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# Associations Between Student-Teacher Relationships and Kindergarten Students' Outcomes

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# Associations Between Student-Teacher Relationships and Kindergarten Students' Outcomes

by

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**ABSTRACT**

The student-teacher relationship (STR) is an important component of a student's success in school. STRs have the potential to serve as an asset for students' well-being and achievement throughout their school career. Current literature suggests that there are two major components of STRs associated with student's academic and behavioral outcomes: closeness and conflict. Research has indicated that STRs characterized by closeness are linked to positive academic and behavior outcomes for students while STRs characterized by conflict are associated with negative academic and behavior outcomes for students. Although research has demonstrated that closeness and conflict have an impact on student outcomes, research on the impact in kindergarten is limited. This study examined the associations between STRs characterized by closeness and conflict with reading, mathematics, and behavior outcomes in kindergarten students ($n$ = 97), as well as the moderating effects of gender on these relationships. Results of the full hierarchical regression models indicated that prior reading and mathematics achievement were the strongest predictors of reading and mathematics outcomes. Closeness did not account for any of the variance in reading, mathematics, or externalizing behavior outcomes. Conflict on the other hand, was a small significant predictor for reading and mathematics outcomes, and a large significant predictor for externalizing behavior outcomes. Implications of these findings and suggestions for future research are discussed.

## CHAPTER I: Introduction

### Statement of the Problem

Since the implementation of No Child Left Behind in 2001, there has been an increasing emphasis on providing every student in America with a "fair, equal, and significant opportunity to obtain a high-quality education" (NCLB; U.S. Congress, 2001, Sec. 1001, para. 1). One suggested method for providing each student this opportunity is to require that every teacher is "highly qualified." More recently, in 2009, the federal government initiated the Race to the Top Fund, a competitive grant program, to encourage states to raise student achievement. One of the reform areas within this initiative focused on hiring and retaining "effective teachers" (U.S. Department of Education, 2009). As part of this reform initiative, schools are required to determine teacher effectiveness by conducting annual teacher evaluations and measuring student performance growth. The underlying belief is that student achievement can be influenced by teacher effectiveness. Therefore, it is important to examine the effects teachers have on student achievement and the teacher characteristics that are associated with these positive outcomes for students (Bill & Melinda Gates Foundation, 2010).

Research supporting the idea that teachers have an effect on student achievement is increasing (Hattie, 2009). Research has shown that within school factors have a more profound impact on student achievement than between school factors, which indicates that teachers may have more of an impact on achievement than other school factors (Konstantopoulos, 2005). Furthermore, studies have shown that teacher or classroom differences account for approximately 16 to 60 percent of the variance in student achievement compared to school-level

factors that account for approximately zero to 20 percent (Alton-Lee, 2003). Although previous research has indicated that teachers make a difference when it comes to student achievement, far fewer studies have pin-pointed the specific teacher characteristics that are related to student achievement (Phillips, 2010).

According to NCLB, a "highly qualified teacher" must have a bachelor's degree, full state certification (defined by the state), and must demonstrate competency (defined by the state) in each core academic subject (NCLB; U.S. Congress, 2001). However, findings from previous research are mixed when determining whether or not these factors are strongly related to student achievement (Goldhaber, 2002). Research has also demonstrated that there are many other factors and qualities aside from certification and content knowledge that are important to consider when determining whether or not a teacher is effective in increasing student achievement (Stronge, 2002). Determining the direct causes of improved student achievement is a very complicated task; however, researchers are exploring the assumption that factors unrelated to certification (e.g., classroom environment, relationships) are possibly more important than certification and training experience (Stronge, Ward, & Grant, 2011).

One dimension of teacher effectiveness that is unrelated to certification and training experience is a teacher's personal qualities, most notably, the teacher's affective skills. Specific components of personal qualities that are related to teacher effectiveness are teachers' caring, positive relationships with students, the fairness and respect shown in the classroom, encouragement of responsibility, and enthusiasm (Stronge, Ward, & Grant, 2011). Overall, when examining differences between higher performing and lower performing teachers based on student achievement, Stronge, Ward, and Grant (2011) found that high performing teachers differed most from low performing teachers in classroom management and personal qualities

(e.g., caring, positive relationships with students, fairness and respect, encouragement of responsibility, enthusiasm).

In regard to personal qualities and affective skills, several researchers have studied the importance of student-teacher relationships (STRs) and their impact on student outcomes (Birch & Ladd, 1998; Buyse, Verschueren, Verachtert, & Van Damme, 2009; Hamre & Pianta, 2001; Roorda, Koomen, Split, & Oort, 2011). The theoretical foundation for STRs is based on attachment theory, developmental systems theory, and empirical research examining STRs. One of the leading researchers of STRs, Pianta and his colleagues, defined STRs as having three distinct features: closeness, conflict, and dependency (Pianta, 1999; Pianta & Steinberg, 1992; Pianta, Steinberg, & Rollins, 1995). The first quality, closeness, refers to the degree of warmth, support, and open communication between the teacher and student. The next quality, conflict, refers to a disconnection between the student and teacher or a high level of antagonistic interactions. The final quality, dependency, relates to the degree in which the child depends (e.g., clingy, needy) on the teacher (Pianta, 1999, 2001).

Previous studies have indicated that positive, supportive, close relationships are beneficial for students and result in better behavioral, academic, and social outcomes (Buyse et al., 2009; Hamre & Pianta, 2001; Roorda et al., 2011). In particular, researchers have found that students who experience positive STRs (high closeness, low conflict) tend to have higher academic engagement and achievement as well as more positive behavioral outcomes (Hamre & Pianta, 2001; Silver, Measelle, Armstrong, & Essex, 2005). On the other hand, students who experience negative STRs (low closeness, high conflict) tend to have lower academic engagement and achievement and more behavior difficulties (Birch & Ladd, 1998; Hamre & Pianta, 2001). More specifically, research has indicated that from first through eighth grade,

students with STRs characterized by more conflict and dependency tend to have poorer letter grades and standardized test performance in both reading and mathematics (Hamre & Pianta, 2001). In terms of behavioral outcomes, researchers have also found that STRs that are characterized by conflict are typically related to problematic behavioral and that the problematic behavior tends to be persistent (Silver et al., 2005). Because there have been multiple significant relationships found among STRs and important student outcomes (i.e., academic and behavioral outcomes), it is important to further explore these relationships to inform interventions. As with any relationships, there is likely a bidirectional relationship between STRs and student outcomes, such that STRs may not only result in higher achievement, but higher achievement may also result in better student-teacher relationships. However, the current study aimed to study the influence of the STRs on student outcomes. Past research has found that STRs in kindergarten predict achievement and behavior outcomes through eighth grade (Hamre & Pianta, 2001). This provides a rationale for studying this directionality between the variables. In addition, because achievement and behavior are important outcomes within the school setting, determining novel intervention targets (i.e., STRs) could provide another option to assist early intervention and prevention to improve student outcomes.

In addition to clarifying relationships among STRs and student outcomes, many studies have shown gender to be a specific moderator of the relationships. In terms of academic outcomes, researchers have found that effects of STRs on engagement were stronger for boys, whereas effects on achievement were stronger for girls (Roorda et al., 2011). Moreover, research indicates that boys tend to have more conflict present in their relationships with their teachers and that highly conflictual relationships were associated with poorer academic outcomes for boys from first through eighth grade. In terms of behavioral outcomes associated with STRs,

researchers have found that girls with highly close relationships had significantly better behavioral outcomes, while high ratings of closeness for boys in kindergarten were not associated with later behavioral outcomes (Hamre & Pianta, 2001). Additionally, there were significant correlations showing longer lasting effects between high conflict relationships and more discipline referrals for boys (Hamre & Pianta, 2001). Although the research on STRs that has explicitly examined gender is limited to two studies, there is evidence that this is an important child factor to consider when understanding the relationship between STRs and academic and behavioral outcomes.

**Purpose of the Current Study**

The purpose of the present research study is to contribute to the literature and inform interventions related to STRs through examination of the associations between STRs and students' academic skills and externalizing behavior in kindergarten. Previous research has been limited in that it has not examined STRs in relation to academic skills while accounting for previous academic skills. Past research has also not included more objective academic measures or measures that are sensitive to growth. For instance, most of the current research has included measures such as letter grades and standardized test scores, which can be subjective and not always accurate measures of a student's academic performance. These measures of academic performance are also not always sensitive to change in a student's acquired skills. In terms of measuring externalizing behavior, researchers have not typically included rating scales of externalizing behavior that can be used for progress monitoring. Rather, prior studies have examined STRs in relation to broader measures of externalizing behavior (e.g., absence of positive work habit marks, discipline referrals) that are less sensitive to change in externalizing behavior. The current study adds to the literature in three distinct ways. First, it provides insight

into the relationship between STRs and kindergarten students' reading and mathematics skills while accounting for prior knowledge. Second, this study includes ratings of externalizing behavior that are sensitive to change over time. Third, the current study adds to the very few studies regarding the impact of gender on the associations between STRs and academics and STRs and externalizing behavior.

**Research Questions**

The current study aimed to answer the following questions:

Reading Outcomes

1. To what extent are student-teacher relationships characterized by closeness associated with kindergarten students' reading skills at time three (May 2012) while controlling for skills at time one (November 2011)?
2. To what extent are student-teacher relationships characterized by conflict associated with kindergarten students' reading skills at time three while controlling for skills at time one?
3. To what degree is the relationship between student-teacher relationships characterized by closeness and reading skills stronger for males than females?
4. To what degree is the relationship between student-teacher relationships characterized by conflict and reading skills stronger for males than females?

Mathematics Outcomes

5. To what extent are student-teacher relationships characterized by closeness associated with kindergarten students' mathematics skills at time three while controlling for skills at time one?

6. To what extent are student-teacher relationships characterized by conflict associated with kindergarten students' mathematics skills at time three while controlling for skills at time one?
7. To what degree is the relationship between student-teacher relationships characterized by closeness and mathematics skills stronger for males than females?
8. To what degree is the relationship between student-teacher relationships characterized by conflict and mathematics skills stronger for males than females?

Externalizing Behavior Outcomes

9. To what extent are student-teacher relationships characterized by closeness associated with kindergarten students' externalizing behavior outcomes at time three?
10. To what extent are student-teacher relationships characterized by conflict associated with kindergarten students' externalizing behavior outcomes at time three?
11. To what degree is the relationship between student-teacher relationships characterized by closeness and externalizing behavior outcomes stronger for males than females?
12. To what degree is the relationship between student-teacher relationships characterized by conflict and externalizing behavior outcomes stronger for males than females?

**Hypotheses**

Regarding research questions 1 and 5, it was hypothesized that student-teacher relationships characterized by closeness would be positively associated with higher reading and mathematics scores in kindergarten. This hypothesis was based on previous research suggesting that closeness is associated with positive academic outcomes for children in elementary school (Buyse et al., 2009; Roorda et al., 2011).

It was also hypothesized that STRs characterized by more conflict would be associated with lower reading (question 2) and mathematics scores (question 6). This hypothesis was based on previous research suggesting that conflict is associated with lower academic outcomes for children in first through eighth grades (Hamre & Pianta, 2001).

Based on previous research suggesting that closeness is more strongly associated with academic outcomes for girls than for boys in elementary school (Roorda et al., 2011), it was hypothesized that the associations between closeness and reading (question 3) and closeness and mathematics (question 7) would be stronger for girls.

Because the literature indicates that conflict is more strongly associated with academic outcomes for boys in elementary school (Hamre & Pianta, 2001), it was hypothesized that the associations between conflict and reading (question 4) and conflict (question 8) and mathematics would be stronger for boys.

Regarding research question 9, it was hypothesized that student-teacher relationships characterized by closeness would be negatively associated with externalizing behavior in kindergarten (i.e., higher ratings of closeness would be associated with lower ratings of externalizing behavior). This hypothesis was based on previous research suggesting that closeness is associated with positive work-habits and more prosocial behavior for children in elementary school (Birch & Ladd, 1998; Silver et al., 2005).

It was also hypothesized that student-teacher relationships characterized by conflict (question 10) would be positively associated with externalizing behavior in kindergarten (i.e., higher ratings of conflict would be associated with higher ratings of externalizing behavior). This hypothesis was informed by previous research suggesting that conflict is associated with more

antisocial behavior and aggression for children in elementary school (Birch & Ladd, 1998; Hamre & Pianta, 2001).

Finally, previous research suggests that closeness is more strongly associated with future behavior outcomes for girls (Hamre & Pianta, 2001) while boys tend to exhibit more externalizing behavior in kindergarten, which is associated with conflict (Silver et al., 2005). Considering past research findings, it was hypothesized that the associations between closeness and externalizing behavior would be stronger for girls (question 11) and that the associations between conflict and externalizing behavior would be stronger for boys (question 12).

**Significance of the Study**

Student-teacher relationships have been shown to be important to the success of students, to the extent that they are currently a component of many teacher evaluation systems (Marzano, 2011). It is crucial that the limited research base be enhanced with more direct links between STRs and student outcomes such as academic achievement and behavior for multiple reasons. First, if teacher performance, and possibly salary, is going to be influenced by evaluations that include STRs, it is important that the associations between STRs and student performance are supported. Additionally, if STRs are influential on student outcomes, it would be beneficial for teachers and student support staff (e.g., school psychologists) to understand the relationships and potential possibilities for improving those relationships. Finally, teachers report externalizing behavior as a common concern in the classroom. Therefore, if STRs are associated with externalizing behavior, this relationship may provide an avenue to improve outcomes among youth with problematic externalizing behaviors.

**Definition of Key Terms**

**Student-teacher relationship.** The student-teacher relationship is the teacher's perception of his or her relationship or connection with the student. In the present study, this includes teacher ratings of his or her closeness to the child, as well as the level of conflict experienced.

**Closeness.** Closeness is "the degree to which a teacher experiences affection, warmth, and open communication with a particular student" (Pianta, 2001, p. 2).

**Conflict.** Conflict is "the degree to which a teacher perceives his or her relationship with a particular student as negative and conflictual" (Pianta, 2001, p.2).

**Academic skills.** Academic skills are defined in terms of both reading and mathematics skills. Reading skills refer to a child's ability to accurately identify letter sounds within a one-minute time limit. Mathematics skills refer to a child's ability to accurately identify a missing number in an order of three consecutive numbers within a one-minute time limit.

**Externalizing behavior.** Externalizing behavior is defined as "a grouping of behavior problems that are manifested in children's outward behavior and reflect the child negatively acting on the external environment" (Liu, 2004, p. 96). Externalizing behavior can include a child's propensity to argue, destroy objects, be disobedient, be stubborn, have a temper, and/or threaten others.

**Moderator.** A moderator is a variable that affects the strength and/or direction of the relationship between independent and dependent variables (Cohen, Cohen, Aiken, & West, 2003). In this study, the moderator was gender (i.e., male and female).

## CHAPTER II: Review of the Literature

Relevant research on STRs will be reviewed in this chapter. First, the conceptual framework for STRs will be reviewed. Next, the literature on how STRs tie to important student outcomes (i.e., achievement, engagement, and behavior) and specific moderators of the relationship between STRs and achievement will be outlined. Finally, the need for the current study is discussed.

### Conceptual Framework

The conceptual framework for STRs is predominantly influenced by two major theories of development: attachment theory and developmental systems theory. Attachment theory provides the primary foundation for the framework of STRs. Bowlby's (1982) attachment theory posits that infants develop their attachment to their primary caregiver within the first 18 months. During these early months of life, infants/toddlers engage in behaviors (e.g., crying) that elicit responses from their caregiver(s). Throughout this time, children begin to develop a sense of the attachment relationship that dictates their understanding and expectations of the dependability and responsiveness of others (Bowlby, 1982), thus influencing their development in general (Ainsworth, Blehar, Waters, & Wall, 1978). The expectations that children develop regarding relationships with caregivers during this time then transfer to the school environment when forming relationships with their teachers.

More recently, the developmental systems theory (DST) has provided a basis for understanding the intricacies of STRs (Pianta, 1999). The DST is a theory related to human

development that states that children are part of organized and dynamic environments that help structure an individual (Lerner, 2002). A person's environment includes multiple contexts that influence the individual which are reciprocally influenced by the individual. At the closest level (proximal), teacher and child characteristics reciprocally influence STRs. These individual characteristics include, yet are not limited to gender, temperament, personality, and self-esteem, as well as one's perception of the other person in the relationship. The characteristics of both student and teacher influence how they interact, respond, and behave within the relationship (Pianta, 1999). DST also posits that at the distal level, external factors such as school climate (e.g., support students receive from other faculty) and physical features of classrooms can affect the student-teacher relationship (Hamre & Pianta, 2006). Taken together, the DST postulates that each person in a relationship brings personal biological and cognitive factors to a relationship that is also influenced by additional external social factors.

Based on the attachment theory, DST, and empirical research examining STRs, Pianta and colleagues defined STRs as having three distinct features: closeness, conflict, and dependency (Pianta & Steinberg, 1992; Pianta, Steinberg, & Rollins, 1995). Pianta and Nimetz (1991) developed the initial version of the Student-Teacher Relationship Scale (STRS) through a pilot study with 24 kindergarten teachers and 72 kindergarten students. After conducting an exploratory factor analysis, two subscales emerged—"positive relationship" and "dependent." After the initial development of the STRS, and revisions to ensure that the measure was as concise and accurate as possible, a three-factor model of STRs was created to include more negative characteristics of relationships (Pianta, 1999). The resulting three-factor model then became a spectrum of variation of closeness and conflict within STRs with the addition of dependency to measure the level of autonomy in the classroom. The first factor or aspect of the

STR is closeness. Closeness refers to the degree of warmth, support, and open communication between the teacher and student. The next factor or quality, conflict, refers to a disconnection between the student and teacher or a high level of coercive or antagonistic interactions. The final quality, dependency, relates to the degree in which the child depends (e.g., is clingy, needy) on the teacher (Pianta, 1992). The three factor model has been supported through research with 1,500 students from preschool to third grade and 200 teachers, which formed the normative sample for the STRS (Pianta, 2001).

**Student-Teacher Relationships and Student Outcomes**

Positive STRs are important for students' learning because they increase students' self-esteem and cause students to feel like they belong in the classroom (Pianta, 1999). Additionally, teachers who have effectively narrowed the achievement gap within their classes tend to convey loving support, compassion, and interest in getting to know their students' talents (Benard, 2003). In the following sections, findings on the relationship between STRs and achievement/engagement and behavior will be outlined.

**Achievement and engagement outcomes.** Roorda, Koomen, Split, and Oort (2011) conducted a meta-analysis that examined the influence of student-teacher relationships (STRs) on school engagement and academic achievement. For this meta-analysis, the authors included 92 articles detailing 99 studies that included adequate statistical information to calculate effect sizes, included students from preschool to grade 12, measured STRs, engagement, and achievement separately, measured STRs simultaneously with engagement and achievement, and measured STRs at the student-teacher level rather than the group level. After selecting studies for inclusion, the authors calculated four separate effect sizes for positive (i.e., more closeness and involvement) and negative relationships (i.e., more conflict) with engagement and achievement.

Overall, they found that the associations between STRs and engagement and achievement were in the expected directions (e.g., positive STRs related to improved engagement and achievement, while negative aspects of the STRs related to decreased engagement and achievement). Furthermore, they found that the relationship between STRs and engagement were stronger than between STRs and achievement. The authors also found that the calculated effect sizes depended on the methodology used within the studies, student characteristics, and teacher characteristics within the studies. Specifically, effect sizes for STRs and engagement were larger in studies that used the same informant while effect sizes for STRs and achievement were larger in studies that used a different informant. Also, studies that used grades rather than test scores to measure achievement had larger effect sizes for positive relationships and achievement. The authors also found that the relationships between variables were moderated by student characteristics. In particular, the effect sizes for positive relationships and achievement and engagement were larger in studies with secondary schools while effect sizes for negative relationships and reduced engagement and achievement were larger in primary school studies. Finally, the authors found that effect sizes for positive and negative relationships with engagement were larger for boys whereas positive relationships and achievement were larger for girls. This means that both positive and negative relationships had a large effect on boys' engagement whereas positive relationships had a large effect on girls' achievement. In summary, this meta-analysis added to the literature by providing evidence for significant relationships between STRs and student engagement and achievement. It also highlighted student characteristics that are important to consider when examining these relationships.

Hamre and Pianta have been key researchers of STRs. In one of their preliminary studies, Hamre and Pianta followed 179 children from kindergarten to eighth grade to determine the

long-term effects of STRs on academic and behavioral outcomes (Hamre & Pianta, 2001). To measure academic outcomes, researchers gathered longitudinal data for each student including mathematics and language arts grades and standardized test scores (i.e., Iowa Test of Basic Skills). To measure cognitive development, children were given the vocabulary subtest of the Stanford-Binet Intelligence Scale-Revised, Fourth Edition (SB-FE; Thorndike, Hage, & Sattler, 1986). At the end of kindergarten, teachers rated the STRs using the Student-Teacher Relationship Scale (STRS; Pianta, 1992), which measures Conflict, Closeness, and Dependency. Hamre and Pianta (2001) found that teachers reported more conflict and less closeness with boys than girls. Correlations found between the STRS factor scores and test performance indicated that STRs that were characterized by high conflict and dependency were associated with poorer academic outcomes for boys from first through eighth grade. Although some significant correlations were found for girls, they were much weaker than the correlations revealed for boys.

Buyse et al. (2009) conducted a study, as part of a larger longitudinal study, in Belgium that examined the impact of STRs at both the individual and classroom level on children's adjustment to school. When measuring children's adjustment to school, the researchers conceptualized adjustment as including dimensions such as academic achievement (e.g., reading and mathematics skills) and psychosocial adjustment (e.g., children's aggressive behavior, popularity with peers, and feelings of well-being). Participants in the beginning of this study included 3,798 kindergarteners from 122 schools in Belgium. At the end of the study when the participants were in the third grade, 3,582 of the original sample were still enrolled in the study. To measure the quality of STRs, teachers completed a shortened Dutch version of the Student-Teacher Relationship Scale (STRS; Pianta et al, 2005), which included four items relating to conflict and four items relating to closeness. To determine relational classroom climate in first-

grade, researchers averaged the scores for student-teacher closeness and student-teacher conflict for all children in each classroom. In this study, academic achievement was measured using the Word-Reading Test (Moelands, Kamphuis, & Rymenans, 2003; Moelands & Rymenans, 2003) in first, second, and third grade; a shortened form of a language test (Kindergarteners' Language Achievement Test for Flanders; Citogroep, 2003) at the end of kindergarten; and curriculum-based mathematics achievement tests specifically designed for the study were administered at each grade level. Results of multiple hierarchical regression analyses revealed a small, yet significant effect of student-teacher closeness on mathematics achievement in first grade (i.e., higher average level and individual level of closeness resulted in higher mathematics scores). However, the researchers noted that based on the proportion of explained variance (0%), the relationship variables did not substantially influence children's achievement.

In conclusion, researchers have found multiple connections between STRs and academic outcomes. Several studies, including a large meta-analysis, found that positive aspects of STRs (i.e., closeness) were significantly and positively associated with academic achievement and engagement (Buyse et al., 2009; Roorda et al., 2011). Additionally, many studies found that negative aspects of STRs (e.g., conflict, dependency) were significantly and negatively associated with academic achievement and engagement (Hamre & Pianta, 2001; Roorda et al., 2011). However, through the research, some studies have found that the STR variable did not change student's achievement to a large extent (Buyse et al., 2009). Some studies have also indicated that gender moderates the relationship between STRs and academic outcomes. Roorda and colleagues (2011) found that the effects of STRs were stronger for boys' academic engagement, whereas the effects on achievement were stronger for girls. Additionally, Hamre and Pianta (2001) found that boys tend to have more conflict present in their relationships with

teachers and that higher levels of conflict are associated with poorer academic outcomes. The presented studies provide data supporting the associations between STRs and academic outcomes as well as provide short-term and long-term implications that STRs can have for students. Finally, the literature also indicates that gender may play an important role in these relationships.

**Behavior outcomes.** The relationship between STRs and student behavior has also been examined. Birch and Ladd (1998) conducted a study that examined the associations between STRs and students' behavioral outcomes. This study included 199 kindergarten students (48% male, 52% female) and their teachers ($n$ = 17) from seven public schools in the Midwest United States. The children were mostly Caucasian (81%) and African American (15%) and were primarily from low- to middle-socioeconomic status families. To measure behavior, the authors used subscales of the Child Behavior Scale (CBS; Ladd & Profilet, 1996) including Aggressive Behavior, Hyperactive-Distractible Behavior, Prosocial Behavior, Asocial Behavior, and Anxious-Fearful Behavior as well as peer perceptions of aggression, which were obtained through student interviews. The teachers' perceptions of their relationships with their students were measured using the Student-Teacher Relationship Scale (STRS; Pianta et al., 1995), which measured closeness, conflict, and dependency.

The researchers conducted correlational analyses to determine the associations between children's early behavior patterns and their STRs in kindergarten and first-grade. They found that higher levels of antisocial behavior were related with more conflict and less closeness in both kindergarten and first grade. Additionally, prosocial behavior was positively correlated with teacher-child closeness and was negatively associated with teacher-child conflict. The researchers also conducted regression analyses to determine the extent to which the children's

behavior in first grade could be predicted based on the quality of their STRs in kindergarten. They found that less conflictual STRs in kindergarten significantly accounted for children's prosocial behavior in first grade (Birch & Ladd, 1998).

In a study conducted by Hamre and Pianta (2001) in which they studied academic and behavioral outcomes related to STRs, they measured behavioral outcomes through analyzing longitudinal data (from kindergarten to eighth grade; $n$ = 179) that included work-habit marks (e.g., listening, participation, cooperation, study habits) and disciplinary records (e.g., defiance of school authority, classroom disruption, unexcused absences). The researchers also measured students' behavior in the classroom in kindergarten using the Behavior Problems subscale of the Teacher-Child Rating Scale (TCRS; Hightower et al., 1986), which included factors of conduct, learning, and shy/anxious problems.

Related to behavior, Hamre and Pianta (2001) found that both boys and girls with high conflict STRs had fewer positive work-habit marks in elementary school and more discipline referrals in upper elementary school. Moreover, in middle school, the significant negative correlations between conflict and positive work-habit marks continued for boys. In terms of dependency, boys with highly dependent relationships were found to have more behavioral difficulties while girls did not. Interestingly, girls with highly close relationships had significantly better behavioral outcomes, while high ratings of closeness for boys in kindergarten were not associated with later behavioral outcomes. Overall, Hamre and Pianta (2001) found that STRs strongly predicted behavioral outcomes more so than academic outcomes from kindergarten through eighth grade. Most importantly, they found that children in kindergarten with behavior problems who were able to develop more positive relationships with their teachers

were more likely to have less behavioral difficulties in the future than their peers with behavior problems and more negative relationships (Hamre & Pianta, 2001).

Silver and colleagues (2005) conducted a study in which they examined the relationship between child and family characteristics with students' externalizing behavior trajectories from kindergarten to third grade. Within this study, researchers also examined the linkage between STRs and externalizing behavior trajectories from kindergarten to third grade. This study included 283, mostly Caucasian (~90%) children that were part of a larger longitudinal study. During preschool, mothers rated their child's hostile-aggressive behavior problems using the Preschool Behavior Questionnaire (Behar & Stringfield, 1974). During the kindergarten year, teachers completed the STRS (Pianta et al., 1995) to rate the quality of their relationships with the children. During kindergarten, first, and third grade, the children's externalizing behavior was reported by teachers through completion of the Mental Health Subscales of the MacArthur Health and Behavior Questionnaire (HBQ; Boyce, Essex, Woodward, Measelle, Ablow, & Kupfer, 2002; Essex et al., 2002). The researchers found that students' gender and initial levels of externalizing behavior (reported in preschool) significantly predicted externalizing behavior in kindergarten. In particular, they found that male students and students with higher levels of reported externalizing behavior in preschool were more likely to receive higher teacher-ratings of externalizing behavior in kindergarten. Furthermore, after controlling for gender, levels of past externalizing behavior, and negative parenting practices, the researchers found that STRs characterized by more conflict in kindergarten predicted increases in externalizing behaviors from kindergarten to third grade. Additionally, a significant interaction between STRs characterized by closeness and externalizing behaviors implied that close STRs in kindergarten were associated with decreased problem behaviors, especially for children who entered

kindergarten with high levels of externalizing behavior. In other words, students that entered school with high levels of externalizing behavior, yet developed close relationships with their teachers were more likely to have less problematic behaviors in first and third grade indicating that positive STRs have a positive influence on students' behavior.

In a longitudinal study conducted by Buyse et al. (2009) in Belgium, the link between STRs and children's aggressive behaviors were examined among children from kindergarten ($n$ = 3,798) to third grade ($n$ = 3,582). Various aspects of psychosocial adjustment were measured including aggressive behaviors using the Child Behavior Scale (CBS; Ladd & Profilet, 1996). After conducting multiple hierarchical regression analyses, the researchers found that higher group average levels and individual levels of student-teacher conflict in first grade were associated with lower psychosocial adjustment, particularly more aggressive behavior. Furthermore, these effects were most pronounced in first grade and carried over to third grade, but were somewhat weaker as time passed. Overall, Buyse et al. concluded that STRs had a stronger effect on psychosocial adjustment, which includes children's aggressive behaviors, than on academics.

Meehan and colleagues (2003) also studied the affiliation between qualities of STRs and children's levels of aggression. The sample in this study included 140 second and third grade participants of a multi-component intervention program for aggressive children. The sample consisted of mostly males and was 37% Caucasian, 41% African-American, and 22% Hispanic. Relationships were measured by student report using the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985) and by teacher and parent report using revised versions of the NRI. The NRI is a structured interview that gathers information regarding types of social support and conflict. Peers in the classroom provided nominations of children who exhibited

aggressive behavior using an adapted version of the Revised Class Play Method (Masten, Morrison, & Pelligrini, 1985). Teachers rated problem behaviors using the Aggressive Behavior or Delinquency subscales of Achenbach's (1991) Teacher Report Form (TRF). After conducting hierarchical multiple regression analyses and controlling for initial levels of aggression, race/ethnicity, and parenting factors, the researchers found that teacher support during the first two years was not predictive of peer-rated aggression in the second year. However, teacher support during the second year predicted lower levels of teacher-rated aggression in year two. The authors noted that the difference between these findings is likely a source effect. The researchers further found that the African American and Hispanic children with aggressive behavior were less likely to experience positive and warm relationships with teachers than Caucasian students. Moreover, the African American and Hispanic children with aggressive behavior were more likely to benefit from the positive relationships than the Caucasian students.

In 2008, Hamre, Pianta, Downer, and Mashburn conducted a study to further analyze teacher's perceptions of conflictual relationships with students and problem behaviors using a large sample of preschoolers ($N = 2282$) and teachers ($N = 597$). In this study, students' social competence and problem behaviors were measured using the Teacher-Child Rating Scale (TCRS; Hightower, Work, & Cowen, 1986); STRs were measured using the STRS (Pianta et al., 1995); and teacher and classroom characteristics were gathered through questionnaires and measures that surveyed demographics, perceptions regarding children, teachers' depressive symptoms, and feelings of self-efficacy. Using hierarchical linear modeling, the authors found a strong association between child problem behavior and teacher-rated conflict ($r = .73$). In fact, over half (53%) of the variance of the teachers' reports of their relationships was explained by the teachers' judgments of problem behavior.

In conclusion, researchers have found that STRs that are characterized by conflict are typically related to problematic behavior and that the problematic behavior tends to be long-lasting. Specifically, highly conflictual relationships were related to more discipline referrals for students (Hamre & Pianta, 2001) and more aggressive behavior (Buyse et al., 2009). Further, relationships with much conflict were linked to increases in externalizing behavior from kindergarten to third grade (Silver et al., 2005). On the other hand, positive or close relationships were associated with positive work habit marks (Hamre & Pianta, 2001), more prosocial behavior, and decreases in externalizing behavior (Silver et al., 2005). Researchers have also found that STRs have a stronger impact on behavior than on academics and engagement (Buyse et al., 2009; Hamre & Pianta, 2001).

**Child Characteristics Related to Student-Teacher Relationships**

The association between STRs and academic and behavioral outcomes are influenced by child characteristics. Two primary child characteristics that have been shown to be important in the past literature include gender and developmental level.

**Gender and student-teacher relationships.** Many research studies have shown gender to be a moderator of the relationship between student-teacher relationships and students' academic and behavior outcomes. For example, Roorda and colleagues (2011) found that effects of STRs on engagement were stronger for boys whereas the effects on achievement were stronger for girls. Hamre and Pianta (2001) also had several findings that illustrated the moderating effect of gender on student-teacher relationships. First, they found that girls with highly close relationships had significantly better behavioral outcomes, while high ratings of closeness for boys in kindergarten were not associated with later behavioral outcomes. Additionally, they discovered that there were longer lasting significant correlations between high

conflict relationships and more discipline referrals for boys. Finally, Hamre and Pianta (2001) found that boys tended to have more conflict present in their relationships with their teachers and the highly conflictual relationships were associated with poorer academic outcomes for boys from first through eighth grade. Through these studies, it is evident that gender can moderate the association between student-teacher relationships and student outcomes, however the research on the moderating effects of gender is limited and has presented mixed results in some instances.

**Student-teacher relationships across developmental levels.** Research has indicated that STRs tend to have stronger associations with student outcomes in younger students than in older students. In their meta-analysis, Roorda and colleagues (2011) found that in the primary school population, negative relationships were more influential on engagement than positive relationships indicating that negative relationships can have more detrimental effects for students in primary school (Roorda et al., 2011). Moreover, researchers have found that the associations between STRs and behavior may have lasting effects. Specifically, Hamre and Pianta (2001) found that children in kindergarten with behavior problems who were able to develop more positive relationships with their teachers were more likely to have less behavioral difficulties in the future than their peers with behavior problems and more negative relationships (Hamre & Pianta, 2001). These findings highlight the need to examine STRs in relation to younger students because STRs seem to have the largest effects with this population.

**Summary of Literature**

In sum, throughout the extant literature, STRs (particularly closeness and conflict) have demonstrated significant associations with students' academic achievement and behavior outcomes. In terms of academic outcomes, research has found that students with STRs characterized by more closeness are more likely to have better academic outcomes while

students with STRs characterized by more conflict tend to have poorer academic outcomes (Buyse et al., 2009; Hamre & Pianta, 2001; Roorda et al., 2011). Research has indicated that relationships characterized by higher levels of conflict are associated with higher levels of externalizing and antisocial behavior and lower levels of positive work habits (Birch & Ladd, 1998; Hamre & Pianta, 2005; Silver et al., 2005). Importantly, research has also indicated that when students with high levels of externalizing behavior experience close STRs, they are more likely to have decreased levels of externalizing behavior in the future (Silver et al., 2005). Finally, research has indicated that STRs are particularly important for younger children and are more strongly associated to academic and behavioral outcomes within the early childhood population.

Although previous research has indicated that STRs can be influential on students' academic and behavioral outcomes, the research has not thoroughly investigated the implications of STRs in kindergarten, which is a critical time for students to develop a positive attitude toward school and have positive academic and behavioral experiences that support adaptive long-term outcomes. Moreover, the literature is limited in terms of gender differences among kindergarten students' relationships with their teachers and the associations of these differences with student outcomes. There is not substantial evidence indicating that gender moderates the associations between STRs and student outcomes in kindergarten.

**Purpose of the Current Study**

The purpose of the present research study was to contribute to the literature base and inform interventions related to STRs through examination of the associations between STRs and student reading and mathematics skills and externalizing behavior in kindergarten. Although previous research has indicated associations between STRs and academic outcomes, the

measures used to support this relationship were not intended to measure growth or to be used for frequent progress monitoring. Rather, previous research has examined STRs in relation to broad, measures of students' academic performance that may not be direct assessments of academic skills (i.e., letter grades and standardized tests). Furthermore, research is limited in that it has not examined STRs in relation to observable forms of externalizing behavior (e.g., strong temper, argues, destroys things) that have potential for direct intervention. Rather, previous research has used measures of externalizing behavior (e.g., absence of positive work habit marks, discipline referrals) that do not accurately measure distinct, externalizing behaviors that can be modified and progress monitored. This study provides insight into the impact of STRs on kindergarten academic skills in both reading and mathematics and aspects of externalizing behavior that have not been included previously. Furthermore, the current study adds to the limited research base regarding the impact of gender on the associations between STRs and academics and STRs and externalizing behavior within the kindergarten population.

## CHAPTER III: Method

The current study explores the associations between STRs and kindergarten students' reading and mathematics skills. Furthermore, the study examined the association between STRs and externalizing behavior and the influence of gender on the associations. This study was quantitative in nature and analyzed data from a secondary source. The original study from which data were drawn was longitudinal with three waves of data collection (fall, winter, spring). The following chapter describes the data source for the study, the measures that were administered, procedures of data collection, and an overview of analyses used to answer the research questions.

### Participants

**Data source.** The current study was a secondary analysis of an archival dataset. That dataset is part of a larger research project funded by the Society for the Study of School Psychology from a grant awarded to Dr. Ogg at the University of South Florida. The purpose of the funded study is to investigate parent and child factors related to school readiness. The data were collected at two sites, one in the U.S. and one in Canada. The dataset used in the current study was just the data from the U.S. sample. The specific dataset that was analyzed in the current study includes data collected from kindergarten students and their teachers. The author of this proposal was an active member of the research team that collected and entered these data in the Fall of 2011 and Spring of 2012. The Institutional Review Board (IRB) for human subject research at the University of South Florida (USF) approved study procedures and personnel for the larger research project. A separate IRB approval was obtained for the current study to analyze the archival dataset.

**Sample.** All students were enrolled in public kindergarten classrooms in the Southeast United States. The student demographics for the population in the current study are listed in Table 1. The average age of the student participants was 69.31(4.40) months.

Table 1

*Demographics of Student Participants*

| Characteristic | Total ($n$ = 97) |
|---|---|
| Gender | |
| Male | 52 (53.6%) |
| Female | 45 (46.4%) |
| Child Race/Ethnicity | |
| American Indian or Alaskan Native | 1 (1%) |
| Asian | 3 (3.1%) |
| Black or African-American | 9 (9.3%) |
| Hispanic or Latino | 20 (20.6%) |
| Native Hawaiian or Pacific Islander | 0 |
| White | 51 (52.6%) |
| Multi-racial* | 12 (12.4%) |
| Other | 1 (1%) |
| Family Income ($n$ = 96) | |
| Less than $5000 | 0 |
| $5001-10000 | 6 (6.2%) |
| $10001-20000 | 3 (3.1%) |
| $20001-30000 | 8 (8.2%) |
| $30001-40000 | 14 (14.4%) |
| $40001-50000 | 9 (9.3%) |
| $50001-60000 | 11 (11.3%) |
| $Over 60000 | 45 (46.4%) |

*Multi-racial includes students designated as multiple races/ethnicities, not necessarily "multi-racial"

The teacher participants in the study were female kindergarten teachers from seven public schools in the southeast. Teacher demographic information was not collected in the larger study; however characteristics of the sampled schools are available in Table 2. The total enrollment at the schools ranged from 403-872 and served either kindergarten through fifth grade or prekindergarten/Headstart through fifth grade. Two of the schools in the sample were Title I

funded schools, one school had a magnet program, and one school was located on a military base. Moreover, the teachers at school G co-taught classrooms. Additional school characteristics can be found in Table 3 (Florida Department of Education, 2011; GreatSchools, 2013; Hillsborough County Public Schools; 2013).

**Student Measures**

Various assessments were given to students and teachers to assess academic and behavior outcomes and STRs. A timeline of assessments is provided in Table 2.

Table 2

*Study Assessment Timeline*

| Time Point | Assessment |
|---|---|
| November 2011 | Child Assessments: AIMSweb TEL (LSF); AIMSweb TEN (MNF)<br>Parent Questionnaire: Demographics form |
| February 2012 | Child Assessments: AIMSweb TEL (LSF); AIMSweb TEN (MNF) |
| May 2012 | Teacher Questionnaires (BRIEF, STRS)<br>Child Assessments: AIMSweb TEL (LSF); AIMSweb TEN (MNF) |

*Note*. TEL = Tests of Early Literacy; LSF = Letter Sound Fluency; TEN = Tests of Early Numeracy; MNF = Missing Number Fluency.

**Demographics form.** The demographics form (see Appendix A) contained questions regarding students' gender, age, race, ethnicity, family income, and parent's education. Parents of the children completed this form.

Table 3

*School Demographics*

| Characteristic | School A | School B | School C | School D | School E | School F | School G |
|---|---|---|---|---|---|---|---|
| Grades Served | PK-5 | Headstart, K-5 | K-5 | K-5 | K-5 | PK-5 | K-5 |
| Total Enrollment | 872 | 403 | 744 | 869 | 588 | 850 | 550 |
| Number of K Teachers (2013) | 9 | 3 | 7 | 8 | 6 | 8 | 5 |
| Number of K Teacher Participants | 1 | 2 | 3 | 2 | 2 | 2 | 7 |
| 2010-11 AYP Grade | A | A | A | A | A | B | B |
| Free & Reduced Lunch (%) | 40 | 84 | 49 | 50 | 15 | 66 | 24 |
| Minority Rate (%) | 40 | 78 | 62 | 47 | 24 | 61 | 51 |
| Classroom Organization & Programs | Grade level departmentalization, looping, multi-age environments, AGP, ESE, ELL | Grades K-2 self-contained; grades 3-5 specialization; ESE collaborative/co-teach model; Animal Science; Gifted & Talent Development Academy | AGP, ESE | AGP, ESE, ELL, Visual Arts | AGP, ESE | AGP, ESE, ELL | Co-teaching, AGP, ESE, ELL |
| Other | | Magnet school, Title I school-wide program | | | | Title I | Located on military base |

*Note.* AGP = Advanced Gifted Placement, ESE = Exceptional Student Education, ELL = English Language Learner

**AIMSweb Test of Early Literacy (TEL).** Two measures of AIMSweb Test of Early Literacy (TEL; Shinn & Shinn, 2008) were administered in the larger study by trained graduate research assistants or the principal investigator (Letter Naming Fluency and Letter Sound Fluency). The TEL is used for assessing children's early literacy skills including naming letters and identifying letter sounds. AIMSweb is a progress monitoring system that provides standardized probes useful for monitoring students' progress toward benchmarks. The measure of AIMSweb TEL that will be used in the present study is Letter Sound Fluency (LSF). For LSF, students were given a sheet of paper with lines of lower-case letters and were told to say as many letter sounds as they could in one-minute. A score was calculated for each probe based on the number of correct letter sounds verbalized in one-minute. Three different probes for LSF were administered and a median score was calculated as recommended by the authors of this measure.

In a study with probes identical to the AIMSweb TEL probes, high inter-rater reliability ($r$ = .82), high test-retest reliability (three sessions, two weeks apart; coefficient alphas ranging from .83), and high alternate-form reliability ($r$ = .82) were established (Elliott, Lee, & Tollefson, 2001). Additionally, high retest reliability ($r$ = .82) was established over a four-month testing period. In the study conducted by Elliott and colleagues (2001), TEL probes have also shown adequate criterion validity (range of $r$ = .58 - .72) with tests including Woodcock-Johnson Revised Broad Reading; Woodcock-Johnson Revised, Reading Skills; a test of phonological awareness; teacher ratings; and a developmental skills checklist.

**AIMSweb Test of Early Numeracy (TEN).** One measure of AIMSweb Test of Early Numeracy (TEN; Clarke & Shinn, 2004) was used for assessing children's early numeracy skills. The measure that was used in this study was Missing Number Fluency (MNF). For this measure, students were given a sheet of paper with rows of three boxes, with each box containing two

numbers and a blank (e.g., ___, 2, 3). The students were instructed to say the numbers that belonged in the blanks and were given one minute to complete as many sets of missing numbers as possible. A score was calculated for each probe based on the correct numbers identified in one-minute. Three different probes for MNF were administered and a median score was calculated as recommended by the authors.

The AIMSweb MNF measure has demonstrated high alternate-form reliability ($r$ = .83 fall and .78 winter) and high retest reliability ($r$ = .79 fall-winter and .81 fall-spring; Clarke & Shinn, 2004). These measures have also demonstrated strong criterion validity with the Woodcock Johnson Applied Problems subtest, Mathematics Curriculum-Based Measurement, and the Number Knowledge Test ($r$ ranging from .67 to .78; Clarke & Shinn, 2004).

**Teacher Measures**

**Student-Teacher Relationship Scale (STRS)—Short Form** (Pianta, 2001)**.** The STRS—short form is a 15-item self-report measure that measures a teacher's perceived closeness (seven items) and conflict (eight items) with a student (see Appendix E). A teacher uses a 5-point Likert scale to indicate whether or not a statement "Definitely Applies" or "Definitely Does Not Apply" to her relationship with a student. The statements refer to characteristics that are exemplary of closeness (i.e., "I share an affectionate, warm relationship with this child") and conflict (i.e., "This child and I always seem to be struggling with each other"). The STRS has demonstrated sufficient test-retest reliability ($r$ = Closeness, .88; Conflict, .92; Total, .89; significance at $p < .05$) with a sample of 24 kindergarten teachers who completed the measure twice for 72 children over a four-week period (Pianta, 2001). The STRS has also demonstrated moderate concurrent validity with teacher-reported classroom behavior problems and student

competence as measured by the Teacher-Child Rating Scale (Hightower et al., 1986; Pianta, 2001).

**Brief Problem Monitor—Teacher Form** (BPM-T; Achenbach McConaughy, Ivanova, & Rescorla, 2011)**.** The BPM-T is an 18-item rating scale that is completed by a teacher to monitor a child's behavior. The measure has an Internalizing subscale (INT), Attention subscale (ATT), and an Externalizing subscale (EXT) that monitor various aspects of a child's functioning. For the purpose of the current study, the EXT subscale was used to measure each child's level of externalizing behavior. Items on the EXT subscale relate to a child's propensity to argue, exhibit signs of disobedience, destroy things, or threaten others. Teachers rated each item on the BPM-T as 0 = not true, 1 = somewhat true, 2 = very true for the child within the past 14 days of completing the measure. Each of the seven items for the EXT subscale is added together to yield a total EXT score. The BPM-T EXT subscale has demonstrated high test-retest reliability over a 16-day period ($r$ = .88) and high internal consistency ($\partial$ = .88; Achenbach et al., 2011). Additionally, the BPM-T EXT subscale has verified criterion-related validity ($d$ = .19) when comparing referred children versus non-referred children where referred children had significantly higher scores on the BPM-T (Achenbach et al., 2011).

**Procedures**

**Recruitment of participants.** Kindergarten teachers were recruited for participation in the study via an email from their school psychologist. The PI of the study contacted the school psychologist. The teachers then volunteered to participate by replying to the email indicating their willingness to participate in the study. The PI conducted a meeting at each school with interested teachers who volunteered to participate to discuss what their participation would require and the incentives they would receive (i.e., $10 gift card for completing a packet for each

student participant). Teachers who consented to participate were asked to distribute recruitment flyers with information about the study to the children in their classroom to take home to their parents. The inclusion criteria for students included: 1) student must be enrolled in public kindergarten in the determined school district, 2) parent and student must be fluent in English, 3) parent must give consent for study participation, 4) student must live with parent/guardian to participate, and 5) child's teacher must agree to participate in the study. Next, two copies of the consent form (in English only—see Appendix B) were sent home with each student. Parents were instructed to return one copy of the consent form, signed, if they would like to participate in the study and to keep the second copy for their records. Students were given small incentives (i.e., pencils, erasers, etc.) for returning their consent forms to their teacher. Prior to sending the consent forms out, the teachers were asked if they would like to include all of the students with consent to participate or if they would like to limit the number of students that participated through a random drawing (parents were also informed of this). This step was taken to ensure that teachers were willing to complete forms for each student that participated. Only one teacher set a number of participants lower than what was returned to her classroom, so a drawing was completed in that classroom. All other teachers were willing to complete forms for all students that participated.

To ensure the research team's competence in conducting the study and administering the assessments, each member of the team was required to attend a training on the measures administered in the study and the procedures of the study and to conduct a practice administration with the PI and experienced research team member who had demonstrated 100% on the administration integrity checklist. Each member had to demonstrate 100% accuracy in administration of the measures prior to collecting data. Further, each team member was given a

study procedures manual that he/she was required to take to each administration so that they had a standard protocol to follow.

**Collection of teacher data.** The teacher participants were asked to sign consent forms (see Appendix D) and were given questionnaires to complete in May 2012. They were asked to complete the questionnaires and return them to the PI within a specified time frame. Teachers completed between 3-10 student packets, with an average of 6 student packets per teacher (*SD* = 1.74). Upon returning the surveys and child packets that they were asked to complete as part of the larger study, teachers received $10 gift cards for each student packet they completed.

**Collection of student data.** In November, 2011 (time one) and February (time two) and May, 2012 (time three), members of the research team from USF individually assessed students. Prior to assessment, student assessment packets were counterbalanced to control for order effects. Specifically, six versions of the assessment packet were administered. The assessment procedure was conducted as follows:

a. A research team member asked the child to be assessed to go with her/him to a quiet location (e.g., the library, hallway) for the assessment.
b. All of the materials (i.e., timer, probes, clipboard, pen/pencil) were set up for testing while the researcher simultaneously built rapport with the student.
c. The verbal assent script was read to the student and he/she was told that he/she can choose not to participate at any time (see Appendix C).
d. The assessment was conducted according to the order that they were stapled in the packet.
e. Each probe was scored immediately after assessment.

f. The child was given a small reward (e.g., pencil, eraser) after completing the assessments.

g. The child was returned to his/her class.

Each assessment took approximately 20 minutes and was conducted in a quiet area at the child's school during the school day.

**Data entry and checking.** To ensure the accuracy of the scores for TEL and TEN, the PI collected all scored assessments and redistributed them to members of the research team who did not score the assessments. The scoring of the probes and the median scores were then verified or corrected by the research team member or the PI. Members of the research team entered all data for the study into an Excel database file using pre-established codes and values. After data were entered, 10% of the data were checked for integrity. To check for integrity, the PI selected 10% of the code numbers in the database for data verification. Once the participants were selected, the PI compared the entered data to the questionnaire responses. Data integrity checks revealed high rates of accuracy in data entry ranging from 97.4% to 100%.

**Analyses**

A series of statistical analyses were performed in order to answer the research questions posed in this study. Descriptive statistics were analyzed first then subsequent analyses specific to the research questions were conducted.

**Preliminary analyses.** Data were first examined for accuracy by examining the ranges for each variable to make sure the values fell within the expected ranges. Means, standard deviations, and additional descriptive data (e.g., skewness, kurtosis) were calculated for the sample for all variables of interest including: gender, reading scores, mathematics scores, STRS scores, and BPM-T EXT scores. Cronbach's alpha was calculated for the Closeness and Conflict

subscales of the STRS and Externalizing Scale of the BPM-T in order to determine the internal consistency of these measures when utilized with this particular sample. A correlation matrix was calculated with the variables of interest to determine the direction and strength of the relationships. IBM SPSS Statistics 21.0 was used to complete these analyses.

**Statistical analyses.** Following preliminary analyses, a series of statistical analyses were conducted to answer the 12 research questions posed in this study (see Chapter I).

**Regression analyses.** After conducting preliminary analyses, prior to determining equations for the primary statistical analyses, correlations were analyzed to determine the relationships among variables. This was done to account for the potential interactions and to examine any issues of multicollinearity and to determine how closeness and conflict should best be included in the equations. Examination of the correlations also helped to determine if any other variables should be included in the equations as covariates. Previous empirical literature does not suggest any obvious covariates.

To determine which dimensions of STRs were most predictive of reading, mathematics, and behavior outcomes, three separate hierarchical regression analyses (one for each outcome) were conducted. A hierarchical regression analysis will allow for the examination of how each dimension (e.g., closeness and conflict) of STRs influences each of the outcome variables (e.g., reading, mathematics, externalizing behavior) while controlling for the influence of the other dimension of STRs. Additionally, it allows for examination of the additional variance accounted for by each variable. For each of the academic outcomes (i.e., reading and mathematics) of interest, the initial level of achievement was entered as a predictor in the equation to control for the influence of this factor on the outcome. A sample equation is below for research questions 1-2, 5-6, 9-10. The equation for mathematics (i.e., research questions 5-6) was similar, however,

for behavior (i.e., research questions 9-10), there was no variables statistically controlled for because there were no data available to measure the impact of changes in time.
Example final hierarchical regression equation: Mean Reading = Reading Time 1 + STR-closeness + STR-conflict.

To determine the influence of gender as a moderator of the relationships between STRs and reading, mathematics, and behavior outcomes, gender was dummy coded (0 = male, 1 = female) and entered into the equation as an interaction effect. A sample equation is below for research questions 3-4, 7-8, 11-12. The equations for mathematics (i.e., research questions 7-8) and behavior (i.e., research questions 11-12) were similar. Example final moderation model hierarchical regression equation: Mean Reading = Reading Time 1 +STR-closeness + STR-conflict + gender + STR-closeness*gender + STR-conflict*gender.

**Ethical Considerations**

Precautions were taken in order to safeguard the participants' rights. University IRB, as well as the IRB of the school district that had schools participate in the study, approved the larger study from which the data for the proposed study were drawn. Written parent consent was obtained prior to the students participating in the study, as well as written consent from teachers for their participation in the study. These consent forms informed parents and teachers of the purpose of the study, potential risks and benefits of participating, and provided contact information for the principal investigators in the case of any questions concerning the study. Students were read the assent form aloud by a member of the research team, permitted time to pose questions, and were told that they could discontinue participation at any time. Any identifying information that was written on any forms was covered to protect identification. Further, each participant (students and teachers) was assigned code numbers, which ensured the

confidentiality of all information. Only approved members of the research team have access to study documents including information linking participants' names and code numbers.

Despite the precautions that were taken to safeguard participants' rights, some risks may have remained. A potential risk for the parents and teachers in the study include embarrassment or emotional stress (i.e., becoming upset) related to survey items. Students in the study risked losing time in class on activities or lessons. Finally, a risk for all participants is accidental breach of anonymity or confidentiality.

## CHAPTER IV: Results

This chapter includes the results of the statistical analyses conducted to answer the 12 research questions in the current study. First, steps taken to screen data and conduct preliminary analyses are described. Next, the results of three hierarchical regressions conducted to determine the portion of variance in the three outcome variables of interest (i.e., reading achievement, math achievement, externalizing behavior) predicted by STRs (i.e., closeness and conflict), are presented.

### Data Screening

Data were screened for accuracy by examining the ranges for each variable to make sure the values fell within the expected ranges. No scores fell outside of the expected ranges. The dataset was also examined for any missing data. Rates of missing data were very low. Missing data included one missing item for one student on the STRS and the data for "family income" for another student. According to the STRS manual, if only one item is missing from a subscale, the score remains valid and can be calculated by multiplying the total of all items completed by the total number of items on the subscale and then dividing that number by the number of items completed on the subscale. For the one student who was missing an item related to the STRS closeness subscale, his/her total closeness score was calculated by multiplying his/her total score from the completed items by seven (total items on the subscale) and then dividing that number by six (number of items completed on subscale). For all other students, the total Closeness and total Conflict scores were calculated by totaling the values for the Closeness subscale and the

values for the Conflict scale separately. For the missing "family income" data, the data were excluded from the descriptive statistics of the sample population (see Table 1).

**Preliminary Analyses**

Preliminary analyses consisted of: (a) computing Cronbach's alphas for the all multi-item scales, (b) computing descriptive statistics (e.g., means, standard deviations, skewness, kurtosis) for all variables of interest, and (c) examining correlations between key variables.

**Measure reliability.** Cronbach's alpha was calculated for the Closeness and Conflict subscales of the STRS and Externalizing Scale of the BPM-T in order to determine the internal consistency of these measures. The Cronbach alpha for the 7-item Externalizing scale of the BPM-T was .74. The internal consistency for the Closeness and Conflict subscales of the STRS were .86 and .84 respectively. In sum, the internal consistency (reliability) for each of the scales analyzed in this study was acceptable to good (Pallant, 2013).

**Descriptive analyses.** Descriptive statistics for the data set are presented in Table 4. To assess univariate normality, skewness and kurtosis of each of the variables were calculated. All obtained values for academic scores (i.e., Reading Time 1, Mathematics Time 1, Reading Time 3, Mathematics Time 3) fell between -1.0 and +1.0 indicating approximate normal distributions of scores on each of the variables. Additionally, the average reading and mathematics scores and standard deviations in this study were similar to the means and standard deviations of raw scores in the national samples for AIMSweb norms (Pearson, 2012).

For reading and mathematics at time 1, mean scores and standard deviations were slightly higher than national norms, which was expected because scores in this study were gathered later than typical Fall data collection. The AIMSweb national average for LSF in Fall was 22 with a *SD* of 16. In the current study, the average score was 29 with a standard deviation of 14. For

mathematics (MNF), the time 1 scores were slightly higher than Fall national averages possibly due to the timing of data collection. The mean mathematics score in the current study was 11 (6) while the national average for reading in Fall was 6 (6).

The data collection for time 3 in this study occurred in May. The time 3 MNF scores in this study were consistent with the national average ($M$ = 15 for each sample) and had a slightly lower standard deviation (5 in the current study compared with 6 for the national sample). The mean reading scores for time 3 in this study [46 (15)] were slightly lower than AIMSweb national averages for Spring which were 52 (18). Overall, the reading and mathematics scores in the current study were consistent with national norms.

Skewness and kurtosis for the STRS Closeness and Conflict variables exceeded ±1, however, this has been suggested to be a stringent criterion, and ±3 has been suggested to be an acceptable range for skewness and kurtosis (Pallant, 2013). All values except the kurtosis for the externalizing behavior (BPM-T EXT) fell within the ±3 range. To address the potential non-normality of this variable, the BPM-T EXT variable was transformed using the natural log function. The transformation of the BPM-T EXT variable greatly reduced the kurtosis, therefore the transformed variable was used in all of the statistical analyses.

Table 4

*Descriptive Analyses*

| Variable | *n* | Min | Max | *M* | (*SD*) | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| STRS Closeness | 97 | 10.00 | 35.00 | 29.53 | 4.82 | -1.38 | 2.88 |
| STRS Conflict | 97 | 7.00 | 29.00 | 11.01 | 4.84 | 1.59 | 2.41 |
| BPM-T EXT Untransformed | 97 | .00 | 8.00 | .74 | 1.53 | 2.89 | 8.92 |
| BPM-T EXT* Transformed | 97 | -.69 | 2.14 | -.19 | .79 | 1.32 | .63 |
| Reading (LSF) Time 1 | 97 | .00 | 61.00 | 28.93 | 13.95 | .10 | -.46 |
| Mathematics (MNF) Time 1 | 97 | .00 | 21.00 | 11.44 | 5.59 | -.33 | -.54 |
| Reading (LSF) Time 3 | 97 | 7.00 | 83.00 | 45.60 | 15.30 | -.09 | .15 |
| Mathematics (MNF) Time 3 | 97 | .00 | 21.00 | 15.01 | 5.30 | -.77 | -.20 |

*Note*. *BPM-T EXT transformed using natural log to reduce kurtosis of raw data.

**Correlation analyses.** Pearson product-moment correlations among all continuous variables included in the analyses are presented in Table 5. Results indicate that prior reading achievement and prior mathematics achievement (Reading LSF Time 1 & Mathematics MNF Time 1) were significantly positively related to reading and mathematics achievement at the end of the school year ($r$ = .46 to .68, $p$ < .01). Additionally, reading and mathematics skills at the beginning and end of the year were significantly positively correlated. In terms of STRs, Closeness was found to be significantly, negatively associated with conflict ($r$ = -.32, $p$ < .01), indicating that as a student and teacher's level of closeness increases, their level of conflict decreases. Closeness was not significantly correlated with any other variable. In addition to

being correlated with Closeness, Conflict was found to be significantly associated with externalizing behavior ($r = .72$, $p < .01$), suggesting that as conflict increases, externalizing behavior also increases. Externalizing behavior was significantly negatively related to mathematics skills at the end of the year ($r = -.23$, $p < .05$) and notably related to reading skills at the end of the year ($r = -.16$, $p = .11$). This indicates that as externalizing behavior increases, mathematics skills decrease and reading skills at the end of the year decrease. Additionally, conflict was more strongly related to academic skills than closeness was ($r = -.01$ to $-.12$ for conflict compared to .00 to .07 for closeness), however the correlations were small. Gender was significantly correlated with closeness and conflict ($r = .26$ and $-.31$ respectively, $p < .01$) with females experiencing more closeness and males experiencing more conflict. Gender was also significantly positively correlated with initial reading achievement (LSF time 1; $r = .24$, $p < .05$) indicating that being female was related to higher initial reading achievement. Finally, whether or not a child was seeing a mental health care professional or taking medications for a mental health disorder were not significantly correlated with any of the variables.

**Regression Analyses**

Multiple hierarchical regression analyses were conducted to address each of the research questions for this study.

**Reading outcomes.** To determine the extent to which student-teacher relationships (i.e., closeness and conflict) predict reading achievement at the end of the year, while controlling for reading skills at the beginning of the year, a hierarchical regression was conducted with reading (LSF time 3) as the dependent variable and prior reading achievement (LSF time 1), STRS closeness, STRS conflict, and gender as the independent variables. As indicated in Chapter 3, both STRS closeness and STRS conflict were entered into this regression because the correlation

between these two variables was less than .80 ($r$ = -.32), which indicates that the assumption of multicollinearity was not violated. Additionally, an alpha level of .05 was used to determine statistical significance. See Table 6 for a summary of the results of regression analyses conducted for STRs, prior reading skills (i.e., LSF time 1) gender, and reading outcomes (i.e., LSF time 3). See Table 6 for a summary of the related coefficients. First, prior reading skills (i.e., LSF time 1) were entered into the regression equation (Model 1). This variable explained 46% of the variance in the dependent variable, reading outcomes, which was significant $F(1, 95) = 80.64$, $p < .01$. Next, STRS Closeness was added to the prior reading achievement in the regression equation (Model 2). Closeness and prior reading achievement accounted for 46% of the variance in reading outcomes, thus closeness did not account for any additional variance over prior reading achievement, $\Delta R^2 = .00$, $p = .51$. Next, STRS Conflict was added to the Model 2 regression equation (Model 3). Prior reading achievement, STRS Closeness, and STRS Conflict accounted for 49% of the variance in reading outcomes, with STRS Conflict explaining an additional 3% of the variance in reading outcomes, and the change in $F$ was significant from Model 2 to Model 3, $\Delta R^2 = .03$, $p = .02$. Next, gender was added to the Model 3 regression equation (Model 4). Model 4 accounted for 50% of the variance in reading outcomes, with gender explaining an additional 1% of the variance in reading outcomes, yet the change in $F$ was not significant from Model 3 to 4, $\Delta R^2 = .01$, $p = .32$. Lastly, the interaction terms (gender x STRS Closeness in Model 5 and gender x STRS Conflict in Model 6) were added to the regression equation created in Model 4 for the final models. These interaction terms together did not account for any additional variance in the dependent variable. Model 5, $F(1, 91) = 1.00$, $p > .32$ and Model 6, $F(1, 91) = .05$, $p = .83$ were not significant and there was not a significant change in $F$ from Model 4 to Model 5, $\Delta R^2 = .01$, $p = .32$ nor from Model 4 to Model 6, $\Delta R^2 =$

.00, $p$ = .83. Therefore, gender does not significantly moderate the relationship between STRS Closeness, STRS Conflict, and reading outcomes. Finally, prior reading achievement and conflict were the only significant predictors ($p$ < .05) in all models. No other variables were found to be significant predictors.

**Mathematics outcomes.** To determine the extent to which student-teacher relationships (i.e., closeness and conflict) predict mathematics achievement at the end of the year, while controlling for mathematics skills at the beginning of the year, a hierarchical regression was conducted with mathematics (MNF time 3) as the dependent variable and prior mathematics achievement (MNF time 1), STRS closeness, STRS conflict, and gender as the independent variables. As previously mentioned, both STRS closeness and STRS conflict were entered into this regression because the correlation between these two variables was less than .80 ($r$ = -.32), which indicates that the assumption of multicollinearity was not violated. Additionally, an alpha level of .05 was used to determine statistical significance. See Table 7 for a summary of the results of regression analyses conducted for STRs, prior mathematics skills, gender, and mathematics outcomes (i.e., MNF time 3). First, prior mathematics skills (i.e., MNF time 1) were entered into the regression equation (Model 1). This variable explained 46% of the variance in the dependent variable, mathematics outcomes, which was significant $F(1, 95) = 81.70$, $p < .01$. Next, STRS Closeness was added to the prior mathematics achievement in the regression equation (Model 2). Closeness and prior mathematics achievement accounted for 46% of the variance in mathematics outcomes, thus closeness did not account for any additional variance over prior mathematics achievement, $\Delta R^2 = .00$, $p = .67$. Next, STRS Conflict was added to the Model 2 regression equation (Model 3). Prior mathematics achievement, STRS Closeness, and STRS Conflict accounted for 48% of the variance in mathematics outcomes, with STRS Conflict

explaining an additional 2% of the variance in mathematics outcomes, yet the change in *F* was not significant from Model 2 to Model 3, $\Delta R^2 = .02$, $p = .10$. Next, gender was added to the Model 3 regression equation (Model 4). Model 4 contributed no additional variance to mathematics outcomes, $\Delta R^2 = .00$, $p = .63$. Lastly, the interaction terms (gender x STRS Closeness in Model 5 and gender x STRS Conflict in Model 6) were added to the regression equation created in Model 4 for the final models. These predictors together predicted 49% of the variance in the dependent variable. Model 5 $F(1, 91) = .30$, $p = .59$ and Model 6 $F(1, 91) = 1.85$, $p = .18$ were not significant and there was not a significant change in *F* from Model 4 to Model 5, $\Delta R^2 = .00$, $p = .59$ nor from Model 4 to Model 6, $\Delta R^2 = .01$, $p = .18$. Therefore, gender does not significantly moderate the relationship between STRS Closeness, STRS Conflict, prior mathematics achievement and mathematics outcomes. Finally, prior mathematics achievement was a significant predictor in each model and conflict was a significant predictor in model 6.

**Externalizing behavior outcomes.** To determine the extent to which student-teacher relationships (i.e., closeness and conflict) predict externalizing behavior outcomes, a hierarchical regression was conducted with externalizing behavior as the dependent variable and STRS closeness, STRS conflict, and gender as the independent variables. It is important to note that regression analyses were conducted using raw externalizing behavior data and transformed externalizing behavior data and the results of the analyses were compared to determine the extent that they differed. After comparison, they were not deemed to be significantly different. Therefore, the transformed externalizing behavior data were used in the analyses because the transformed data had a much lower kurtosis value, making it a more normal distribution. Again, both STRS closeness and STRS conflict were entered into this regression because the correlation between these two variables was less than .80 ($r = -.32$), which indicates that the assumption of

multicollinearity was not violated. Additionally, an alpha level of .05 was used to determine statistical significance. See Table 8 for a summary of the results of regression analyses conducted for STRs, gender, and externalizing behavior outcomes. First, STRS Closeness was entered into the regression equation (Model 1). This variable explained 3% of the variance in the dependent variable, externalizing behavior outcomes, but was not significant $F(1, 95) = 2.41$, $p = .12$. Next, STRS Conflict was added to the STRS Closeness the regression equation (Model 2). Closeness and conflict accounted for 53% of the variance in externalizing behavior outcomes, thus conflict explained an additional 50% of the variance in externalizing behavior outcomes, $\Delta R^2 = .51$, $p = .00$. Next, gender was added to the Model 2 regression equation (Model 3). STRS Closeness, STRS Conflict, and gender accounted for 53% of the variance in externalizing behavior outcomes, therefore gender did not contribute to any additional variance, $\Delta R^2 = .00$, $p = .57$. Lastly, the interaction terms (gender x STRS Closeness in Model 4 and gender x STRS Conflict in Model 5) were added to the regression equation created in Model 3 for the final models. The interactions of gender x STRS closeness and gender x conflict predicted 53% of the variance in the dependent variable $F(1, 92) = .53$, $p = .99$ and $F(1, 92) = .53$, $p = .95$ respectively, thus not adding any additional variance. Therefore, gender does not significantly moderate the relationship between STRS Closeness, STRS Conflict, and externalizing behavior outcomes. Finally, conflict was found to be the only significant predictor in each of the models. No other variables were significant predictors.

Table 5

*Correlation Matrices*

| | BPM-T EXT | STRS Closeness | STRS Conflict | Reading (LSF) Time 1 | Mathematics (MNF) Time 1 | Reading (LSF) Time 3 | Mathematics (MNF) Time 3 | Gender | Mental Health Care Received | Medication |
|---|---|---|---|---|---|---|---|---|---|---|
| BPM-T EXT[a] | 1.00 | | | | | | | | | |
| STRS Closeness | -.16 | 1.00 | | | | | | | | |
| STRS Conflict | .72** | -.32** | 1.00 | | | | | | | |
| Reading (LSF) Time 1 | .02 | .03 | .10 | 1.00 | | | | | | |
| Mathematics (MNF) Time 1 | -.18 | .04 | -.01 | .61** | 1.00 | | | | | |
| Reading (LSF) Time 3 | -.16 | .07 | -.11 | .68** | .46** | 1.00 | | | | |
| Mathematics (MNF) Time 3 | -.23* | .00 | -.12 | .53** | .68** | .59** | 1.00 | | | |
| Gender[b] | -.17 | .26** | -.31** | .24* | .00 | .16 | .05 | 1.00 | | |
| Mental Health Care Received[c] | .07 | -.02 | .12 | .06 | .05 | .05 | -.04 | -.04 | 1.00 | |
| Medication[d] | -.12 | .12 | -.04 | .10 | .07 | .18 | .14 | .07 | .12 | 1.00 |

*Note*. ** $p < .01$, * $p < .05$. LSF = Letter Sound Fluency, MNF = Missing Number Fluency. [a]The natural log transformed BPM-T EXT data were used for correlation analyses. [b]Gender dummy coded with 0 = male, 1 = female. [c]Mental health care dummy coded as 0 = no mental health care received, 1 = mental health care received in past 2 years. [d]Medication dummy coded as 0 = not taking medication, 1 = taking medication.

Table 6

*Summary of Regression Analyses for Reading Outcomes (n = 97)*

| Variable | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | | Model 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß |
| Reading (LSF) Time 1 | .74 (.08) | .68* | .74 (.08) | .68* | .77 (.08) | .70* | .79 (.09) | .72* | .80 (.09) | .73* | .80 (.09) | .73* |
| STRS Closeness | | | .16 (.24) | .05 | -.03 (.25) | -.01 | .01 (.25) | .00 | .19 (.31) | .06 | .20 (.31) | .06 |
| STRS Conflict | | | | | -.59 (.25) | -.19* | -.67 (.26) | -.21* | -.71 (.26) | -.22* | -.68 (.30) | -.21* |
| Gender | | | | | | | -2.49 (2.51) | -.08 | 12.61 (15.30) | .41 | 15.16 (19.99) | .50 |
| Gender x Closeness | | | | | | | | | -.51 (.51) | -.53 | -.56 (.56) | -.57 |
| Gender x Conflict | | | | | | | | | | | -.12 (.59) | -.04 |
| $R^2$ | .46 | | .46 | | .49 | | .50 | | .50 | | .50 | |
| $F$ for change in $R^2$ | 80.64* | | .44 | | 5.69* | | .99 | | 1.00 | | .05[a] | |

*Note*. *$p < .05$. [a]$F$ for change in $R^2$ is in comparison to Model 4.

Table 7

*Summary of Regression Analyses for Mathematics Outcomes (n = 97)*

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | | Model 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß |
| Math (MNF) Time 1 | .65 (.07) | .68* | .65 (.07) | .68* | .65 (.07) | .68* | .65 (.07) | .68* | .65 (.07) | .69* | .65 (.07) | .68* |
| STRS Conflict | | | | | -.15 (.09) | -.08 | -.14 (.09) | -.12 | -.14 (.09) | -.13 | -.21 (.11) | -.06* |
| STRS Closeness | | | -.04 (.08) | -.03 | -.08 (.09) | -.08 | -.09 (.09) | -.08 | -.06 (.11) | -.05 | -.07 (.11) | -.06 |
| Gender | | | | | | | .41 (.85) | .04 | 3.35 (5.45) | .32 | -2.10 (7.00) | -.20 |
| Gender x Conflict | | | | | | | | | | | .26 (.21) | .26 |
| Gender x Closeness | | | | | | | | | -.10 (.18) | -.29 | -.01 (.20) | -.02 |
| $R^2$ | .46 | | .46 | | .48 | | .48 | | .48 | | .49 | |
| *F* for change in $R^2$ | 81.70* | | .19 | | 2.85 | | .24 | | .30 | | 1.85[a] | |

*Note*. *$p < .05$. [a]*F* for change in $R^2$ is in comparison to Model 4.

Table 8

*Summary of Regression Analyses for Externalizing Behavior Outcomes (n = 97)*

| Variable | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß | B (SE) | ß |
| STRS Closeness | -.03 (.02) | -.16 | .01 (.01) | .08 | .01 (.01) | .08 | .01 (.02) | .08 | .01 (.02) | .08 |
| STRS Conflict | | | .12 (.01) | .75* | .12 (.01) | .76* | .12 (.01) | .76* | .12 (.02) | .76* |
| Gender | | | | | .07 (.12) | .04 | .16 (.76) | .10 | .16 (.98) | .10 |
| Gender x Closeness | | | | | | | .00 (.03) | -.06 | .00 (.03) | -.06 |
| Gender x Conflict | | | | | | | | | .00 (.03) | .00 |
| $R^2$ | .03 | | .53 | | .53 | | .53 | | .53 | |
| $F$ for change in $R^2$ | 2.41 | | 100.87* | | .33 | | .02 | | .00 | |

*Note*. *$p < .05$. The transformed BPM-T EXT data were used for analyses. [a]$F$ for change in $R^2$ is in comparison to Model 3.

## Chapter V: Discussion

The purpose of the current study was to gain insight into the associations between student-teacher relationships (STRs; i.e., Closeness and Conflict) and kindergarten students' academic (i.e., reading and mathematics) and externalizing behavior outcomes. The moderating effect of gender on these relationships was also examined.

### Relationship between STRs and Academic Outcomes

Results of the current study demonstrated that after controlling for kindergarten students' prior reading and mathematics skills, STRs characterized by closeness were not associated with kindergarten students' reading outcomes (i.e., LSF) or mathematics outcomes (i.e., MNF). However, STRs characterized by conflict were associated with a small portion of kindergarten students' reading outcomes accounting for 3% of the variance in reading outcomes. Conflict was negatively associated with reading outcomes indicating that as conflict increases, students' reading performance declines. In mathematics, conflict was not a significant predictor. These results are similar to what was hypothesized based on previous studies regarding conflict and academic outcomes. For instance, using hierarchical regression, Hamre and Pianta (2001) found that in the early elementary population (grades 1-4), student-teacher relational negativity (i.e., conflict & dependence) accounted for an additional 3% of the explained variance (beyond gender, ethnicity, Verbal IQ, and behavior problems) for math and language arts grades and standardized test scores (ß = -.23 & -.20 respectively), which was comparable to the results of the current study. Additionally, Buyse et al. (2009) found a small, significant effect for conflict

on mathematics (ß = -.03); however conflict accounted for 0% of the proportion of explained variance in mathematics.

When examining the effects of closeness on academic outcomes, the literature is mixed. Previous research indicates that there are larger effect sizes for closeness and achievement and engagement in secondary school studies while effect sizes for conflict and achievement and engagement are larger in primary school studies (Roorda et al., 2011). This is consistent with the current study in that conflict was more strongly associated with outcomes than closeness was for kindergarten students. The insignificant finding for the relationship between closeness and academic outcomes is similar to past research within primary school populations. For instance, Hamre and Pianta (2001) found that closeness was insignificantly related to academic outcomes throughout elementary school, while conflict was significantly related to academic outcomes. Buyse and colleagues (2009) also found no significant effect for closeness in relation to reading and mathematics. Because studies have not found that closeness is a significant predictor, little research has been conducted to investigate possible hypotheses concerning why closeness is an insignificant predictor of student academic outcomes in kindergarten, while conflict is a significant predictor of academic outcomes. Research also has yet to investigate whether or not alternative methods for measuring student-teacher interactions, such as observational tools, are more predictive of student outcomes than teacher-reported relationships with students. While tools have been developed for observing student-teacher interactions, research has yet to compare these measures with teacher-reported STRs. Moreover, preliminary research is finding that students' perceptions of the relational warmth they experience with their teachers may be more predictive than teachers' perceptions (Hughes, 2011). However, these findings are limited to students in second grade and may not generalize to younger students. While second graders

are able to describe their relationships with their teachers, it may be more challenging for kindergarten students because of their developmental level. Therefore, kindergarten students' perceptions of their relationships may not be more predictive of outcomes.

An additional purpose of this study was to determine if gender served as a moderator in the relationships between closeness, conflict, and academic outcomes. Although several studies found gender to have a moderating effect on these relationships (Hamre & Pianta, 2001; Roorda, et al., 2011), the current study did not demonstrate this effect. One possible reason for the absence of the moderating effect of gender on STRs and academic outcomes in the current study could possibly be due to differences in academic measurement among the studies (i.e., CBM in the current study as opposed to standardized test performance or classroom letter grades). Research has indicated that classroom grades may be a biased estimate of student academic performance and that this bias is related to gender. This bias has been illustrated in studies that indicate that boys typically score higher on standardized tests than their classroom grades would predict, meaning that boys typically receive poorer letter grades even though they have the knowledge and skills required for standardized tests (Roorda et al., 2011). Another possible reason is because the focus in the current study was on mathematics and reading performance instead of academic engagement (Hamre & Pianta, 2001; Roorda, et al., 2011), which is more of an indicator of academic behavior not academic performance. The lack of a moderating effect could also be due to the differing methods of analysis. Many of the previous studies used multilevel or hierarchical linear modeling for analysis while the current study employed hierarchical regression. Because of the more complex analysis of the alternative analyses that takes into account intercorrelations among variables and accounts for nested data effects, a moderating effect could have been detected (Raudenbush & Byrk, 2002). Another possible

reason for the differences in findings could be because of the time span during which these variables were measured. Previous research has primarily found moderating effects of gender over a much longer period of time (i.e., kindergarten through eighth grade) than was analyzed in the current study. Therefore, the moderating effect of gender may emerge over a long period of time, but not in the shorter span of one year.

In summary, the results of the analyses conducted to answer the research questions regarding the effects of STRs on reading and mathematics outcomes after controlling for prior reading and mathematics skills suggest that conflict has a small significant effect on reading outcomes, but does not significantly impact mathematics outcomes. Closeness was not found to affect either of these academic outcomes. These findings are similar to previous research on the effects of STRs on academic outcomes. Additionally, gender was not found to have a moderating effect on the relationship between STRs and academic outcomes.

**Relationship between STRs and Externalizing Behavior Outcomes**

An additional intention of the current study was to examine the relationships between closeness and conflict with externalizing behavior outcomes. Results of the current study indicated that closeness was not significantly associated with externalizing behavior outcomes, but conflict was significantly associated with externalizing behavior outcomes, accounting for 50% of the variance. These findings align with previous research that found that conflict strongly predicted behavioral outcomes more so than academic outcomes (Buyse et al., 2009; Hamre & Pianta, 2001). For example, Hamre, Pianta, Downer, and Mashburn (2008) found through hierarchical linear modeling that over half (53%) of the variance of teachers' reports of their relationships were explained by the teachers' judgments of students' problem behavior.

Research has consistently shown that conflict is more strongly related to children's behavior outcomes (Birch & Ladd, 1998; Buyse et al., 2009; Hamre & Pianta, 2001; Silver et al., 2005). This finding is not surprising due to the common patterns and the reciprocal relationship that is likely to occur between a child with externalizing behavior problems and student-teacher conflict (Zhang & Sun, 2011). It is likely that conflict is influenced by a child's externalizing behavior problems because it is difficult for a teacher to manage these behaviors causing the teacher to feel challenged and experience conflict (Silver et al., 2005; Zhang & Sun, 2011). This type of relationship is illustrated by items on the STRS that ask the teacher the degree to which a child easily becomes angry with the teacher, how much the teacher and child struggle with each other, and how drained the teacher feels when dealing with the child (Pianta, 1992). It is easy to see how these items on the STRS are associated with items from the BPM-T that measure externalizing behavior such as the child argues a lot, the child is disobedient, the child throws tantrums, the child is irritable, and the child threatens people (Achenbach et al., 2011). It makes sense that a teacher would find that a child that exhibits many of these behaviors is difficult to manage in the classroom and that he or she would feel exhausted dealing with this child. Researchers have also shown that the association between behavior problems and student-teacher conflict is reciprocal in nature—a child's behavior problems affects his/her relationship with his/her teacher, which consequently affects the child's future behavioral outcomes (Zhang & Sun, 2011). As evidenced by the literature, it's understandable that a child's externalizing behavior problems would cause a stressful situation for a teacher, thus increasing conflict between the child and teacher, and that this conflict would continue to cause the child to exhibit externalizing behavior problems (Doumen et al., 2008; Zhang & Sun, 2011). Finally, the subjective nature of the STRS and the higher likelihood that teachers will report more conflictual

relationships with students with hyperactive behavior problems (Thijs & Koomen, 2009) could be the reason conflict was shown to highly predict externalizing behavior problems.

The findings from the current study are not only consistent with previous findings, but also expand previous research. First, previous studies tended to rely on subjective behavior indicators that may not be indicators of externalizing behavior such as work-habit marks and disciplinary records (Hamre & Pianta, 2001). In contrast, this study employed a reliable and valid measure of student externalizing behavior (BPM-T) that is a more accurate representation of externalizing behaviors in particular. Also, many studies used longer behavior rating scales that take more time to complete (Birch & Ladd, 1998; Buyse et al., 2009; Meehan et al., 2003; Pianta et al., 2008; Silver et al., 2005) than the rating scale used in the current study, which is not always feasible within schools. The current study adds to previous findings in that it employed a short externalizing behavior checklist that is reliable and distinctly measures externalizing behavior.

All in all, the results of the current study indicated that closeness was not a significant predictor of externalizing behavior. A review of the literature revealed that the research findings regarding closeness and student outcomes are mixed. While some research has shown significant associations between student-teacher closeness and students' behavior outcomes (Birch & Ladd, 1998), other studies have indicated that there is no significant effect for closeness on student outcomes (Buyse et al., 2009; Silver et al., 2005), which is consistent with the current study. Although Birch & Ladd (1998) found that closeness was related to students' behavior outcomes, it is questionable whether or not the measurement of closeness was reliable. Because two different teachers reported closeness (one in kindergarten and one in first grade), it is possible that the teachers had varied perceptions of their relationships with the children, therefore limiting

the reliability of the measure of closeness. Moreover, as mentioned previously, the items on the STRS could account for the insignificance of closeness. For instance, the items that measure closeness relate more to a teacher's feelings of their relationship with the child (i.e., "I share a warm relationship with this child") while the conflict scale more so measures a child's behavior (i.e., "This child easily becomes angry with me;" Pianta, 1992). Therefore, it is possible that a kindergarten teacher would feel that she shares a warm relationship with most children in her classroom, however, she may perceive the externalizing students as being more angry and difficult to deal with. Furthermore, it is possible that kindergarten teachers typically rate their relationships with students as being warm and supportive with most children in their classrooms (which is reflected in the current study with approximately 70% of students having close STRs), thus this could reduce the variance accounted for by closeness because teachers view all relationships as being highly close.

Another purpose of the current study was to determine whether or not gender moderated the relationship between STRs and externalizing behavior outcomes. Gender was not a moderator in the current study, which is contrary to previous research. For example, Hamre and Pianta (2001) found that girls with highly close relationships had significantly better behavioral outcomes, while ratings of closeness for boys in kindergarten were not associated with later behavioral outcomes. Additionally, they discovered that there were longer lasting significant correlations between high conflict relationships and more discipline referrals for boys (Hamre & Pianta, 2001). The lack of the moderating effect of gender on the relationship between STRs and externalizing behavior outcomes in the current study is possibly due to the smaller sample size of the current study. With smaller samples, interactions are more difficult to detect. Another possible reason for the lack of the moderating effect of gender could be the shorter time frame of

the current study compared to the time frame of a previous study (Hamre & Pianta, 2001). Although the current study investigated the kindergarten year alone, previous studies had a much longer time period examining gender effects from kindergarten through eighth grade. This indicates that while a moderating effect of gender may not be present during the kindergarten year, over time, this effect is more apparent. This effect could be due to actual behaviors related to gender, perceptions of gender differences based on stereotypes, or other confounding variables that were not examined in the previous studies. Additionally, the varying methods of measuring student behavior among the studies could cause the discrepancies of findings. While this study used a teacher-rated measure for externalizing behavior symptoms, Hamre and Pianta (2001) employed the use of discipline referrals for behavior, which provide insight into only some forms of externalizing behavior. It is unclear the distinct behaviors that were measured by the discipline referrals, thus the definition of behavior could vary among the studies. Future research is needed to clearly illustrate the effect of gender on the relationships between STRs and student outcomes.

In alignment with previous research, the current study found that closeness did not predict externalizing behavior outcomes, while conflict accounted for half of the variance. Also, the current study did not find a moderating effect of gender on the relationship between STRs and externalizing behavior outcomes as found in another study (Hamre & Pianta, 2001).

**Contributions to the Literature**

The current study contributes to the current literature on STRs in multiple ways. First, this study is the first to examine STRs in regard to academic outcomes as measured by curriculum-based measures, and externalizing behavior outcomes as measured by a brief behavior monitoring measure. Given that these measures are frequently used in schools due to the brief amount of time required to administer them, it is important to know the extent to which

previous research findings are similar to the findings of the current study that employed these measures. Additionally, this study is the first to control for the impact of academic skills at the beginning of the kindergarten year on academic skills at the end of the year. With this study, it was evidenced that prior reading and mathematics skills were much more predictive of academic outcomes than STRs were.

The current study also adds to the literature because it is the first to examine the effects of STRs on academic and behavioral outcomes during the kindergarten year. Because of the sole focus of the current study on the kindergarten year, this study illustrates the potential negative effects of student-teacher conflict during the kindergarten year on academic outcomes. Furthermore, the current study emphasizes that student-teacher conflict has an even larger negative impact on kindergarten students' behavioral outcomes, which has significant implications for educators. Understanding these concurrent effects of the relationship during the kindergarten year is important because it illustrates that kindergarten teachers can be instrumental in assisting students with adjustment to school and fostering relationships that are not characterized by conflict so that the students will have higher academic outcomes and experience less externalizing behavior problems. Facilitating relationships with less conflict with students will likely help prevent exacerbation of externalizing behavior problems, which are shown to be a significant risk-factor for later school maladjustment (Sabol & Pianta, 2012).

Finally, this study added to the limited research base regarding the effect of gender on the relationships between STRs and student outcomes. While a few researchers found an impact of gender on these relationships (Hamre & Pianta, 2001; Roorda et al., 2011), the current study did not find that gender was a moderator. As previously mentioned, the varying grade levels of participants and the length of duration of the previous studies may have allowed for the

observation of gender as a moderator in previous studies. It is possible that gender does not moderate the relationships during the kindergarten year; however, this effect may be apparent as time passes.

**Limitations of the Current Study**

Many attempts to minimize threats to the reliability and validity of the proposed study's results were made. However, some limitations to this study exist. First, the data collected in this study for STRs and externalizing behavior were gathered from teacher self-report measures. Teachers may have felt compelled to rate their relationships with their students in a more socially desirable way with indication that they are closer than they actually are. Additionally, while the STRS is a reliable and valid measure, Thijs and Koomen (2009) found that the STRS is a subjective measure that measures teachers' perceptions of relationships, which is not always consistent with external observations or student report. Teachers' perceptions of a student's externalizing behavior also may not have been entirely accurate of the actual amount of externalizing behavior the student exhibits. However, the BPM-T is a reliable and valid measure and research indicates that teacher ratings of externalizing behavior are strongly associated with behavior observations (Hinshaw, Han, Erhardt, & Huber, 1992), therefore teacher ratings of externalizing behavior should be similar to actual, observed externalizing behavior.

A second limitation to the study is that the teacher report forms were brief (i.e., BPM-T and STRS). Shorter versions were used in the study for the sake of time due to the multiple forms the teachers had to complete. The use of shorter forms has the potential to not include components of STRs and externalizing behavior that may have important influences on the associations. However, both measures had adequate psychometric properties for use in the study and are thought to be reliable and valid measures for the purposes intended. Another potential

limitation of the study is that the STRS may not have accurately measured the theoretical constructs of closeness and conflict. Conducting a confirmatory factor analysis to determine whether or not the STRS properly measured closeness and conflict as the theoretical framework defines them could have strengthened this study. However, because of the small sample size of the study, a confirmatory factor analysis could not be conducted.

The associations between STRs and academic and behavior outcomes may have been more accurate or stronger if STRs and externalizing behavior were both measured across all three time points. If STRs and externalizing behavior were measured longitudinally, it would have allowed for statistical examination of change in all variables over time (i.e., growth) and would allow for better understanding of the trends in STRs and externalizing behavior over the school year and an understanding of whether or not the trends are similar for both.

Another limitation of the current study is that it did not account for possible effects that could occur at other levels of the ecological system such as classroom factors and teacher qualities (e.g., years of experience, classroom/behavior management, self-efficacy, personality, beliefs), and the family environment. When examining the variance between teachers' ratings of STRS, analyses revealed an intraclass correlation (ICC) of 0.002 for conflict and an ICC of 0.069 for closeness. Although the ICC for conflict is very low in this study, it may be higher in studies with larger sample sizes or higher frequencies of reported conflict. The ICC for closeness indicates that approximately 7% of the variance for closeness is attributable to teacher characteristics. Therefore, teacher characteristics such as years of experience, classroom/behavior management, self-efficacy, personality, and beliefs could be important factors to consider in future research. School level characteristics such as school climate may be other important factors affecting STRs and student outcomes, however, school level

characteristics were not examined in the current study. Through the collection of data such as teacher and school characteristics and the use of a multilevel data analysis, different results may have been found. Multilevel data analysis would allow for examination of group or classroom effects on the outcome variables. The current study is limited in that it did not account for these additional ecological system variables that could have influenced the outcome variables.

**Implications for School Psychologists**

The current study reiterates and enhances knowledge related to the impact of STRs on academic and behavioral outcomes and the importance of students' prior knowledge and skills. This study found that students' prior reading and mathematics performance (i.e., LSF and MNF almost at entrance of kindergarten) was the most predictive factor of reading and mathematics performance at the end of the kindergarten year accounting for 46% of the variance. This finding is in line with previous literature that suggests that students' prior achievement is the most predictive factor of students' future achievement (Hattie, 2009). These findings underscore the importance of school psychologists supporting the development of academic skills in prekindergarten prior to the students' entrance into kindergarten. Additionally, school psychologists can assist in informing parents of the impact of prior skills and emphasizing the necessity to help build academic skills for their children at home.

An important role of the school psychologist is to assist educators with problem solving student problems and inform school-wide and classroom behavioral interventions. The current study found that conflict significantly and strongly predicted students' levels of externalizing behavior; therefore student-teacher conflict has potential for intervention to improve externalizing behavior. With this knowledge, school psychologists can consider student-teacher relationships during their analysis of student problems. For example, if a student is exhibiting

externalizing behavior symptoms, the school psychologist could assess the student-teacher relationship and if the relationship is characterized by high levels of conflict, the school psychologist can encourage teachers to implement interventions such as "Banking Time" (Driscoll & Pianta, 2010) and the relationship-focused reflection program (Split, Koomen, Thijs, & van der Leij, 2012). The intervention "Banking Time," requires the teacher and student to interact in one-on-one, child-led play sessions to strengthen their relationship and improve closeness (Driscoll & Pianta, 2010). In the relationship-focused reflection program, teachers provide a narrative of their reflections on their relationships with students, including their positive and negative emotions and then compare these narratives to video recordings of their interactions with students (Split et al., 2012). Both of these interventions have potential to decrease the levels of conflict teachers experience with students, which may consequently reduce students' levels of externalizing behavior.

**Future Directions**

Student-teacher relationships are thought to have a significant impact on student outcomes; however, the literature base is limited. While the current study added to the available literature by examining the relationships between STRs and student academics and behavior in kindergarten using brief screening and progress monitoring measures and by evaluating the moderating effect of gender, there remain gaps in the research. First, the current study did not find that closeness predicted any student outcomes. It is possible that effects of close STRs do not occur until later in a child's school career, but the current study that spanned the kindergarten year did not find an effect for closeness. Longitudinal research that spans several years should more thoroughly investigate the impacts of a close STR. While a few longitudinal studies exist, they do not consistently measure STRs at each grade level and do not provide a thorough

examination of the qualities of STRs present during each year and examine the developmental aspect of STRs. For example, some studies have indicated that conflict is more influential in the elementary years while closeness is more influential in the secondary years (Roorda et al., 2011); however, there is not enough evidence in the literature to support this finding.

Future research on STRs should continue to examine the relationships between STRs and socioemotional factors such as school avoidance, anxiety, and social relationships with peers, all of which impact a students' academic performance and success in school. More research on these factors could point to additional importance of STRs and emphasize the necessity of positive or close STRs, which were not found to be significant in the current study. Moreover, these socioemotional factors could potentially be mediators of the relationship between STRs and achievement and should be further examined in that regard. Initial research has began examining the links between STRs and student-peer social interactions and researchers found that student-teacher conflict does predict disruptive peer play in preschool (Griggs, Gagnong, Huelsman, Kidder-Ashley, & Ballard, 2009), which has implications for children's future social competence. Additionally, preliminary research indicated that the STR in first grade was associated with mental health symptoms in seventh grade (Essex, Armstrong, Burk, Goldsmith, & Boyce, 2011).

Another potential for future research is the accuracy and consistency of teacher rated STRs, or in other words, how well teachers are able to characterize their relationships with students compared to observer or student ratings. Recent research indicated that student report of STRs was more predictive of changes in achievement than teacher report was in grades 2-4 (Hughes, 2011). However the research base is limited to one study that does not provide support for the accuracy of ratings by younger children in kindergarten. While the current study used

teacher-rated perceptions of their relationships with students, which are thought to be accurate representations of STRs, it is possible that a teacher's perception of their relationship is biased and would be characterized differently according to an external observer or the child himself/herself. If a student or external observer reported the STR differently, then results of the current study could be different. Future research with various informants and various ages of children is needed to determine if having different informants of STRs results in different outcomes. In addition to examining differences in age of informants, future research should also examine whether or not cultural differences exist among informants. A relationship is a culturally defined construct; therefore it is possible that people from various cultures would perceive their relationships differently.

The impact of other ecological system factors such as familial factors (i.e., low SES, low levels of literacy at home, parent-child relationships), teacher/classroom factors (i.e., teacher personality, teacher self-efficacy, teacher sensitivity, teacher's mental health/stress, classroom management, teacher-parent relationships, gender of teacher, years of teaching), and school climate factors on STRs warrants future research, especially across developmental levels. Research indicates that STRs may be more significant for children from disadvantaged backgrounds (Pianta, 2002) because these students likely experience more conflict at home, which then transfers to school (Sabol & Pianta, 2012). Future research should aim to examine other possible home factors that impact STRs and student outcomes. In addition, the association of teacher/classroom factors with STRs should be more thoroughly examined because these factors have potential for intervention and can impact more children at the classroom level rather than the dyadic student-teacher level. In sum, future research should employ multilevel modeling techniques that examine school-, teacher-, and student-level characteristics associated with

student-teacher relationships and their effects on achievement and behavior. Multilevel models in future research could potentially include teacher level variables such as years of experience, classroom/behavior management, self-efficacy, personality, and beliefs and school level variables such as school climate.

Finally, future research should further explore the reciprocal relationship between conflict and externalizing behavior. Because the current study did not measure externalizing behavior and STRs at the beginning of the school year, it is unclear whether or not the observed levels of conflict and externalizing behavior were evident at the beginning of the year or if they changed throughout the year. Additional research should investigate the intricate relationships between externalizing behavior and student-teacher conflict and possibly use more objective measures of externalizing behavior such as classroom observations.

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## APPENDIX A

Parent Demographic Questionnaire

**Date:** _____

**Parent Information**

**Primary caregiver's [your] name:**

_____

| | | | | |
|---|---|---|---|---|
| ○ Biological Mother | ○ Biological Father | ○ Stepparent | ○ Foster Parent | ○ Other (please specify): _____ |
| ○ Adoptive Mother | ○ Adoptive Father | ○ Parent's Partner (living in household) | ○ Other Adult Relative | |

**1. Your relationship to child:**

**2. Your race/ethnicity:**

- ○ American Indian or Alaskan Native
- ○ Asian
- ○ Black or African American
- ○ Hispanic or Latino
- ○ Native Hawaiian or Pacific Islander
- ○ White
- ○ Multi-racial (please specify):_____
- ○ Other (please specify):_____

**3. Your level of education (please check the highest completed):**

- ○ Less than high school
- ○ Some college, 2-year college or vocational
- ○ Some graduate work
- ○ Doctoral degree
- ○ High school or GED
- ○ Bachelor's degree
- ○ Master's degree

**4. On average, how many hours <u>per week</u> do you work?**

○ 0-5 ○ 6-20 ○ 21-40 ○ 40 or more

**5. Number of adults in the home who care for children** (including you):

_____

**6. What is your marital status?**

- ○ Single, never married
- ○ Divorced
- ○ Living together as if married
- ○ Separated
- ○ Married
- ○ Widowed

**If Single, never married, please skip to number 10.*

**Spouse/Partner's name:** _____

**7. Spouse/Partner's relationship to child:**

- ○ Biological Mother
- ○ Biological Father
- ○ Stepparent
- ○ Foster Parent
- ○ Other (please specify) _____
- ○ Adoptive Mother
- ○ Adoptive Father
- ○ Parent's Partner (living in household)
- ○ Other Adult Relative

**8. Your spouse/partner's level of education (please check the highest completed):**

- ○ Less than high school
- ○ Some college, 2-year college or vocational
- ○ Some graduate work
- ○ Doctoral degree
- ○ High school or GED
- ○ Bachelor's degree
- ○ Master's degree

**9. On average, how many hours per week does your spouse/partner work?**

- ○ 0-5
- ○ 6-20
- ○ 21-40
- ○ 40 or more

**10. What is the primary language spoken in your home?**

- ○ English
- ○ French
- ○ Chinese
- ○ Russian
- ○ Spanish
- ○ Vietnamese
- ○ Korean
- ○ Other (please specify):_____

**11. Family income per year (check one):**

- ○ Less than $5,000
- ○ $5,001-$10,000
- ○ $10,001-$20,000
- ○ $20,001-$30,000
- ○ $30,001-$40,000
- ○ $40,001-$50,000
- ○ $50,001-$60,000
- ○ Over $60,001

## Child Information

**Child's Name:**_____

**Child's Gender:** Male Female

**Child's Date of Birth:** _____ (month / day / year)

**Child's Race/Ethnicity:**

- ○ American Indian or Alaskan Native
- ○ Asian
- ○ Black or African American
- ○ Hispanic or Latino
- ○ Native Hawaiian or Pacific Islander
- ○ White
- ○ Multi-racial (please specify):_____
- ○ Other (please specify):_____

**In the past 2 years, has your child seen a counselor, therapist, psychologist, psychiatrist, social worker or other mental health professional for treatment for mental health or behavior problems s/he may have been having?**

**_____ Yes _____ No _____ Don't Know**

**Is this child taking any medications for ADHD, OCD, or other behavioral or mental disorder?**

**_____ Yes _____ No**

## APPENDIX B

Parent Consent

Dear Parent or Legal Guardian:

This letter provides information about a research study that will be conducted at your school by investigators from the University of South Florida. Our goal in conducting the study is to examine child and family factors that help children start school ready to learn. The title of the study is "Predictors of Kindergarten Success: The Roles of Parental Involvement, Child Behavior, and Academic Skills and Enablers" (USF IRB # Pro 4196).

- ✓ Who We Are: Dr. Julia Ogg, an Assistant Professor in the College of Education at the University of South Florida (USF), is the Primary Investigator for this study which will be conducted in conjunction with the Early Childhood Research Group at USF.

- ✓ Why We are Requesting You and Your Child's Participation: This study is being conducted as part of a project entitled, "Predictors of Kindergarten Success: The Roles of Parental Involvement, Child Behavior, and Academic Skills and Enablers." You and your child are being asked to participate because your child is starting kindergarten in Hillsborough County Public Schools.

- ✓ Why You and Your Child Should Participate: We need to learn more about how parents can help their children start school ready to learn. This study will help us determine how to help parents support their child's development as it relates to getting ready to start school. In addition, you will receive a $10 gift card in the fall for completing a packet of questionnaires and a $10 gift card in the spring for completing another packet of questionnaires. Your child will receive a small incentive (e.g., sticker, pencil) for participating in the study.

- ✓ What Participation Requires: If you consent to participate in the study, you will be asked to fill-out questionnaires regarding your involvement with school, activities you do with your child at home, your parenting practices, and your child's behavior two times during the school year: once when you agree to participate (September), and again at the end of the school year (April or May). The packet of questionnaires will take you approximately 50-60 minutes to complete. Your child will be required to complete short assessments of their academic skills three times throughout the school year: once when you agree to participate (September), once around January or February, and again in April or May. These assessments will be completed during the school day at your child's school and will take approximately 5-10 minutes. Your child's teacher will also be asked to complete questionnaires about your child's behavior and their interactions with you regarding your child's education.

- ✓ Please Note: Your decision to participate and to allow your child to participate in this research study is completely voluntary. You are free to allow your child to participate in this research study or to withdraw him or her at any time. Your decision to participate, not to participate, or to withdraw participation at any point during the study will in no way affect your child's

student status, his or her grades, or your relationship with your child's school, USF, or any other party.

- ✓ Confidentiality of You and Your Child's Responses: The risks to you and your child for participating in this research are considered minimal. Your privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, the USF Institutional Review Board and its staff, and other individuals acting on behalf of USF may inspect the records from this research project, but your individual responses will not be shared with school system personnel or anyone other than us. Your questionnaires and your child's completed assessments will be assigned a code number to protect the confidentiality of responses. Only we will have access to the locked file cabinet kept by the Primary Investigator that will contain: 1) all records linking code numbers to participants' names, and 2) all information gathered from assessments and surveys. All records from the study (completed surveys, assessments) will be destroyed in five years.

- ✓ What We'll Do With You and Your Child's Responses: We plan to use the information from this study to inform what parenting and child factors help children be ready to start school. The results of this study may be published. However, the data obtained from you or your child will be combined with data from other people in the publication. The published results will not include your name or any other information that would in any way personally identify you or your child.

- ✓ Questions? If you have any questions about this research study, please contact Julia Ogg at (813) 974-9698. If you have questions about your child's rights as a person who is taking part in a research study, you may contact a member of the Division of Research Integrity and Compliance of the USF at (813) 974-5638.

- ✓ Want to Participate? To indicate your consent to participate and to have your child participate in this study, please sign the consent form at the bottom of this page.

Sincerely,

Julia Ogg, Ph.D., NCSP
Assistant Professor
School Psychology Program
University of South Florida

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**Consent for Parent and Child to Take Part in this Research Study**

I freely give my permission to let my child take part in this study. I also consent to participate in this study. I understand that this is research. I have received a copy of this letter and consent form for my records.

_____ _____
Printed name of child Date

_____ _____
Signature of parent taking part in the study Printed name of parent

**Statement of Person Obtaining Informed Consent**

I certify that participants have been provided with an informed consent form that has been approved by the University of South Florida's Institutional Review Board and that explains the nature, demands, risks, and benefits involved in participating in this study. I further certify that a phone number has been provided in the event of additional questions.

| _____ | _____ | _____ |
|---|---|---|
| Signature of person obtaining consent | Printed name of person obtaining consent | Date |

## APPENDIX C

Student Assent

We are doing a study to learn about how kids get ready for kindergarten. We are asking you to help because we want to learn more about what kids need to know to do well in school. Your parent has said that it is ok for you to work with me today.

I am going to ask you to do a few activities with me that will let us know which letters, sounds, and numbers you've learned. You will receive a [small prize] for working with me today.

You can ask me questions about the study at any time. If you decide at any time that you want to stop, just let me know. No one will be upset if you want to stop.

## APPENDIX D

Teacher Consent

Dear Teacher:

This letter provides information about a research study that will be conducted at your school by investigators from the University of South Florida. Our goal in conducting the study is to examine child and family-level factors that help children start school ready to learn. The title of the study is Predictors of Kindergarten Success: The Roles of Parental Involvement, Child Behavior, and Academic Skills and Enablers (USF IRB # Pro 4196).

- ✓ Who We Are: Dr. Julia Ogg, an Assistant Professor in the College of Education at the University of South Florida (USF), is the Primary Investigator for this study which will be conducted in conjunction with the Early Childhood Research Group at USF.

- ✓ Why We are Requesting Your Participation: This study is being conducted as part of a project entitled, "Predictors of Kindergarten Success: The Roles of Parental Involvement, Child Behavior, and Academic Skills and Enablers." You are being asked to participate because you are the teacher for at least one student who is participating in the study.

- ✓ Why You Should Participate: We need to learn more about how parents can help their children be ready to start school. This study will help us determine how to help parents support their child's development as it relates to getting ready to start school. You will receive a $10 gift card for completing a packet of questionnaires for each student in your classroom who is participating in the study. You will be asked to complete this[these] packet[s] during the spring of 2012. You will be asked to complete a packet for each child in your classroom who is participating in the study. You will receive a gift card for each packet upon your completion of the packets.

- ✓ What Participation Requires: If you consent to participate in the study, you will be asked to fill-out a packet of questionnaires for each child in your classroom that is participating in the study in April or May 2012. These questionnaires will ask about the academic skills and behaviors of the child, classroom behaviors, your interactions with the child's parents, and your general classroom practices. The packet of questionnaires will take you approximately 40 minutes to complete for each child.

- ✓ Please Note: Your decision to participate in this research study is completely voluntary. You are free to participate in this research study or to withdraw at any time. Your decision to participate, not to participate, or to withdraw participation at any point during the study will in no way affect your relationship with your school, USF, or any other party.

- ✓ Confidentiality of Your Responses: The risks to you for participating in this research are considered minimal. Your research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, the USF Institutional Review Board and its staff, and other individuals acting on behalf of USF

may inspect the records from this research project, but your individual responses will not be shared with school system personnel, the child's parents, or anyone other than us. Your completed assessments will be assigned a code number to protect the confidentiality of your responses. Only we will have access to the locked file cabinet kept by the Primary Investigator that will contain: 1) all records linking code numbers to participants' names, and 2) all information gathered from assessments and surveys. All records from the study (completed surveys, assessments) will be destroyed in five years.

- ✓ What We'll Do With Your Responses: We plan to use the information from this study to inform what parenting and child factors help children start school ready to learn. The results of this study may be published. However, the data obtained from you will be combined with data from other people in the publication. The published results will not include your name or any other information that would in any way personally identify you.

- ✓ Questions? If you have any questions about this research study, please contact Julia Ogg at (813) 974-9698. If you have questions about your rights as a person who is taking part in a research study, you may contact a member of the Division of Research Integrity and Compliance of the USF at (813) 974-5638.

- ✓ Want to Participate? To indicate your consent to participate in this study, please sign the consent form at the bottom of this page.

Sincerely,

Julia Ogg, Ph.D., NCSP
Assistant Professor
School Psychology Program
University of South Florida

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**Consent to Take Part in this Research Study**

I freely give my permission to take part in this study. I understand that this is research. I have received a copy of this letter and consent form for my records.

_____ _____
Signature of teacher taking part in the study Date

_____
Printed name of teacher

**Statement of Person Obtaining Informed Consent**

I certify that participants have been provided with an informed consent form that has been approved by the University of South Florida's Institutional Review Board and that explains the nature, demands, risks, and benefits involved in participating in this study. I further certify that a phone number has been provided in the event of additional questions.

_____ _____ _____
Signature of person obtaining consent | Printed name of person obtaining consent | Date

## APPENDIX E

Student-Teacher Relationship Scale—Short Form

Robert C. Pianta

Child: _____ Teacher:_____ Grade:_____

*Please reflect on the degree to which each of the following statements currently applies to your relationship with this child. Using the scale below, circle the appropriate number for each item.*

| Definitely does not apply 1 | Not really 2 | Neutral, not sure 3 | Applies somewhat 4 | Definitely applies 5 |
|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | I share an affectionate, warm relationship with this child. (CL*) | 1 | 2 | 3 | 4 | 5 |
| 2. | This child and I always seem to be struggling with each other. (CO*) | 1 | 2 | 3 | 4 | 5 |
| 3. | If upset, this child will seek comfort from me. (CL) | 1 | 2 | 3 | 4 | 5 |
| 4. | This child is uncomfortable with physical affection or touch from me. (CO) | 1 | 2 | 3 | 4 | 5 |
| 5. | This child values his/her relationship with me. (CL) | 1 | 2 | 3 | 4 | 5 |
| 6. | When I praise this child, he/she beams with pride. (CL) | 1 | 2 | 3 | 4 | 5 |
| 7. | This child spontaneously shares information about himself/herself. (CL) | 1 | 2 | 3 | 4 | 5 |
| 8. | This child easily becomes angry with me. (CO) | 1 | 2 | 3 | 4 | 5 |
| 9. | It is easy to be in tune with what this child is feeling. (CL) | 1 | 2 | 3 | 4 | 5 |
| 10. | This child remains angry or is resistant after being disciplined. (CO) | 1 | 2 | 3 | 4 | 5 |
| 11. | Dealing with this child drains my energy (CO) | 1 | 2 | 3 | 4 | 5 |
| 12. | When this child is in a bad mood, I know we're in for a long and difficult day. (CO) | 1 | 2 | 3 | 4 | 5 |
| 13. | This child's feelings toward me can be unpredictable or can change suddenly. (CO) | 1 | 2 | 3 | 4 | 5 |
| 14. | This child is sneaky or manipulative with me. (CO) | 1 | 2 | 3 | 4 | 5 |
| 15. | This child openly shares his/her feelings and experiences with me. (CL) | 1 | 2 | 3 | 4 | 5 |

*CL = Closeness; CO = Conflict

## APPENDIX F

IRB Approval Letter

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

October 24, 2013

Leslie Wells
Psychological and Social Foundations
Tampa, FL 33612

RE: **Expedited Approval for Initial Review**
IRB#: Pro00014558
Title: Associations Between Student-Teacher Relationships and Kindergarten Students' Outcomes

**Study Approval Period: 10/24/2013 to 10/24/2014**

Dear Dr. Wells:

On 10/24/2013, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents outlined below.

**Approved Item(s):**
**Protocol Document(s):**
Wells, ver 1, 10-18-13.docx

**Consent/Assent Document(s)*:**
Waiver of Informed Consent Process is granted

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your study qualifies for a waiver of the requirements for the process of informed consent as outlined in the federal regulations at 45CFR46.116(d) which states that an IRB may approve a consent procedure which does not include, or which alters, some or all of the elements of informed consent.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board