussed above, the general construct of sociability employed in the current research is unrelated to teacher-student relationship closeness, and that a better alternative would be either sociability with peers or pro-social behavior in the classroom, as rated by an independent observer or previous teacher. Whereas teachers may differ (in some way that was ***not*** measured) in how they respond to a child who enjoys interacting with others (which probably includes talking more with peers during class time), they may respond in a more uniformly positive way to a child who seems kinder and more thoughtful toward others.

6.3 Replicating versus Extending the Research Base

The goals of the current study were partially achieved. Student externalizing behavior was confirmed as a predictor of contemporaneous relationship conflict, apart from any teacher factors or joint effects. Due to the repeated finding of statistical significance, this association had been viewed as important for our understanding of teacher-student relationship conflict. However, significant differences in the effect sizes reported in previous and current research raise questions about just how uniformly teachers respond negatively to disruptive children in the classroom and whether common source variance has inflated results. Future investigations would do well incorporating independent observations of child ***and*** teacher behavior in the classroom.

At least in this study, 2nd-grade teachers who spoke warmly to children, gave positive attention to children, and were generally supportive of the children appeared to view child externalizing behavior more tolerantly than teachers showing less of this kind of behavior in the classroom (that is, it is less connected to relationship conflict). In conjunction with the finding that change in teacher sensitivity from 1st to 2nd grade predicts change in these teachers' reports of relationship closeness, there is some evidence for "lawful discontinuity" in teacher-student relationship quality from one (early) grade to the next. In particular, when a child changes from a less sensitive teacher in one grade to a more sensitive teacher in the next, reported relationship quality likewise improves or declines. Whether this is due to a real change in relationship quality (perhaps directly related to teacher sensitivity) or to the tendency of more child-centered teachers to report more relationship closeness, or to a third, as yet unexplored, variable affecting both, it is a finding that merits more attention.

6.4 Future Research

Given the current findings that there is a statistical interaction between some characteristics of the child and the teacher (vis a vis relationship conflict), and that change in teacher classroom behavior across grades is associated with change in teacher-student relationship quality (closeness) over time, future research should further pursue the question of 'goodness of fit' between teachers and students. Cross-sectional results have contributed to the identification of some student factors and the occasional teacher factor (when included) associated with relationship quality, good and bad. Additionally, recent efforts utilizing longitudinal designs have shed light on the process of change in teacher-student relationships over time, but have focused exclusively on characteristics of the students.

Future efforts should utilize longitudinal methods to analyze student ***and*** teacher factors associated with ***change*** in relationship conflict and closeness. Specifically, research should include measures of child sociability and pro-social orientation in the school setting, as well as measures of change in child behavior subsequent to changes in relationship quality (i.e., reduced conflict or increased closeness). Previous research documented an association between child sociability with peers and teacher-student closeness in early elementary grades, whereas the current research failed to find one using parent-rated, general sociability.

The question remains whether child sociability, sociability in the classroom, or pro-social behavior contribute to relationship closeness in and beyond 1st grade, and if child sociability interacts with any teacher factors to predict relationship quality. This could potentially address the dearth of information on factors associated with positive relationship quality, above and beyond gender.

The utilization of linear mixed modeling (LMM/HLM) have been shown to be effective models of both longitudinal effects (e.g. students nested within time) and hierarchical effects (e.g. students nested within classrooms). The current study demonstrated the power of LMM to detect associations otherwise undetected by multiple regression analyses (MRA), due to the tolerance of LMM for missing data, and the inclusion of additional error terms. Additionally, it should be noted that extraordinarily large n's are not a requirement of LMM/HLM. LMM is an ideal analysis tool to utilize with longitudinal data and research questions regarding change.

Although it is informative to know what student and teacher factors correlate with closeness and conflict in teacher-student relationships, it is more informative to know ***how*** much change in relationship quality can occur over time, and ***if*** change in relationship quality forecasts change in child behavior. It is not sufficient to say that being a boy and African American

increases the likelihood that a student will develop conflicted relationships with his teachers. It is necessary to understand how to prevent this and any consequences that might ensue. Is it possible to break the apparent cycle of "bad" behavior, negative relationships with teachers, and worsening school adjustment? Can more positive overtures and fewer negatively tones responses from teachers result in more appropriate behaviors in school and more positive relationships subsequently?

6.5 Limitations

The most prominent limitation of the current study is its sample. Although some of the results reported were consistent with previous findings, there were some differences in effect size between the current study and previous research. Although these differences can be sufficiently explained by the use of slightly different constructs and/or sources of reports on child temperament and behavior, caution should be made in generalizing the results of the current study, on the basis of the limited sample size and lack of representativeness of any specific demographic group.

The sample for the current study was drawn from two disparate sub-samples, one of which was low-income and predominantly attending public schools; the other of which was more middle-income (in this case, working class) and entirely attending parochial schools. Not only did this sampling confound family income and school type (parochial vs. public), observed differences between the two sub-samples on the variables of interest indicated a lack of comparability between the two groups, necessitating the use of (sub)sample as a covariate.

The sample size also limits interpretation of the findings. In 2nd grade the tests lacked power to detect true differences. In the multiple regression and linear mixed model results, the sample size met the bare minimum requirements for sufficient power, which made detecting small effect less likely. In order to produce generalizable results, the current study must necessarily be replicated, with a larger, stratified random sample. Ideally, this sample would be stratified across income groups (low, middle and high), and would be matched on gender, race, and school type, resulting in three sub-samples based on income level. Each level would also be representative of both boys and girls, minority and majority races, and public and private school settings.

Additionally, the sampling of 1st and 2nd grade teacher student relationships may serve to limit the findings of the current study. Due to the close temporal and environmental associations between 1st and 2nd grades, the *differences* observed over time between teachers, students and the interaction between the two may have been functionally limited in the current study. Should a larger time frame be applied to research questions concerned with change in teacher-student relationship quality, there would likely be larger differences.

7.0 CONCLUSIONS

The current study found that teacher-student relationship quality in early elementary is associated with both teacher and child factors, and that there is predictable variability in reported relationship quality by teachers across grades. Developmentally appropriate classroom behaviors, particularly sensitivity, of early elementary teachers are associated with more positive reports of relationship quality, including relationships with more disruptive children. Changes in teacher sensitivity can predict changes in reported relationship closeness over time.

Results of this study point to the importance of studying teacher contributions to relationship quality, especially when teachers are the sole source of information about the relationship. Previous research either ignored teacher contributions to relationship quality or only studied teacher demographic characteristics, teacher training, or teacher mental health (i.e. depressive symptoms), as possible contributors to relationship quality. Teacher classroom behaviors are not only significant predictors of contemporaneous reports of relationship quality, but also of change in reported relationship quality. In point of fact, measurement of the quality of teacher-student relationship needs to be made independently of either teacher or student ratings.

Student temperament (sociability versus shyness), in contrast, showed less usefulness in this study, even as a moderator of teacher (statistical) effects. This may be a consequence of the particular construct used (general sociability versus sociability with peers or pro-social behavior in the classroom), the varied sources of information about student temperament (from parent to extended kin, to adult friend or child care provider in this study), or simply a reflection of the fact that child temperamental "fit" with teacher is more subtle in any effect it may have on relationship quality than fit reflecting salient classroom behavior—on the part of both teacher **and** student.

Student externalizing behavior, the only other student factor studied, was found to be relatively small in its statistical effect when it was reported by the parents as opposed to the teacher who is also rating relationship quality, compared to the observed teacher factors of sensitivity, detachment, and punitiveness. It stands to reason, however, that the effect sizes of student factors would be smaller than those of teacher factors given that teachers rate teacher-student relationship quality on the STRS. While the STRS does provide useful information about the teachers' perspective of his or her relationship with a student, it is not equally representative of the student's perspective, nor is it an objective indicator of the interpersonal interactions between the two.

Research conducted by Henricsson and Rydell (2004) on 2nd and 3rd grade students, utilized three separate measures of the teacher-student relationship: teacher-rated relationship quality (STRS), student-rated relationship quality, and observed relationship quality. Each of the measures was able to distinguish between children categorized into externalizing problem and problem free groups. However, observed teacher-child interactions did not directly covary with ***either*** teacher or child reports of the relationship, suggesting that all three measure different

things, only some of which may concern the relationship itself. Negative teacher behavior, when isolated from the observed teacher-student interactions, did contribute significantly to the child's evaluation of the relationship as more negative. Clearly, student reports of the relationship, as well as actual observation of teacher and student interactions, both provide unique information about teacher-student relationship quality.

Findings from this and other research on teacher-student relationship quality, while informative as to factors and outcomes associated with teacher student relationship quality, are limited in that they are strictly correlational and not experimental. Unlike experimental research, associational research does not support the inference of causation. Only with experimental (i.e. intervention) data will we be able to understand how teacher-student relationships work, or if improving relationship quality will result in improved educational outcomes. Having already established the important predictive power of teacher-student relationship quality, and knowing student and teacher factors associated with relationship quality, we currently possess the necessary evidence to support experimental/intervention research in the field of improving teacher-student relationships.

Points of intervention could include the teacher and the student, increasing teacher supportive behavior, working with teachers and students to reduce disruptive behavior in the classroom, even helping teachers repond more neutrally to negative student behavior. At the school management level, carefully distributing the concentration of disruptive children across classrooms to avoid overwhelming any teacher and expanding early elementary curriculum to include positive communication and relationship building techniques (Pianta, 1999) could both possibly help to improve relationship quality.

While not conclusive or generalizable to the larger population of early elementary grade teachers and students, the current findings suggest that both teachers and students do, of course, contribute to relationship quality, that clearly observable teacher and child classroom behaviors are both potentially influential and therefore promising as a point of intervention, and that the fit between the teacher and the student has real consequences for the quality of their relationship… and probably for the child's early trajectory of success or difficulty in the elementary school setting.

References

Achenbach, T. M. (1981). "Behavioral problems and competencies reported by parents of normal and disturbed children aged 4-16." *Monographs for the Society for Research in Child Development* **46**(1).

Alexander, K. L. and D. R. Entwisle (1988). "Achievement in the first two years of school: Patterns and processes." *Monographs for the Society for Research in Child Development* **53**(2).

Arnett, J. (1989). "Caregivers in day care centers. Does training matter?" *Journal of Applied Developmental Psychology* **10**: 541-552.

Baker, J. A., G. Sycarah, Morlock, L. (2008). "The teacher-student relationship as a developmental context for children with internalizing externalizing behavior problems." *School Psychology Quarterly* **23**(1): 3-15.

Birch, S. H. and G. W. Ladd (1998). "Children's interpersonal behaviors and the teacher-child relationship." *Developmental Psychology* **34**(5): 934-946.

Boer, F. and M. P. Westernberg (1994). "The factor structure of the Buss and Plomin EAS Temperament Survey (parental ratings) in a Dutch sample of elementary school children." *Journal of Personality Assessment* **62**(3): 537-551.

Bredenkamp, S. and C. Copple, Eds. (1997). *Developmentally appropriate practice in early childhood programs.* Washington, DC, National Association for the Education of Young Children.

Buss, A. H. and R. P. Plomin (1984). *Temperament: Early Developing Personality Traits*. New Jersey, Lawrence Erlbaum Associates,Inc.

Campbell, F. A. and C. T. Ramey (1995). "Cognitive and school outcomes for high-risk African-American students at middle adolescence: Positive effects of early intervention." *American Educational Research Journal* **32**(4): 743-772.

Chess, S. and A. Thomas (1977). *Goodness of Fit: Clinical Applications From Infancy Through Adult Life.* Philadelphia, Brunner/Mazel.

Chomsky, N. (1965). *Aspects of the Theory of Syntax.* Cambridge, MA, MIT Press.

Dunn, J. (1996). Sibling relationships and perceived self-competence: Patterns of stability between childhood, and early adolesence. *The 5 to 7 Year Shift*. A. J. Sameroff and M. M. Haith. Chicago, Chicago University Press**:** 253-270.

Early, D. M., R. C. Pianta, and Cox, M. J. (1999). "Kindergarten teachers and classrooms: A transition context." *Early Education and Development* **10**(1): 25 - 46.

Garner, P. W. and W. Bajiyyaah (2008). "The associations of emotion knowledge and teacher-child relationship to preschool children's school-related developmental competence." *Journal of Applied Developmental Psychology* **29**: 89-100.

Garson, G. David (n.d.). "Multiple Regression Analyses", from *Statnotes: Topics in Multivariate Analysis.* Retrieved 02/28/2009 from http://www2.chass.ncsu.edu/garson/pa765/statnote.htm.

Gillespie, D. F. and C. L. Streeter (1994). "Fitting regression models to research questions for analyzing change in nonexperimental research." *Social Work Research* **18**(4): 239-244.

Greenberg, M.T., Speltz, M.L. and DeKlyen, M. (1993). "The role of attachment in the early development of disruptive behavior problems." *Development and Psychopathology* **5**: 191 - 213.

Hamre, B.K. and Pianta, R.C. (2001). "Early teacher-child relationships and the trajectory of children's school outcomes through eigth grade." *Child Development* **72**(2): 625 - 638.

Hamre, B. K., Pianta, R.C. and Mashburn, A. J. (2008). "Teacher's perceptions of conflict with young students: looking behond problem behaviors." *Social Development* **17**(1): 115 - 136.

Harter, S. (1996). Developmental changes in self-understanding across the 5 to 7 shift. *The 5 ot 7 Year Shift*. A. J. Sameroff and M. M. Haith. Chicago, Chicago University Press**:** 207 - 233.

Henricsson, L. & Rydell, A.M. (2004). Elementary school children with behavior problems: Teacher-child relations and self-perceptions. A prospective study. *Merrill-Palmer Quarterly*, 50(2), 111 - 138.

Howes, C. (1987). Quality indicators in infant and toddler child care: The Los Angeles study. *Quality in child care: What does research tell us?* D. A. Phillips. Washington, DC, National Association for the Education of Young Children. **1:** 81 - 88.

Howes, C. (1999). Attachment relationships in the context of multiple caregivers. *Handbook of Attachment.* J. Cassidy and P. R. Shaver. NY, The Guilford Press**:** 671 - 687.

Howes, C. and Matheson, C.C. (1992). Contextual constraints on the concordance of mother-child and teacher-child relationships. *Beyond the parent: The role of other adults in children's lives*. R. C. Pianta. San Francisco, Josey-Bass Publishers**:** 25-40.

Howes, C., Phillipsen, L.C. and Peisner-Feinberg, E. (2000). "The consistency of perceived teacher-child relationships between preschool and kindegarten." *Journal of School Psychology* **38**(2): 113 - 132.

Howes, C. and Ritchie, S. (2002). *A Matter of Trust: Connecting Teachers and learners in the Early Childhood Classroom.* New York, Teachers College Press.

Jerome, E.M., Hamre, B.K., and Pianta, R.C. (in press). "Teacher-child relationships from kindergarten to sixth grade: Early childhood predictors of teacher-perceived conflict and closeness." *Social Development*.

Kagan, S. L. and N. E. Cohen (1997). Not by chance: Creating an early care and education system for America's Children. The Quality 2000 Initiative. New Haven, CT, The Bush Center in Child Development and Social Policy.

Kesner, J.E. (2000). "Teacher characteristics and the quality of child-teacher relationships" *Journal of School Psychology* **28**(2): 133-149.

Ladd, G.W. (1996). Shifting ecologies during the 5 to 7 year period: Predicting children's adjustment during the transition to grade school. *The Five to Seven Year Shift: The age of reason and responsibility*. A. J. Sameroff and M. M. Haith. Chicago, Chicago University Press**:** 364-386.

Lerner, J.V. and R.M. Lerner (1983). "Temperament and elementary school children's actual and rated academic performance: A test." *Child Psychology and Psychiatry* **26**(1): 125 - 136.

Lynch, M. and Cicchetti, D. (1992). Maltreated children's reports of relatedness to their teachers. *Beyond the parent: The role of other adults in children's lives*. R. C. Pianta. San Francisco, Josey-Bass Publishers**:** 81-107.

Mayseles, O. (2005). Ontongeny of attachment in middle childhood *Attachment in Middle Childhood.* K. A. Kerns and R. A. Richardson. New York, The Guilford Press**:** 1-23.

Meehan, B.T., Hughes, J.N. and Cavell, T.A. (2003). "Teacher-student relationships as compensatory resources for aggressive children." *Child Development* **74**(4): 1145-1157.

Murray, C. and Murray, K.M. (2004). "Child level correlates of teacher-student relationships: An examination of demographic characteristics, academic orientations, and behavioral orientations." *Psychology in the Schools* **41**(7): 751 - 762.

Patterson, C.J. (1990). "Income level, gender, ethnicity and household composition as predictors of children's school based competence." *Child Development* 61: 485 - 494.

Pianta, R.C. (1999). *Enhancing relationships between children and teachers.* Washinton, DC, American Psychological Association.

Pianta, R .C. (2001). *STRS: Student Teacher Relationship Scale Professional Manual,* Psychological Assessment Resources, Inc.

Pianta, R. C. and M. J. Cox, Eds. (1999). *The transition to kindegarten.* Baltimore, MD, Paul H. Brooks Publishing Co.

Pianta, R .C., Kraft-Sayre, M ., R imm-Kaufman, S ., G ercke, N . a nd H igging, T. (1999). "Collaboration i n bui lding pa rtnerships be tween f amilies a nd s chools: T he N ational center for Early Development and Learning's kindergaten transition intervention." *Early Childhood Research Quarterly* **16**: 117 - 132.

Pianta, R .C. a nd N imetz, S .L. (1991). " Relationships be tweeen c hildren and teachers: Associations w ith c lassroom a nd ho me be havior." *Journal of Applied Developmental Psychology* **12**: 379-393.

Pianta, R.C. and Steinberg, M. (1992). Teacher-child relationships and the process of adjusting to school. *Beyond the parent: The role of other adults in children's lives.* R. C. Pianta. San Francisco, Josey-Bass Publishers**:** 61-80.

Pianta, R.C., Steinberg, M. and Rollins, K.B. (1995). "The first two years of school: Teacher-child relationships and deflections in children's classroom adjustment." *Development and Psychopathology* **7**: 295 - 312.

Ramey, S .L., Ramey, C .T., P hillips, M .M., L anzi, R .G., B rezausek, C .M. K atholi, C .R., a nd Snyder, S .W. (2000). H ead S tart children's e ntry i nto pu blic s chool: A r eport on t he National H ead Start/ public early C hildhood Transition D emonstration. Washington, D.C., U.S. Department of Health and Human Services.

Ramey, S.L. and. Ramey, C.L. (1994). "The transition to school." *Phi Delta Kappan* **76**(3): 194 - 199.

Rimm-Kaufman, S., Early, D.M., Cox, M.J., Saluja, G., Pianta, R.C., and Bradley, R.H. (2002). "Early behavioral attributes and teacher's sensitivity as apredictors of competent behavior in the kndergarten classroom." *Applied Developmental Psychology* **23**: 451 - 470.

Shonkoff, J.P. and D.A. Phillips, Eds. (2000). *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, D.C., National Academy Press.

Sroufe, L .A., F leeson, J . (1988). T he c oherence of f amily r elationships. I n R . H inde & J . Stevenson-Hinde (Eds) *Relatonships Within Families: Mutual Influences.* Oxford, England: Clarendon Press.

Turner, P. (1991). Relations between attachment, gender and behavior with peers in preschool." *Child Development* 62: 1475-1488.

U.S. Census Bureau (2000). Census 2000. http://www.census.gov

Van Izjerdoorn, M.H., Sagi, A. and Lambermon, A. (1992). The multiple caretaker paradox: Data from Holland and Israel. *Beyond the parent: The role of other adults in children's lives*. R. C. Pianta. San Francisco, Josey-Bass Publishers**:** 1-25.