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STUDENTS' PERCEPTIONS OF SOCIAL RELATEDNESS

IN THE CLASSROOM:

THE ROLES OF STUDENT-TEACHER INTERACTION QUALITY, CHILDREN'S

AGGRESSIVE BEHAVIORS, AND PEER REJECTION

A Thesis in

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Rebecca A. Madill

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The thesis of Rebecca A. Madill was reviewed and approved* by the following:

Scott D. Gest
Associate Professor of Human Development and Family Studies
Thesis Advisor

Thomas W. Farmer
Associate Professor of Education

Douglas M. Teti
Professor of Human Development and Family Studies
Professor-in-charge of the Human Development and Family Studies Graduate Program

*Signatures are on file in the Graduate School

Abstract

The present study examines the roles of classroom characteristics (teacher-child interaction quality) as well as child characteristics (aggression and rejection) in children's perceptions of social relatedness in 1st, 3rd, and 5th grade classrooms. Results from a series of multilevel models suggest that supportive teacher-child interactions are associated with children's perceptions of greater support from their teachers and peers. Children's feelings of loneliness were not associated with teacher-child interaction quality at the classroom level, though reports of loneliness were higher among children with lower peer social preference. Aggressive children and boys perceived less-supportive relationships with their teachers. Though analyses are not longitudinal, they suggest that classroom-level factors, particularly teachers' interactions with students, may affect children's sense of relatedness to teachers and peers above and beyond the influence of children's individual characteristics.

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Thank you to Mom and Dad, whose support and love helped me get where I am today. Any researcher would be impressed by your incredible parenting skills; I'm just thankful to be your daughter. Mom, the time I have spent with you in your kindergarten classroom taught me that amazing teachers are still out there, and that classroom relationships are essential. Those kids are so lucky to have you.

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Students' Perceptions of Social Relatedness in the Classroom: The Roles of Student-Teacher

Interaction Quality, Children's Aggressive Behaviors, and Peer Rejection

Chapter 1: Introduction

The need to perceive supportive connections with others is universal, and this sense of

belonging is fundamental to both our emotional and physical health (Baumeister & Leary, 1995).

This need to belong is fulfilled by positive, supportive interactions that are part of an ongoing

relationship in which individuals care about one another's well-being (Baumeister & Leary). In

childhood, one of the primary contexts for the development of social relationships is the

elementary school classroom (Maddox & Prinz, 2003). Children appear to be more motivated

and engaged when they feel supported by their teachers (Deci, Vallerand, Pelletier, & Ryan,

1991; Connell & Wellborn, 1991) and classmates (Battistich, Solomon, Kim, Watson, & Schaps,

1995). In this way, high-quality relationships with teachers and peers may contribute to

children's social and academic success (Connell & Wellborn; Osterman, 2000). Therefore, a

central task for educational researchers is to understand how perceptions of relatedness emerge

from actual relationship experiences in the classroom, as well as how teachers may foster—or

hinder—such perceptions (O'Connor, 2010). It is also important to understand other

characteristics that may affect children's sense of relatedness, such as aggressive behavior (Gest,

Welsh, & Domitrovich, 2005).

Children's sense of relatedness can be examined in terms of relationships with specific

partners, as well as an overall feeling of loneliness (Gest et al., 2005). We conceptualize

perceived teacher support as children's sense of a warm, close, and caring relationship with their

teacher (Pianta, 2001), whereas *perceived peer support* refers to children's feelings that their

classmates respect and help one another (Battistich et al., 1995). *Loneliness* refers to a feeling of

overall dissatisfaction with one's social relationships and a desire for closer relationships (Asher et al., 1984).

We see two limitations to the current state of knowledge about children's perceptions of relatedness in the classroom. First, to predict children's sense of relatedness with peers, researchers have typically looked to proximal predictors such as actual interaction experiences with peers. For example, peer-nomination measures of peer rejection are strongly associated with children's feelings of loneliness (Crick & Ladd, 1993). Less often explored, however, is the possibility that interactions between teachers and children may contribute to children's perceptions of relatedness with peers. Supportive teacher-child interactions may create an environment in which students feel supported by one another (Brock, Nishida, Chiong, Grimm, & Rimm-Kaufman, 2008; Donohue, Perry, & Weinstein, 2003). Second, research is lacking regarding the role of actual teacher-child interactions in children's perceptions of relatedness to their teacher. Although frequently studied, teacher-child relationships are typically examined using teacher reports rather than student reports of their perceptions of relatedness to the teacher.

Our interest in the role of actual teacher-child relational experiences in children's perceptions of relatedness emerges from research evaluating the usefulness of observed student-teacher interaction quality as an indicator of effective teaching (e.g., MET Project, 2010; Pianta, Mashburn, Downer, Hamre, & Justice, 2008). One approach to studying teacher-child interactions classifies interactions into three domains: *Emotional support* refers to the level of sensitivity and positive affect in interactions. *Instructional support* refers to interactions that support language development and conceptual understanding, in contrast to rote learning. The level of *classroom organization* refers to teachers' management of behavior and classroom time (Pianta, La Paro, & Hamre, 2008). Compared to students in the classrooms of lower-scoring

teachers, students in classrooms with high teacher-child interaction quality have better social and academic outcomes (Hamre & Pianta, 2001; Pianta, Belsky, Vandergrift, Houts & Morrison, 2008).

The association between observed teacher-child interactions and child outcomes may be due, in part, to children's increased sense of support in high-quality classrooms. High-quality teacher-child interactions may increase children's perceptions of support in the classroom (e.g., Brock et al., 2008; Watson, Battistich, & Solomon, 1998). Perceived support, in turn, has been linked to children's increased motivation and engagement (Connell & Wellborn, 1991; Wentzel, 1998; see Figure 1).

In the present study, we examined the association between directly observed teacher-child interactions and children's perceptions of relatedness. In doing so, we are building on the work of others who have studied the impact of actual relational experiences with peers on children's perceptions of relatedness (e.g., Asher et al., 1984; Crick & Ladd, 1993). We also add to the teacher-child relationship literature (e.g., Pianta, 1999) by focusing on children's perceptions of support from the teacher.

Although there is relatively little research on the effect of teacher-child interaction quality on students' perceptions of relational support in the classroom (Figure 1, path "a"), substantial evidence suggests that children who are aggressive or rejected by their peers perceive stressed or distant relationships with teachers and peers (Figure 1, path "b"; Birch & Ladd, 1998; Davidson, Gest, & Welsh, 2010; Gest et al., 2005). It may be that positive student-teacher interactions can moderate the negative associations between these two child characteristics—aggression and rejection—and children's perceptions of support in the classroom. Our starting point for this

hypothesis is evidence that high-quality teacher-child interactions may be especially important for children with risk factors for poor achievement (Hamre and Pianta, 2005).

The following section discusses the constructs of perceived teacher support, perceived peer support, and loneliness as three indicators of children's sense of relational support in the classroom. We also present the hypothesized predictors of perceived relatedness: Three aspects of teacher-child interactions (emotional support, instructional support, and classroom organization) and two individual characteristics, aggression and peer rejection.

Chapter 2: Defining Key Concepts

The Need for Relatedness in Positive Human Development

Many psychological perspectives consider the importance of social relationships in human development (e.g., Ainsworth, Blehar, Waters, & Wall, 1978; Bronfenbrenner & Morris, 2006). In their review of the literature, Baumeister and Leary (1995) found empirical support for the notion that social relationships are fundamental to human development: Bonds develop naturally in all cultures, knowledge of the relationships between people influence the development of our cognitions, and belongingness leads to positive emotions such as happiness and a sense of calm. Furthermore, the absence of relationships has been associated with stress and physical illness.

Theoretical support for the importance of a sense of relatedness comes primarily from theories of self-system processes (Connell & Wellborn, 1991; Deci et al., 1991), which recognize competence, autonomy, and relatedness as three basic psychological needs that motivate human behavior. Connell (1990) defines *relatedness* as "the appraised security of one's relationships with significant others in the social surround, and the experience of oneself as worthy and capable of affection and positive regard" (p. 65).

Relational Support in the Context of Elementary School Classrooms

Relationships in the classroom, and their importance for children's learning, have been a focus of study since the mid-1900s (Gronlund, 1959; Lewin, 1943). Gronlund's review of small educational experiments revealed that, to some extent, teachers can control the relationships that form among students. More recently, researchers have returned to the study of relationships among students, as well as between teachers and students, as a means of improving students'

social and academic success in times of heightened educational accountability (Pianta, 1999; Rodkin & Gest, 2010).

Attachment theory assigns a key role to relationships (Connell, 1990). In an attachment theory framework, children are free to explore and learn when they have a "secure base" to which they may return when they feel that their comfort or safety is threatened (Ainsworth et al., 1978; Connell, 1990; O'Connor & McCartney, 2007). Furthermore, relationships contribute to children's internal working models of relationships, which influence the way a child's future relationships may develop (Baker, 2006; Bowlby, 1982; Jennings & Greenberg, 2009).

Although parents are typically considered to be the primary attachment figures, Connell (1990) stressed the importance of teachers and peers, in addition to the caretaker, for school-aged children. A sense of relatedness to teachers and peers may allow children to successfully interact with their environments, resulting in better social functioning, higher motivation, and greater engagement in schoolwork (Klem & Connell, 2004; Solomon, Battistich, Watson, Schaps, & Lewis, 2000; Ryan & Patrick, 2001). Furrer and Skinner (2003) eloquently describe this effect: "Feelings of belonging may have an energetic function, awakening enthusiasm, interest, and willingness to participate in academic activities" (p. 158).

In the current study, we explore children's perceptions of teacher support and peer support. Evidence suggests that teachers and classmates may have unique effects on student outcomes (Davidson et al., 2010; Furrer & Skinner, 2003; Wentzel, 1998). We also consider children's overall feelings of loneliness. Below, we describe these three types of relatedness, including the typical developmental trajectory, implications for children's development, and known antecedents for each type of relatedness.

Perceived teacher support. *Perceived teacher support* refers to the degree of closeness the child perceives in the teacher-child relationship, including the degree of warmth and open communication between the child and teacher (Pianta, 2001). The construct of closeness is distinct from both conflict and dependency, two other relationship constructs that are often measured in teacher reports (Birch & Ladd, 1997; Hamre & Pianta, 2001; Pianta & Steinberg, 1992). For example, it is possible, and perhaps preferable, for a child to have a close relationship with a teacher without being dependent upon the teacher (Birch & Ladd, 1997). Research on the importance of supportive teacher-student relationships generally addresses the topic from an attachment theory framework (e.g., Baker, 2006; Birch & Ladd, 1997; Jennings & Greenberg, 2009; Jerome, Hamre, & Pianta, 2009). Children with secure relationships with their teachers might be more engaged in school activities because they know their teacher will provide help if necessary (Myers & Pianta, 2008). Furthermore, because relationships are the "input" system for so many skills, relationships may be better predictors of school success than are standard school readiness assessments (Mashburn & Pianta, 2006).

Measuring perceived teacher support. The vast majority of research has approached the topic of student-teacher relationships from the perspective of the teacher, rather than the child (Mashburn & Pianta, 2006). Reliance on teacher reports limits the generalizability of the construct and can result in method bias when the teacher also rates the predictors of relationship quality (Howes, 2000; Meehan, Hughes, & Cavell, 2003; Pianta & Stuhlman, 2004). To obtain teacher reports, many studies use the Closeness subscale of the Student-Teacher Relationship Scale (Pianta, 2001), which essentially measures a teacher's perception of his or her provision of support to a child, and the extent to which they have a warm relationship. Other methods include observational measures of close teacher-child relationships, which have achieved acceptable

reliability (Ladd, Birch, & Buhs, 1999). Peer nominations, which ask students to report which classmates have close relationships with their teacher, have also been used (Wu, Hughes, & Kwok, 2010). Finally, the use of child self-reports (Gest et al., 2005; Wu et al.) recognizes the importance of the child's own perception of his or her relationship with the teacher.

Although preschool children may not be able to express the quality of their relationships with teachers, necessitating teacher reports, school-aged children can report their relationship quite accurately (Gest et al., 2005; Ryan, Stiller, & Lynch, 1994; Valeski & Stipek, 2001). Factor analytic techniques revealed that children in kindergarten and first grade can differentiate among items related to general satisfaction with school, academic competence, and their relationship with their teacher (Valeski & Stipek). Wu and colleagues (2010) compared child and teacher reports of warmth in the teacher-child relationship and found incongruence in many of the reports. Thus, for at least some children, teacher reports will not represent what a child actual perceives. Child reports also eliminate method biases in analyses using teacher-reported academic, social, and behavioral ratings as predictors or consequences of teacher-child relationship quality.

Developmental trajectories of student-teacher relationships. In general, teachers report close relationships with students (Birch & Ladd, 1997; Howes, 2000; Jerome et al., 2009). The extent to which teachers rate their relationships with children as warm, open, and nurturing appears to decline across elementary school and middle school, with some evidence of a sharper decline for boys than for girls (Baker, 2006; Jerome et al.; O'Connor, 2010; Pianta & Stuhlman, 2004). This decline may be due, in part, to a shift from emotionally supportive interactions to a stronger focus on instruction in later grades (Jerome et al.; O'Connor & McCartney, 2007). In contrast, student reports from 3rd, 4th, and 5th graders show similar levels of perceived teacher

support (Gest et al., 2005). It may be that significant differences in perceptions would not be discernable in the small 3rd-5th grade range. Still, average relationship quality is quite positive even in 5th grade, in both student reports (Gest et al.) and teacher reports (O'Connor, 2010).

Although the average quality of teacher-child relationships is high, children's relationships with different teachers from one year to the next are not always consistent. Across elementary school, children have only moderate correlations on teacher ratings of closeness (e.g., $r = .35$; Birch & Ladd, 1998; Jerome et al., 2009; Pianta & Stuhlman, 2004). In contrast, rates of conflict are more stable across the years (e.g., $r = .50$; Birch & Ladd, 1998; Jerome et al.; Pianta & Stuhlman). Two studies that examined the growth trajectories of children's relationship quality identified patterns characterized by different starting points and directions of change (Gest et al., 2005; O'Connor & McCartney, 2007). Such studies suggest that there are significant differences in children's experiences of relatedness with teachers across grades. Most children experience an annual change in teachers, and this fluctuation in teacher quality could be partly to blame for the inconsistency of teacher-child relationship quality across the school years (Pianta, 2006).

Outcomes associated with supportive teacher-child relationships. Although high-quality teacher-child relationships are important in their own regard, researchers have examined links between relationship quality and important developmental outcomes. Below, we review empirical evidence related to the benefits of supportive teacher-child relationships. We present findings from both teacher-report and child-report measures of relationship quality.

Academic achievement. Numerous studies have associated teacher and child reports of close, supportive relationships with children's academic adjustment (e.g., Birch & Ladd, 1997; Davidson et al., 2010; Wu et al., 2010; Hughes, Luo, Kwok, & Loyd, 2008). Most research has

explored concurrent associations between close teacher-child relationships and academic outcomes, rather than predictive relationships that allow for causal inference. For example, teacher reports of teacher-child closeness have been associated with children's report card grades and standardized test scores within the same year (Baker, 2006). Similarly, Pianta and Stuhlman (2004) found that teachers' reports of close relationships in 1st grade were associated with teacher-rated academic achievement, beyond the effect of preschool achievement and relationships with previous teachers. Because the authors controlled for baseline levels of achievement, their findings suggest that relationships may indeed be an important factor in academic achievement within the same school year.

The evidence is less clear regarding the association between earlier relationships and later academic adjustment. Pianta and Stuhlman (2004) found no effects of preschool or kindergarten relationship quality on first-grade achievement. Hughes and colleagues (2008), however, found a significant effect of first-graders' self-reported relationship with teachers on third-grade academic outcomes. These conflicting results may be due to different sources of information regarding the teacher-child relationship: Whereas Pianta and Stuhlman relied on teacher-reported relationship quality, Hughes and colleagues employed child reports. It may be that teachers' perceptions of their relationships with students are biased by students' current behaviors and performance, which may not be as important for children's later achievement as their actual feelings about their teacher. Thus, although there exists a substantial body of literature focused on determining the effect of relationship quality on academic achievement, further research is needed.

Engagement. The association between supportive relationships with teachers and engagement is important, given that student engagement is thought to mediate the association

between student-teacher relationship quality and achievement (Connell & Wellborn, 1991; Furrer & Skinner, 2003; Hughes et al., 2008). Teacher reports of close relationships are associated with younger students' liking for school and self-directedness, as reported by the teacher (Birch & Ladd, 1997). Similarly, children's own perceptions of support are associated with greater school engagement (Klem & Connell, 2004). If young children carry forward an early liking for school, positive student-teacher relationships may promote students' later engagement (Valeski & Stipek, 2001).

In one longitudinal study, teacher reports of high-quality teacher-child relationships in 1st grade predicted children's effortful engagement, based on teacher-reported participation and persistence, in 2nd grade, even when controlling for children's classroom engagement during the previous year. Furthermore, the effect of supportive relationships on engagement fully mediated the effect of 1st-grade relationship quality on 3rd-grade math and reading scores. Notably, the quality of 2nd-grade teacher-child relationships did not predict engagement in 3rd grade, suggesting that relationship quality in the early years is especially important (Hughes et al., 2008).

Social and behavioral outcomes. Concurrently, teacher-rated relationship quality is positively associated with teacher-rated prosocial competencies and classroom adjustment, such as following the rules and using time wisely (Baker, 2006). Children's perceptions of support from the teacher are also correlated with parent, child, and teacher ratings of children's social skills (Demaray & Malecki, 2002). Because the research using teacher reports of relationship quality is often fraught with source effects, Pianta and Stuhlman's (2004) longitudinal study included direct observations of children's social competence in addition to teacher ratings. First graders who had closer relationships with their teacher had better observer- and teacher-rated

social skills, even after controlling for children's social skills in preschool and relationships with earlier teachers. Although preschool and kindergarten teacher-child relationships did not affect first-graders' social skills, the quality of the current relationship appears to be important for changes in social competencies.

Teacher-child relationship quality may also influence the development of antisocial behaviors (e.g., Meehan et al., 2003, Howes, 2000). Elementary students with closer teacher-rated relationships are less likely to engage in risky behaviors in early adolescence (Rudasill, Reio, Stipanovic, & Taylor, 2010), although the association could be due to a common cause leading to poor relationship quality and adolescent risk-taking behaviors. Meehan and colleagues (2003) controlled for children's aggression in the previous year and found current teacher-rated relationship quality to be associated with children's teacher-rated aggression. Still, a serious source of bias in this study is the use of a single rater—the current teacher—to rate both aggression and relationship quality. Indeed, teacher-reported closeness in the teacher-child relationship was not associated with *peer reports* of aggressive behavior.

Limitations of the research. A major limitation of the research is that relationships and outcomes are frequently measured concurrently, leaving the direction of influence unclear. On the one hand, it is possible that close relationships are associated with academic outcomes because children may get more out of classroom activities when they use their teachers for support and a sense of security. On the other hand, children with more advanced academic skills may form closer relationships with their teachers as a result of the underlying maturity necessary for both schoolwork and relationship formation (Birch & Ladd, 1996). Indeed, path analyses reveal reciprocal associations between engagement and relationship quality (Hughes et al., 2008). Similar issues exist for attitudes: Although having a close relationship with one's teacher

may increase school enjoyment, it could also be that teachers simply find it easier to form close relationships with children who like school (Birch & Ladd, 1996).

Moderators of teacher support outcomes. Teacher-child relationships may be more important for girls than for boys. Teacher-rated closeness was more important for elementary-aged girls' scores on teacher-reported prosocial skills, standardized reading assessments, and report card grades in reading than for boys (Baker, 2006; Hamre & Pianta, 2001). The significance of teacher-child relationships for such outcomes as reading scores, classroom adjustment, and social skills seems to hold across the elementary grades (Baker, 2006).

Predictors of supportive teacher-child relationships. Although teacher ratings of the teacher-child relationship are, on average, quite high (Birch & Ladd, 1997), there is significant between-child variance (Jerome et al., 2009). Studies have attempted to account for inter-individual differences in relationship quality using both individual child characteristics, described here, and factors at the classroom level, which are described in detail in a later section.

Demographic factors. Girls are more likely than boys to have close relationships with their teachers, a trend that appears in both child-report and teacher-report measures (Baker, 2006; Birch & Ladd, 1998; Demaray & Malecki, 2002; Gest et al., 2005; Hamre & Pianta, 2001; Jerome et al., 2009; Rudasill & Rimm-Kaufman, 2009; Ryan et al., 1994; Wyrick & Rudasill, 2009). Children from higher-income families also have closer teacher-rated relationships (Wyrick & Rudasill). The role of race in the formation of close student-teacher relationships is less clear; indeed, the ethnic match of the student and teacher may be more important than race alone (Saft & Pianta, 2001).

Child behavior. Behavior problems in kindergarten are predictive of less-close relationships with first-grade teachers, as rated by the teacher, even after controlling for

relationship quality with kindergarten teachers (Birch & Ladd, 1998). Similar findings have emerged in studies of with children's self-reports of teacher supportiveness (Gest et al., 2005). Still, results are mixed regarding the effect of children's behavior problems on teacher-child relationship quality. Jerome and colleagues (2009) found that maternal reports of children's externalizing behaviors at the beginning of kindergarten were not associated with teacher ratings of closeness in sixth grade. The lack of effect could be due to the measurement of children's behavior at 54 months. Some children may decrease in aggression as they adjust to school, whereas other children may continue to exhibit the behavior. Furthermore, it is likely that not all children who are aggressive at home transfer their behavior to a well-managed classroom.

Young children's shyness has been associated with less close relationships, as reported by the teacher. This effect may be explained by less frequent child-initiated interactions with the teacher among shy children (Rudasill & Rimm-Kaufman, 2009). After kindergarten, however, the association between withdrawn behavior and less-close teacher-child relationships appears to diminish (Ladd & Burgess, 1999).

Academic achievement. Higher-achieving students tend to form closer relationships with their teachers, both in teacher reports (Jerome et al., 2009) and child reports (Valeski & Stipek, 2001) of relationship quality. In one study, kindergartners with higher scores on a standardized achievement test had closer relationships with their teachers than did their lower-achieving peers at school entry, and continued to have closer relationships with teachers through early elementary school. After 3rd grade, however, kindergarten levels of academic achievement are no longer associated with the closeness of student-teacher relationships (Jerome et al.).

Perceived peer support. Perceived peer support refers the degree to which children feel that their classroom consists of a caring group of students who respect and support one another

(Battistich et al., 1995). Examining children's feelings about their classmates as a whole allows us to better understand life in the classroom, one of the primary contexts in which children develop (Bronfenbrenner & Morris 2006; Pianta, 1999). Although children may work and play in small groups, their overall feelings about the community in the classroom remain important (Solomon et al., 2000).

Outcomes associated with perceptions of support from peers. A sense of relatedness to peers is an important outcome in its own regard (e.g., Osterman, 2000); however, perceived peer support has also been linked to social, behavioral, and academic outcomes. Of particular interest in the study of perceived support from peers is the Child Development Project (CDP), a school-based intervention that aimed to change students' sense of connectedness to one another as well as to the institution as a whole. The CDP focused on fostering a "sense of community", which includes classroom and school support, as well as a sense of autonomy and responsibility in the classroom (Solomon et al., 2000). Findings from the CDP and several other studies (e.g., Demaray & Malecki, 2002; Wentzel, 1998) reveal possible benefits and risks associated with high and low levels of perceived support from peers, respectively.

Engagement and academic outcomes. Perceived support from peers has been linked to academic outcomes, though findings are inconsistent. Teacher-rated academic competence and standardized test scores are unrelated to children's perceptions of social support from peers (Connell & Wellborn, 1991; Demaray & Malecki, 2002). Perceived peer support appears to be more important for motivation and engagement, which may, in time, predict academic success (Connell & Wellborn, 1991; Furrer & Skinner, 2003). There are moderate associations between peer support and students' personal academic initiative (Danielson, Wiium, Wilhelmsen, & Wold, 2010), and students with a higher sense of community like school more, enjoy helping

others with schoolwork, and are more intrinsically motivated (Battistich et al., 1995). Furthermore, students who perceive more support from their classmates are more confident in their ability to succeed at tasks (Demaray & Malecki, 2002) and are more engaged, measured with both teacher-rated school attendance, class participation, and task completion (Murdock, 1999) and self-reported persistence, effort, involvement, and attention (Furrer & Skinner, 2003).

Because the CDP evaluated a school-based community-building program by comparing it to control schools, it is possible to infer some level of causation regarding the importance of a sense of community on children's outcomes. Structural equation models tested pathways from participation in the intervention to implementation, from implementation to reported sense of community, and from sense of community to the child outcomes (Solomon et al., 2000). This analysis of change over time provided strong support for a causal pathway from sense of community to children's increased enjoyment of class and school in general, as well as a greater sense of efficacy, better engagement, and less avoidance of work. In fact, the only measure of academic behavior unrelated to sense of community was students' standardized achievement scores. Furthermore, sense of community mediated the associations between level of implementation of the CDP intervention and student outcomes. The demonstration of mediation confirmed the importance of classroom and school supportiveness for students' academic attitudes and behaviors (Solomon et al., 2000).

It is likely that the effect of peer support on academic outcomes is more complex than a simple direct effect. Wentzel (1998) found no direct effects of sixth graders' perceptions of peer support on their interest in school; however, in line with the hypothesis that having social support buffers individuals from the negative effects of stress, which leads to positive outcomes, there was an indirect pathway through students' reported levels of distress. That is, students who felt

more support from their peers also reported less stress, which in turn was associated with greater enjoyment of learning.

Because only five of the 12 schools implementing the CDP actually demonstrated changes in teaching practices, Solomon and colleagues (2000) examined the middle-school outcomes of children who had attended these "high change" elementary schools. Students from elementary schools that had successfully implemented the CDP indeed had higher grade point averages in middle school than did students from the comparison schools, suggesting that there may be lasting effects of improving students' sense of classroom and school community.

Social and behavioral outcomes. A sense of relatedness with peers may encourage students to behave according to the norms promoted by the school or classroom (Wentzel, 1994; 1999). Indeed, children in the CDP who perceived a stronger sense of community managed conflict better than other students (Battistich et al., 1995). Relatedness to peers may also contribute to better self-esteem (Battistich et al.) though some children may believe their classmates care about them as a *result* of their higher self-esteem; that is, they believe others see them in the same positive light in which they see themselves (Harter, 1996). Furthermore, students who perceive high levels of social support from classmates tend to have better social skills, as measured with self-reports as well as parent- and teacher-reports, and are more willing to help others and cooperate (Demaray & Malecki, 2002; Wentzel, 1998).

Perceiving poor support from peers has been associated with several negative developmental outcomes. Pre-intervention data from the CDP revealed that students with lower perceptions of the school as a community had more drug use and delinquent behaviors (Battistich & Hom, 1997). Poor peer support has also been associated with higher scores on a clinical scale of externalizing and internalizing behaviors, although these correlations did not control for

gender or grade effects (Demaray & Malecki, 2002). Middle school students who perceive less academic support from their peers experience more disciplinary actions, including visits to the office and detentions (Murdock, 1999).

Limitations of the research. The concurrent nature of much of the peer support research limits our ability to draw conclusions from the findings. Although it seems reasonable that children who feel supported by their classmates will enjoy school more and engage in their schoolwork, perhaps because they feel secure or believe that they are an important part of the classroom's functioning, the reverse may also be true: Children who are well-adjusted may also simply make friends easily. The direction of effect is difficult to identify. Indeed, as with teacher support, the associations between perceived peer support and developmental outcomes are likely bidirectional (Anderman, 2003).

Moderators of peer support effects. Boys may benefit more than girls from perceptions of support from peers. Goodenow (1993) found that the relationship between middle-school students' perceived peer support and intrinsic motivation to learn was only significant for boys. Peer support may also be more important for younger children; Goodenow found that the correlation between perceived peer support and children's expectations for academic success was stronger for sixth graders than for 8th graders, perhaps because older children have developed lasting beliefs based on earlier experiences.

Predictors of supportive peer relationships. Both individual effects, described here, and contextual effects, described in a later section, may influence the perception of supportive relationships with peers.

Demographic factors. In general, girls perceive more support from their classmates than do boys (Demaray & Malecki, 2002; Gest et al., 2005). Younger students also report more

support; elementary school students report higher levels than middle school students, who, in turn, have higher levels than high school students (Demaray & Malecki). The same pattern emerges even when considering a range of just three grades, with fifth graders reporting less relatedness to school than did third graders (Gest et al.). Race is not often explored as often as a predictor of perceived support, but a study using a large, diverse sample suggests that Native Americans perceive less social support from their classmates than do White or Hispanic students, with no differences between African American, Hispanic, and White students' perceptions. These findings should be taken with caution, however, as they employ a multi-study dataset from studies of various target populations that are not representative of the general population (Demaray & Malecki, 2002).

Child behavior. Aggressive children tend to have lower-quality relationships with peers (Campbell, Spieker, Burchinal, Poe, & NICHD ECCRN, 2006; Cohen, Hsueh, Russell, & Ray, 2006; Crick, 1996). Children who decreased in perceived support across the school year started the year with high levels of peer- and teacher-rated aggressive behavior. Children do not like to interact with aggressive children, and aggressive children indeed perceive this rejection in terms of poor support from classmates (Gest et al., 2005).

Loneliness refers to children's feelings of dissatisfaction with the quality of peer social experiences and desire for better relationships. The concept of loneliness is distinct from peer rejection. Children who are lonely report feelings of discontentment with their social isolation, whereas children who are rejected are simply disliked by their peers, which may or may not affect a child's subjective feelings of loneliness (Asher et al., 1984). That is, loneliness is subjective, whereas measures such as those based on number of friends or "like most"

nominations are inherently objective. In fact, some well-liked children may not be satisfied with the quality of their social relationships, and thus feel lonely (Asher & Paquette, 2003).

Measuring loneliness. Reviewing the literature on childhood loneliness, Asher and Paquette (2003) concluded that children understand what it means to be lonely. Children in kindergarten and first grade describe loneliness as a feeling of being alone and sad, such as not having anyone to play with, and can respond to self-reports of their own loneliness (Cassidy & Asher, 1992). Children's self-reports of loneliness are consistent across the school year, although they are most stable for children who report feeling the highest levels of loneliness (Renshaw and Brown, 1993).

Prevalence of childhood loneliness. The vast majority of students do not report significant feelings of loneliness (Gest et al., 2005). However, approximately 10% of elementary-aged children do report that loneliness statements are "always true" or "true most of the time." This is a significant proportion, especially because children likely underreport feelings of loneliness due to their social desirability (Asher et al., 1984).

Outcomes associated with childhood loneliness. Feeling lonely is, in itself, a negative outcome. Research on the significance of a sense of relatedness for children's development implies that children's well-being may be negatively affected when children experience chronic loneliness (Baumeister & Leary, 1995). Kindergarten children who feel lonely are more likely to try to avoid going to school, and do not enjoy kindergarten as much as their socially-satisfied peers. Lonely children are also more anxious during their interactions with peers, as judged by parents and teachers (Coplan, Closson, Arbeau, 2007). In elementary grades, however, loneliness is only related to anxiety for girls; avoidance remains correlated with loneliness for both boys and girls (Crick & Ladd, 1993). Finally, lonely children feel less confident in their ability to do

well on cognitive tasks (Coplan et al.). Despite the numerous social and emotional outcomes that appear to be associated with loneliness, researchers find no concurrent association between loneliness and standardized achievement test scores (Asher et al., 1984).

Predictors of childhood loneliness. Studies generally find no gender or grade differences in elementary students' reports of loneliness (Asher et al., 1984; Asher & Paquette, 2003; Gest et al., 2005; Renshaw & Brown, 1993). When children are asked to nominate classmates with whom they would most like to play, lonely children tend to have fewer friendship nominations than their socially satisfied peers. Similarly, feelings of loneliness may develop when children are rejected by peers (Asher et al.; Crick & Ladd, 1993; Renshaw & Brown), especially if the child is also victimized, or exhibits withdrawn rather than aggressive behavior in the classroom (Asher & Pacquett). The high variability in children's sociometric status within groups of both "popular" and "unpopular" children, however, suggests that factors other than acceptance are important for children's loneliness (Asher et al.).

Indeed, it appears that the *accumulation* of particular behavioral, sociometric, and internal attributional styles leads to greater levels of loneliness. Children who are socially withdrawn; receive low rankings from classmates as a desired play partner; lack reciprocal friendships, or only have one or two; and blame themselves for situations in which others rebuke them tend to be lonelier (Renshaw & Brown, 1993). Renshaw and Brown conclude that findings from this model provide support for both a model of loneliness caused by both personal behaviors, such as social withdrawal, and negative social impacts. Contextual effects on the development of loneliness, as well as predictors of perceived support and peer support, are described below.

Factors Affecting the Development of Classroom Relatedness: Teacher-Child Interactions and Child Characteristics

Given the evidence that a sense of relatedness may be a critical element of children's development, it is important to consider factors that put children at risk for perceiving poor-quality relationships in the classroom. Understanding these factors could lead to more effective school-based interventions that target the improvement of relationships (Pianta & Walsh, 1996). We focus on potential influences on perceptions of relatedness at the classroom and individual child levels, and explore the interactions between the two levels, as suggested by Pianta (1999).

Classroom-level effects on academic and social development: Teacher-child interactions. What happens within the walls of the classroom affects children's social development as well as their cognitive development (Danielsen et al., 2010; Nye, Konstantopoulos, & Hedges, 2004). Following a review of the teacher-effect literature, we describe how the quality of teacher-child interactions may be an important factor in understanding why teachers have such a profound effect on children's development.

Evidence of teacher effects. Recent studies have presented evidence that teachers do have an effect on their students, independent of the effects of academic curricula or school characteristics. Some of the best evidence comes from a study in which students were randomly assigned to classrooms. Analyses revealed large teacher effects on student achievement in the elementary grades, such that being in a different classroom had more implications for students' success than being in a different school (Nye et al., 2004).

Teacher effects have also been found on indicators of social relatedness. Student-teacher relationship quality does not appear to be randomly distributed among all children; rather, significant between-classroom variation in the quality of teacher-child relationships has been

found on both teacher and student reports (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008; Danielsen et al., 2010; Ryan & Patrick, 2001), suggesting that relationship quality is affected by than just individual child factors. Closeness, more than conflict, may depend on the "goodness-of-fit" between the teachers and their students (Pianta and Stuhlman, 2004), resulting in differences in teacher-child relationship quality from one classroom to the next.

Students' perceptions of support from their classmates also vary between classrooms (Danielson et al., 2010), indicating that classroom-level variables may affect the formation of close relationships among classmates as well as between teachers and children. It is important to note that although children within the same classroom do systematically agree on reports of classmate support, there is much more between-classroom variance in children's perceptions of teacher support (Danielson et al.). Nonetheless, teachers may play an important role in the determining the quality of relationships that develop in the classroom.

Explaining teacher effects: Structural features of the classroom and children's academic outcomes. Structural features of the classroom, such as class size and teacher characteristics, are among the possible explanations for academic effects at the classroom level. When students are randomly assigned to different class sizes, there are indeed significant benefits for students in smaller class sizes (Nye, Hedges, & Konstantopoulos, 2000), but reducing class sizes likely less cost-effective than increasing the quality of teachers (Nye et al., 2004). Looking at years of research on the importance of school resources, Cohen, Raudenbush, and Ball (2003) concluded that schools with more resources (e.g., library books, high-quality buildings) do *not* produce more successful students, after accounting for the average socioeconomic status of the children attending the school.

Regarding teacher characteristics, teachers with advanced degrees are not any more effective than teachers with college degrees. Teachers with more than three years of experience, however, may produce better students, but results did not reach significance (Nye et al., 2004). Furthermore, though choices in academic curriculum do matter (Agodini, Harris, Atkins-Burnett, Heaviside, Novak & Murphy, 2009), the between-classroom differences in achievement within a single school, coupled with the autonomy allowed most American elementary school teachers when following a prescribed curriculum, suggests that teaching practices may be more important than choice of curriculum (Nye et al., 2004; Rowan, Correnti, & Miller, 2002). Taken together, the evidence suggests that there are few structural features that could explain large differences between classrooms.

Explaining teacher effects: Structural features of the classroom and children's relatedness. As with academic outcomes, the quality of teachers' relationships with students may depend on a number of factors. Teacher-reported relationship quality between elementary teachers and students is higher when teachers have higher salaries, regardless of students' socioeconomic status. Teachers also report better relationships with students when they have higher teaching self-efficacy, although teachers' level of education is not associated with teacher-reported relationship quality (O'Connor, 2010). Teacher effects on children's perceptions of peer support have not been explored to the same extent as teacher-child relationships, though it is clear that children report a poorer sense of community and school belonging in lower-income schools (Battistich et al., 1995; Battistich & Hom, 1997; Goodenow, 1993). Peer relationships may also be negatively affected by teachers' use of ability grouping and school structures that track students through courses by ability level (Osterman, 2000).

***Explaining teacher effects: Teacher-child interaction quality*.** In light of the above evidence, researchers would do well to look beyond structural features of the classroom and identify teaching practices that are responsible for teacher effects on relatedness and achievement (Osterman, 2000; Wright et al., 1997). Careful measurement of student-teacher interactions may be the key (Mashburn & Pianta, 2006; Pianta, Belsky, et al., 2008). Research from a large-scale study concluded that student-teacher interaction quality does predict child outcomes (Pianta, Belsky, Houts, Morrison, & the NICHD ECCRN, 2007). For example, when teachers effectively manage student behavior, use time productively for student activities, and use a variety of modalities to enhance students' conceptual understanding, students who begin with low scores on math show significant growth; similarly, children who begin with low levels of literacy have larger growth when teachers use instructionally supportive interactions such as feedback loops and scaffolding (Curby, Rimm-Kaufman, & Ponitz, 2009).

Theoretical basis for examining teacher-child interactions. One of the most relevant systems theories for classroom-based research is the bioecological model of human development, which recognized the importance of interactions between children and their environments (Bronfenbrenner & Morris, 2006). Children's individual differences may affect the quality and content of these interactions, but it is the interaction itself that is the focus of the theory. Of upmost importance are interactions that occur in the microcontext, which includes everyday settings for the child such as the home and childcare or school. In these settings, the interactions between children and their peers and adults are known as *proximal processes.* Children's development can be directed via these proximal processes, which may contribute to their acquisition of skills and knowledge (Bronfenbrenner & Morris). The classroom provides a

setting for numerous proximal processes, and the teacher must capitalize on opportunities to scaffold learning through high-quality interactions (Pianta et al., 2007).

Assessing teacher-child interaction quality. Although teacher observations are widely accepted as important for evaluating teachers, it is rare that standardized measures are used in non-research situations (Pianta & Hamre, 2009a). The Classroom Observation Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008) moves away from the counting and equal weighting of specific behaviors that form the basis for other observational protocols (Pianta & Hamre, 2009a), and moves towards a holistic approach that considers a number of supportive teacher-student interactions (Hamre, Pianta, Mashburn, & Downer, 2007). The CLASS scales were developed using existing measures of teacher effectiveness, focus groups with teachers, and pilot studies (Pianta, La Paro, & Hamre, 2008). Elements of the measure were informed by the emerging research on the importance of support for both academic and social and emotional learning for children's development (Pianta, Belsky, et al., 2008). Thus, three domains were proposed as unique aspects of teachers' interactions with their students: Emotional support, instructional support, and classroom organization (Pianta, La Paro, & Hamre, 2008). The CLASS measure begins with these macro-level domains, which are broken into more specific behaviors that the observer can identify (Pianta & Hamre, 2009a). Each of these domains is briefly described below.

Emotional Support. According to Hamre and Pianta (2007), the domain of emotional support is based in attachment theory (e.g., Ainsworth et al., 1978) and self-determination or self-systems theories (e.g., Connell & Wellborn, 1991; Deci et al., 1991). The teacher who provides emotionally supportive interactions creates a secure base for the child to explore and learn (Ainsworth et al.; Hamre & Pianta, 2007). Emotional support is measured with four

dimensions: Positive climate, negative climate, teacher sensitivity, and regard for student perspectives (Pianta, La Paro, & Hamre, 2008).

Instructional Support. The choice of dimensions used to assess instructional support comes from research on how children learn (Pianta & Hamre, 2009b). For example, rote learning is much less effective than meaningful learning (Mayer, 2002). Supportive instructional interactions should therefore allow students to play an active role, through creating their own projects and applying concepts to the real world (Pianta, La Paro, & Hamre, 2008). The instructional support domain includes three dimensions: Concept development, quality of feedback, and language modeling (Pianta, La Paro, & Hamre).

*Classroom Organization***.** According to Hamre and Pianta (2007), classroom organization is an important domain given the evidence that students' self-regulation skills are critical for learning, and that the classroom may be an important setting for learning such skills (Blair, 2002). Classroom organization is characterized by three dimensions: Behavior management, instructional learning formats, and productivity (Pianta, La Paro, & Hamre, 2008).

Uniqueness of the domains. Although the domains were selected prior to the implementation of the scale, confirmatory factor analyses on nearly 4,000 classrooms reveal that the three-factor solution to organizing the ten CLASS dimensions is indeed a well-fitting solution; each domain includes unique information about the experiences of children with regards to their interactions with teachers (Hamre, Pianta, Mashburn, & Downer, 2007). Still, some researchers have found high inter-correlations among the domains and have chosen to present a single measure (e.g., "overall classroom quality") by aggregating the ten underlying dimensions (Brown, Jones, LaRusso, & Aber, 2010).

What promotes high-quality teacher-child interactions? One large-scale study revealed that student-teacher interaction quality in 3rd grade classrooms was not associated with many of the most commonly used indicators of classroom quality, including teacher-child ratio, class size, years of experience, age, or salary. Teachers' in-service training and years of education were only slightly associated with positive climate, and the only indicator highly correlated with teachers' creation of a positive climate was teachers' reported levels of teaching efficacy (NICHD ECCRN, 2005). A high-quality social-emotional and literacy program, coupled with mental-health consultants for teachers, has been found to improve the quality of teacher-child interactions in the context of the 4Rs intervention (Brown et al., 2010).

The effect of teacher-child interaction quality on children's sense of relatedness. It may be that teacher-child interactions are associated with achievement outcomes because interactions improve children's sense of relatedness in the classroom (e.g., O'Connor, 2010; see Figure 1, path "a"). Indeed, children in classrooms with more positive climates and better-organized instructional practices have better teacher-rated teacher-child relationships (O'Connor; Hamre, Pianta, Downer, & Mashburn, 2008). Furthermore, the rate of decline in closeness scores across elementary school is smaller for children who are placed in more supportive classrooms (O'Connor). Although others have found no association between observed emotional support and closeness, small sample sizes may have limited researchers' power to detect effects.

A small number of studies have also shown that more positive student-teacher interactions are associated with students' perceptions of a peer support. For example, teachers who were observed to be warm, emphasize cooperation, and encourage students to share their ideas have students who report a better sense of community (Schaps, Battistich, & Solomon, 2004; Solomon, Battistich, Kim, & Watson, 1997). The effect of teaching practices on sense of

community may be mediated through children's improved classroom behavior (Solomon et al., 1997).

Protective effects of teacher-child interaction quality. High-quality teacher-child interactions may be protective for children who would otherwise have poor achievement, such as aggressive children and children with poor social skills (Hamre & Pianta, 2005). Furthermore, teacher who provide high-quality interactions report less conflicted relationships with these at-risk students, compared to teachers who were observed to provide lower-quality interactions. These findings suggest that teacher-child interactions may serve as protective factors, keeping at-risk students from experiencing the negative outcomes that would otherwise be expected (Luthar, Cicchetti, & Becker, 2000).

Child characteristics. As mentioned above, certain characteristics put children at risk for poor relatedness at school. Here, we describe two characteristics—aggression and sociometric status—that predict lower-quality relationships (Birch & Ladd, 1998; Campbell et al., 2006; Crick, 1996; Gest et al., 2005).

Childhood aggression and social relationships. Aggressive behaviors have been associated with poor relationships with both teachers and peers (Birch & Ladd, 1998; Gest et al., 2005; Ladd et al., 1999). Kindergarten children with behavior problems are more likely to have conflicted, nonclose, and overly dependent teacher relationships in first grade, as reported by their teachers, even after controlling for kindergarten relationship quality (Birch & Ladd, 1998). Given the stability of aggressive behaviors from year to year, aggression could be a serious risk factor for poor student-teacher relationships (Birch & Ladd, 1998). Uncooperative students may threaten teachers' ability to maintain control over their own behavior and the classroom in general, and there is the added risk to the teacher that an aggressive child will react to

confrontation with a disruptive outburst. As a result, teachers are not as responsive to

uncooperative students' attempts to initiate contact with the teacher (Brophy & Evertson,

1981).Over time, a lack of high-quality interactions could contribute to poor relationships

between aggressive children and their teachers.

Aggressive behaviors also have a strong, negative effect on relationships with peers.

Concurrent and longitudinal analyses have linked aggression to high peer rejection, low peer

acceptance, and inferior friendship quality (Campbell et al., 2006; Cohen et al., 2006; Crick,

1996). Girls' overt aggression predicts declining peer acceptance across the school year (Crick).

Similarly, whereas most children increase in the quality of their friendships across middle

childhood, children on a trajectory of high, stable levels of aggression from toddlerhood onward

actually have decreases in their friendship quality between the ages of nine and twelve

(Campbell et al.).

Peer rejection and social relationships. Peer rejection is often associated with children's

dissatisfaction with their social interactions and reported loneliness (Asher, Parkhurst, Hymel, &

Williams, 1990, Cassidy & Asher, 1992). One approach to studying the effect of children's

sociometric status is to compute social preference scores, which are based on "like most"

nominations minus "like least" nominations (Asher & Coie, 1990). Children with lower social

preference earlier in the school year become lonelier as the year progresses (Gest et al., 2005).

There is less research regarding the role that social status plays in children's perceptions of

support from their teacher or peers. In one study, researchers found that children with low social

preference also had lower-quality relationships with their teacher, as reported by the teacher (Wu

et al., 2010). Similarly, children who are less preferred by their classmates perceive less close

relationships with their teacher, although this association does not hold up longitudinally. The

same study found no association between social preference and perceptions of school support, (Gest et al.). In another study, however, children who were rejected did perceive their peers to be less supportive and trustworthy in the following year, suggesting that having aversive peer experiences may negatively affect children's later perceptions of peers (Salmivalli & Isaacs, 2005).

The need for high-quality social relationships for aggressive and rejected children. Given the above evidence that classroom relatedness has numerous benefits for children's adjustment, it is unfortunate that rejected and aggressive children often lack these supportive relationships (Birch & Ladd, 1998; Campbell et al., 2006; Crick, 1996; Gest et al., 2005) and experience more loneliness (Coie, Dodge, & Kupersmidt, 1990; Gest et al., 2005). Indeed, the resiliency literature suggests that the quality of the attachment system is a critical factor in determining whether at-risk children succeed at developmental tasks (Masten & Coatsworth, 1998).

A small body of evidence suggests that relationships may protect aggressive children from negative consequences typically associated with their risk status. Aggressive children with positive relationships with their teacher, as rated by the teacher, have better academic and social adjustment than children with similar behavior problems who lack positive relationships with their teacher (Baker, 2006; Hamre & Pianta, 2001). Furthermore, the negative association between children's levels aggression and the extent that they like school appears to be mediated by their perceptions of teacher support, suggesting that perceiving a supportive relationship with one's teacher may increase an aggressive child's liking for school (Gest et al., 2005). The importance of relatedness for rejected children has been studied less often, perhaps because rejected children, by nature of their classification, have fewer relationships. However, Gest and

colleagues found that children who were less socially preferred perceived worse relationships with their teachers and reported being more lonely. Furthermore, children who were less preferred in the fall had steeper increases in feelings of loneliness across the school year.

The Present Study

As described above, there is a large body of evidence suggesting that relationships in the classroom are important for children's academic and social development. This literature, however, has failed to account for the role that actual teacher-child interactions may play in children's perceptions of relatedness in the classroom. Furthermore, studies often fail to consider children's own perceptions of teacher-child relationship quality, often relying on teacher reports. The present study addresses these weaknesses by exploring the role that teacher-child interaction quality plays in children's perceptions of relatedness in their classroom. Significant results would indicate that teacher-child interaction quality is an important element in the total picture of high-quality teaching. In addition to expanding our understanding of teacher-child interactions and children's perceptions of relatedness, the present study also sought to explore how children with certain risk factors—namely, aggressive behaviors and rejection by their peers—perceive their relationships in the classroom. It may also be that high-quality teacher-child interactions are especially important in ensuring that these at-risk children perceive high levels of relatedness in their classroom.

The present study has three primary hypotheses: 1) Children in classrooms with better overall teacher-child interaction quality and, more specifically, with higher levels of emotional support, will have better perceptions of teacher support and peer support, and lower levels of loneliness; 2) Aggressive and rejected children will report lower scores on these measures of relatedness, and 3) The association between child characteristics (aggression, rejection) and

relatedness will be moderated by the quality of teacher-child interactions, with a stronger negative association for children in classrooms with lower teacher-child interaction quality. We also explored, as secondary hypotheses, whether the influences of teacher-child interaction quality, aggression, or peer social preference on relatedness varied by gender and grade. Although we expected that boys may be more sensitive to the quality of the classroom environment, and thus to teacher-child interactions, the other interactions were primarily exploratory in nature.

Chapter 3: Method

Participants

Children and teachers were involved in a study exploring social ecologies and child outcomes in elementary school classrooms. Forty-one classrooms participated, providing a total of 794 students in 1st, 3rd, and 5th grade. Written consent was obtained from the 41 classroom teachers, and parental consent was obtained for 645 students. Written (3rd and 5th graders) or oral (1st graders) assent was obtained from children before administering surveys. After accounting for dissenting and absent students, a total of 635 students (80% of all possible students) participated in at least one of the two administrations of the survey ($T_{1=}76\%$, $T_2 = 76\%$). Because one classroom had extremely low participation ($N = 6$), its students were excluded from analysis. One child did not respond to the measures used in the present study. Therefore, the final sample included 40 classrooms and 628 children (52% male).

Schools were located in small- to mid-sized urban areas in central Illinois and rural areas in central Pennsylvania. Illinois schools were drawn from two school districts that serve populations of 70,000 and 35,000. In both districts, approximately 44% of students were classified as disadvantaged. The IL districts were quite diverse (approximately 43% African-American, 8% Asian, 3% Hispanic). In Pennsylvania, data were collected from one school district that serves a population of 12,882, with 35% of students classified as economically disadvantaged. Students in this district were racially homogenous (>97% European-American).

Procedure

Teachers in participating districts were provided with a letter written description of the study. The letter explained that the principal had agreed to allow teachers to participate, but they could decline to participate. Teachers who chose to participate were promised monetary

reimbursement for their time ($100 at Time 1; $150 at Time 2). Once a classroom teacher agreed to participate, his or her students were given letters describing the project. Children brought the letters home to their parents, who indicated whether their child was allowed to participate in the study. Classrooms were promised a pizza party if students returned at least 80% of their permission slips, regardless of the percentage of students with consent to participate.

Classrooms were observed early in the spring semester and lasted approximately two hours. Students completed surveys early in the spring semester, and again at the end of the spring semester. Because first-grade children are limited in their reading and writing abilities in comparison to third- and fifth-grade children, we used two different methods for collecting child reports. Children in first grade responded to surveys in an individual interview format. A trained research assistant pulled children one at a time and went through the survey orally. Third- and fifth-grade children, in contrast, responded during a classroom-administered survey that was guided by a lead research assistant and several other assistants to answer children's questions and work with slower readers. Children provided written assent to participate at the beginning of the first survey, and very few children chose not to participate. Children without parental consent, and those who did not provide assent, worked quietly on educational activities provided by the researchers or on their own work. Group-administered surveys generally lasted 30 – 45 minutes per classroom; individual interviews for first-grade children required approximately 20-25 minutes per child.

Measures

Self-reported relatedness. Social relatedness was measured with three child-report scales. *Teacher support* was conceptualized as the degree to which students perceived a warm, caring relationship with their teacher. It was measured using seven items adapted for student-report

from the Closeness subscale of the Student-Teacher Relationship Scale (α_{t1} = .84, α_{t2} = .89, $r_{1,2}$ =.69; e.g., "My teacher is kind to me"; Pianta, 2001). *Peer support* was conceptualized as the degree to which students perceived the classroom as a supportive and caring environment. It was measured using seven items from the Sense of Community scale (α_{t1} = .83, α_{t2} = .82, $r_{1,2}$ =.63; e.g., "People care about each other in my classroom"; Battistich et al., 1995). *Loneliness* was measured with three items that correlate strongly with a longer scale measuring social disaffection (α_{t1} = .87, α_{t2} = .85, $_{r1,2}$ =.55; Parker & Asher, 1993). Scores of child-reported relatedness represent averages across the two surveys, except for children who only participated at one time point; for these children, the measures from the single time point were used. Each child's final score on perceived teacher support, perceived peer support, and loneliness was the average of scores at the beginning of the spring semester and at the end of the academic year. Averages were used because of the high stability between survey administrations.

Child characteristics. Children's aggressive behavior and status were assessed with peer nomination measures, based upon unlimited nominations; results for each measure were standardized within the classroom by dividing each child's number of received nominations by the total number of children providing nominations. For the measure of *peer social preference,* children indicated which of their classmates they would "like most to play with" and "like least to play with." Social preference was calculated as "like most" – "like least" ($r_{1,2}$ = .72;), a standard procedure for interpreting sociometric status that provides a picture of a child's overall social experience (Asher & Coie, 1990). *Aggression* was measured with three peer-nomination items; ("These kids start fights", "These kids make fun of other kids"; "These kids get in trouble"; α_{t1} = .90, α_{t2} = .89, $r_{1,2}$ = .87). Because scores on both social preference and aggression were highly correlated between waves, the average of the cross-wave scores was used for

analyses. Each child's peer social preference score was the average of scores in the beginning of the spring semester and at the end of the academic year. The same technique was used to compute average aggression scores. As with perceived relatedness, averages of child characteristics were used because of the high stability between survey administrations.

Observed teacher-child interactions. Teacher-student interactions were evaluated with the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008). Two observers rated each classroom for four 20-minute cycles, typically at the beginning of the day. Inter-rater reliability was high, as indicated by the intraclass correlations (ICCs): Emotional Support ICC = .71; Instructional Support ICC = .88; and Classroom Organization; ICC = .84. Scores were averaged across observers. This dual-observer system was designed to maximize the reliability of the scores used in analyses, based on research indicating that rater-variance was a critical source of measurement error for the CLASS procedure (Raudenbush, Martinez, Bloom, Zhu, & Lin, 2008).

Because of the high inter-correlations among the three CLASS domains, we computed a measure of overall interaction quality (OIQ) by averaging the ten dimensions of the CLASS. Others have used a composite CLASS score for this same reason and found it to be both a meaningful teacher-level outcome measure (Brown et al., 2010) as well as a significant predictor of child outcomes (Jones, Brown, & Aber, 2011) in the evaluation of a school-based intervention. The OIQ score had good internal reliability ($r = .90$) and good inter-rater reliability (ICC = .77).

Chapter 4: Results

Data Analysis Plan

Descriptive statistics were calculated for each type of relatedness and teacher-child interaction. The distributions were examined for any non-normal distributions (e.g., skewness). Where there were non-normal distributions, the appropriate transformations were made. Class size, overall interaction quality, emotional support, social preference, and aggression were grand-mean centered, and gender was coded as 0 for male and 1 for female. These steps ensured that the intercept could be interpreted as the expected level of relatedness for a boy with average scores on all covariates.

Because children were nested within classrooms, regular regression analysis would be biased by shared variance among children in the same classroom, who are likely to be more similar than children in different classrooms (West, Welch, & Galecki, 2007). Multi-level models address this concern, accounting for both shared classroom-level variance and unique individual variance. Therefore, hypotheses were tested with two-level multilevel models, with children nested within classrooms. Analysis followed the recommendations for nested data in classrooms presented by West and colleagues.

First, a variance components model was run for each dependent variable (perceived teacher support, perceived peer support, and loneliness). The variance components model predicts the dependent variable using only the fixed and random slopes of the dependent variable; that is, no covariates or predictors are included in the model. The purpose of the variance components model is to determine whether there are significant between-classroom differences in the measure of relatedness. If there are no significant differences between classrooms, the random intercept for classroom could be left out (West et al., 2007). SAS proc

MIXED provides a significance test for random effects, but this Wald test assumes very large samples in its calculation of standard errors, resulting in a significance test that may be biased. We therefore used χ^2 likelihood-ratio tests based on REML estimates to verify the presence of significant variance components (Tabachnick & Fidell, 2007; West et al., 2007). ICCs were calculated for each dependent variable based on the unconditional model. ICCs describe how much of the total variance on the dependent variable was due to classroom-level variation as opposed to child-level variation (Tabachnick & Fidell).

Three separate models were run to test the association between overall interaction quality and each indicator of social relatedness (i.e., perceived teacher support, perceived peer support, loneliness). We followed a bottom-up model-building approach similar to that specified by Tabachnik and Fidell (2007) and West and colleagues (2007). Following the variants component model, the next model included the child-level covariates of grade, gender, aggression, and social preference, in addition to all hypothesized interactions. One at a time, non-significant interactions were trimmed from the Level 1 model using a χ^2 likelihood-ratio tests based on full ML estimates. The presence of random slopes was examined in four separate models. Each model included all Level 1 covariates as fixed effects and a single Level 1 covariate as a random effect. Significance of each random slope was tested with a χ^2 likelihood-ratio test based on REML estimates. Once a satisfactory random effects structure was built, we added the classroom-level covariates of class size and overall interaction quality. At this time, we added interaction terms for Level 2 covariates and as well as cross-level interactions (e.g., Overall Interaction Quality x Gender). As there were not enough schools to justify a third random effect, a fixed effect for school was included by dummy coding the seven schools. As with the Level 1 equation, interactions that were not significant based on a χ^2 likelihood-ratio tests using full ML

estimates were omitted from the model. The final model retained all significant and non-significant main effects.

When there was a significant effect of Overall Interaction Quality on relatedness, we conducted follow-up analyses to determine whether the domain of emotional support was a significant predictor of relatedness. Instructional support and classroom organization were not included in this test because our hypothesis was specific to the effect of emotional support.

Descriptive Statistics and Data Transformations

Relatedness. On average, children perceived high levels of teacher support and peer support, and low levels of loneliness (see Table 1). Relatedness measures were significantly intercorrelated (see Table 2)

Teacher-child interactions. Teachers generally provided moderately high levels of emotional support and classroom organization, and lower levels of instructional support, as shown in Table 1. The three CLASS domains were moderately to strongly intercorrelated in the forty classrooms: Emotional Support - Instructional Support, $r = .67$, $p < .001$; Emotional Support - Classroom Organization, $r = .57$, $p < .001$; Instructional Support - Classroom Organization, $r = .50$, $p < .001$.

Child characteristics. The average level of peer-reported aggression was low. The mean of 0.18 indicates that the average child was perceived to be aggressive by approximately 20% of his or her classmates, with a possible range of 0% to 100%. Social preference has the potential to range from -1, meaning that every classmate disliked the student and no one liked the student; to 1, indicating the reverse. The mean score was 0.03. Aggression and social preference were significantly negatively correlated, $r = -.44$, $p < .001$.

Data transformation. Due to the tendency for children to perceive very positive relationships with their teachers, the distribution was negatively skewed. The skew was eliminated by exponentiating Teacher Support scores prior to analysis. Although scores on Loneliness were slightly positive skewed, the decision was made to keep it in the original metric to facilitate interpretation. No differences were observed when models were run with square-root-transformed Loneliness values.

Unconditional Means Models

The Wald test indicated significant variance between classrooms for all indicators of relatedness, suggesting that classrooms differed in their provision of support for student relatedness. To follow up the potentially biased Wald test, we computed a χ^2 likelihood-ratio test for each model (Tabachnik & Fidell, 2007; West et al., 2007). The χ^2 likelihood-ratio test confirmed that there was significant between-classroom variance for each indicator of relatedness: Teacher Support, χ^2 (1.5, N=628) = 46.72, p < .001; Peer Support, χ^2 (1.5, N=628) = 75.5, p < .001; Loneliness, χ^2 (1.5, N=628) = 4.6, p < .05. Furthermore, the ICCs indicated that 15% of the variance in teacher support was due to between classroom differences, as was 21% of the variance in peer support. Classroom differences were responsible for only 4% of the variance in loneliness.

Predicting Relatedness from Overall Interaction Quality

Perceived teacher support. The final model in which overall interaction quality predicts perceived teacher support is presented in Table 3. None of the interactions between child-level covariates were significant. Using separate χ^2 likelihood-ratio tests to test the significance of each random slope for each child covariate, we found significant random effects for both gender and aggression ($p < .05$). When combined in the same model, however, the random effect of

aggression became non-significant. The final model therefore included a random intercept and a random slope for gender. There were no significant interactions among classroom-level covariates, or across levels; these interactions were therefore omitted from the model. In the final model, class size was unrelated to perceptions of teacher support. Perceptions of teacher support were higher among girls (p < .001) and younger students (p < .01). Aggressive children perceived less support from their teachers (p < .001), while peer social preference was unrelated to teacher support. Finally, overall interaction quality was significantly associated with children's perceptions of teacher support ($p < .01$).   Figure 2 illustrates the expected values of children's perceived teacher support, based on child and classroom characteristics.

Perceived peer support. The model in which overall interaction quality predicted perceived peer support is presented in Table 3. None of the interactions between child-level covariates were significant. Using separate χ^2 likelihood-ratio tests to test the significance of each a random slope for each child covariate, we found significant random effects for both gender and peer social preference ($p < .05$). When combined in the same model, however, the random effect of peer preference became non-significant. The final Level 1 model therefore included a random intercept and a random slope for gender. The random slope for gender became nonsignificant when Level 2 covariates were added to the model; examining the AIC revealed that removing the random slope provided a better, more parsimonious fit to the model (Singer, 1998). In the final model, only one interaction term—gender*overall interaction quality—was significant and therefore retained.

Class size was unrelated to children's perceptions of peer support. Younger children perceived more support from classmates than did older students (p < .001). There were no differences between boys and girls on reported levels of peer support. Aggression and social

preference did not predict children's perceptions of peer support. The significant interaction for gender*overall interaction quality indicated that the effect of teacher-child interactions on perceptions of peer support was stronger for boys than for girls. The expected values of perceived peer support for boys and girls at different levels of OIQ are presented in Figure 3.

Loneliness. The model in which overall interaction quality predicts children's reports of loneliness is presented in Table 3. None of the interactions between child-level covariates were significant. Using separate χ^2 likelihood-ratio tests to test the significance of each a random slope for each child covariate, we found significant random effects for gender ($p < .05$). The final Level 1 model therefore included a random intercept and a random slope for gender. Interactions among Level 2 covariates, and across levels, were not significant and were removed from the final model.

In the final model, class size was unrelated to children's reported loneliness. Furthermore, there were no age or gender differences. Aggressive children did not report more loneliness, though higher social preference was associated with less loneliness ($p < .001$). The effect of overall teacher interaction quality on loneliness was not significant. Figure 4 presents the expected values of loneliness at varying levels of peer social preference and OIQ.

Predicting Relatedness from a Single CLASS Domain: Observed Emotional Support

As follow-ups to the significant effects of OIQ on perceptions of support from teachers and peers, we ran two separate models in which we substituted observed emotional support for OIQ. As with OIQ, the model for perceived teacher support included a random slope for gender, and the model for perceived peer support did not. The model-building process revealed results that were nearly identical to the model with OIQ (see Table 4). Importantly, children in classrooms with greater observed emotional support perceived more teacher support ($p = .01$) and more peer

support ($p < .01$).

Interpreting Interaction Effects

Across these five models of relatedness, we tested a total of 40 interaction terms based on gender, peer preference, aggression, and overall interaction quality. Only two interactions—gender*observed overall interaction quality and gender*observed emotional support—reached significance, for a probability of 2/40 = 5%. This is equal to what would be expected by chance. Looking more narrowly, we tested a total of 15 interactions with gender and only two were significant (2/15 = 15%), which is more than would be expected by chance. As described above, the effect of overall interaction quality on perceived peer support was stronger for boys.

Chapter 5: Discussion

In general, children were satisfied with the level of support from their teachers and classmates, and did not report feeling lonely to a significant extent. Not all children, however, perceived such supportive relationships. Other research has similarly found wide variation in children's social experiences (Gest et al., 2005; Davidson et al., 2010). We examined two levels of potential predictors of the variation in children's perceived support: The influence of the observed teacher-child interactions on the classroom level, and the specific characteristics of individual students. Indeed, classrooms varied in the extent to which students reported high levels of relatedness. As expected, a portion of this variance was accounted for by the quality of teachers' interactions with students. Furthermore, individual variation in children's perceived relatedness was partially accounted for by children's aggressive behavior and social status.

Grade and Gender Differences in Perceived Relatedness

Differences in perceived relatedness across grade level. In our sample of 1st, 3rd, and 5th graders, younger students perceived better relationships with their teachers than did older children, consistent with previous research (Demaray & Malecki, 2002; Gest et al., 2005). The importance of academic performance is increased in the upper elementary grades, and teachers who focus on preparing students for high-stakes end-of-year standardized tests may fail to develop close relationships with their students. Indeed, the decrease in teacher-child relationship quality across the middle school transition is well documented in the literature. This decline is, in part, due to increased teacher control and evaluation based on accuracy, rather than effort, at a time when students require autonomy as well as support (Eccles, Midgley, Wigfield, Buchanan, Reuman, Flanagan, et al., 1993). Our findings suggest that children may begin to decline in their relationships with teachers even during the later elementary school years. Still, in spite of these

cross-sectional differences, fifth graders had generally positive reports of teacher support. It may simply be that younger children are more idealistic about their teachers, and accumulated experiences with school lead to a more realistic perspective.

Older children also perceived lower-quality relationships with their classmates, consistent with previous research with elementary-aged children (Gest et al., 2005; Demaray & Malecki, 2002). Anderman (2003) hypothesized a decrease in perceived peer support may be related to an increase is social comparison across elementary school. Children in first grade are unlikely to use information about peers' competence when forming opinions about their own abilities; it is not until later, around fourth grade, that children truly use social comparison for self-evaluations (Ruble, Boggiano, Feldman, & Loebl, 1980). Preadolescence is also a time of decreased self-esteem for many children (Marsh, 1989). It may be that older elementary children perceive their peers less as caring, supportive equals, and more as sources of competition and threats to their self-concept. Moreover, the overall sense of community in a classroom may be negatively affected when children compare themselves to others, which could create a climate of competition in upper elementary classrooms. Again, the age difference may also reflect a shift from first-grade idealism to fifth-grade realism, after years of experiences with peers at school.

Finally, as others (Gest et al., 2005) have found, there were no differences in loneliness across grade level. This was an interesting finding, given that both teacher support and peer support showed a clear decline across elementary school. Children's dissatisfaction with their social experiences may be more directly affected by their actual relational experiences, such as peer social preference, than by the gradually changing structure of the classroom across grades. It seems that when a child is rejected, the immediate, natural response is to feel lonely, regardless of that child's age or the quality of teacher-child interactions.

Differences in perceived relatedness across gender. Consistent with previous research (Furrer & Skinner, 2003; Gest et al., 2005), girls perceived better relationships with their teachers than did boys. There are several possible explanations. First, boys are more likely to disrupt classes, whereas teachers rate girls higher in prosocial behavior (Birch & Ladd, 1998). Such differences could result in more negative interactions between boys and their teachers. Second, the vast majority of teachers nationwide, as well as in our sample, are female. It could be that female teachers find it easier to interact with girls, resulting in the development of warm relationships between females, though it is difficult to answer this question given the scarcity of male elementary teachers (Pianta, 2006).

Previous evidence suggests that girls perceive more support from classmates (Demaray & Malecki, 2002; Gest et al., 2005), but we found this to be true only at lower levels of teacher-child interaction quality. In classes with higher-quality teacher-child interactions, boys perceived *more* peer support than did girls. Boys seem to be more sensitive to the quality of the interactions in their environment. It may be that high-quality teacher-child interactions create climates that minimize some of the more negative aspects of school. For example, because boys are more likely than girls to experience physical bullying (Craig, 1998) and are less satisfied with school (Okun, Braver, & Weir, 1990), they may benefit more from teachers who create supportive classroom environments. The OIQ*gender and ES*gender interactions should be interpreted with caution, however, as these interaction terms were not significant in the prediction of perceived teacher support or loneliness.

We found no differences between boys and girls in their feelings of loneliness, consistent with previous research (Asher et al., 1984; Asher & Paquett, 2003; Gest et al., 2005; Renshaw & Brown, 1993). Regardless of their gender, children who are rejected are likely to feel lonelier

than well-accepted children. Again, this speaks to the importance of proximal social experiences to loneliness. Both boys and girls are vulnerable to feeling lonely in the context of peer rejection.

Teacher-child Interactions

Our results revealed differences in the overall mean levels across CLASS domains. Of all CLASS domains, emotional support had the highest average score across classrooms. Many teachers created positive climates, valued student input, were sensitive to the needs of individual students, and minimized the use of negative interactions such as sarcasm or yelling. In short, teachers generally supported their students' emotional needs in the classroom, a finding that is consistent with previous research using the CLASS (Hamre, Pianta, Mashburn, & Downer, 2007).

The lowest average scores were observed in teachers' provision of instructional support. Previous studies have also found lower levels of instructional support compared to other domains (Hamre et al., 2007). Whereas some teachers frequently used "why" questions, feedback loops, and advanced language, and connected lessons to children's own experiences (Pianta, La Paro, & Hamre, 2008), many other teachers took a more traditional, rote-learning approach to instruction.

The average score for classroom organization was moderately high, which is typical for early childhood and elementary school classrooms (Hamre et al., 2007). In general, teachers managed classroom behavior fairly effectively, incorporated effective teaching formats that engaged students, and used time wisely such that the classroom resembled a "well-oiled machine" (Pianta, La Paro, & Hamre, 2008). Finally, classrooms were rated as moderately high our composite measure of overall interaction quality (OIQ).

Teacher-child Interactions and Children's Perceptions of Relatedness

We hypothesized that teachers who provided the types of high-quality interactions

recommended by the CLASS framework would have students who perceived higher levels of relatedness. We tested the effects of OIQ, with follow-up tests based on observed emotional support (ES). Our hypotheses were generally supported, though loneliness was unrelated to teacher-child interactions.

Perceived teacher support. We found significant classroom-level differences in children's perceptions of teacher support, consistent with previous findings on teacher-child relationship quality (Buyse et al., 2008; Danielsen et al., 2010). As Danielsen and colleagues describe it, there was "systematic agreement" among classmates regarding their relationships with their teacher. That is, whereas some teachers managed to create classrooms in which students had above-average feelings of closeness to the teacher, children in other classrooms were less positive about their relationship with the teacher. Some teachers may easily develop relationships with students (Hamre et al., 2008), whereas other teachers struggle to develop close relationships. Alternately, some teachers not see the importance of developing a relationship with every student, whereas other teachers may see relationship-building as an important component of their role as a teacher.

Furthermore, we found no effect of school in the omnibus test, which suggests that the classroom in which a child is placed may be more important than the school for his or her relationship with a teacher. Similarly, teacher assignment has been found to be more important to children's outcomes than school assignment (Nye et al., 2004). In the present study, we considered whether the CLASS domains of teacher-child interaction quality could account for between-classroom variance in teacher support. Because the teacher plays such a large role in the asymmetrical teacher-child relationships (Pianta, 1999), it made sense to expect teachers' behaviors to impact children's perceptions of the relationship.

Teacher-child interaction quality and children's perceptions of teacher support. As expected, children in classrooms with higher overall interaction quality perceived more teacher support. Teachers with high-quality interactions are more likely to focus on engaging their students with analysis and reasoning discussion, rather than basic memorization of facts. Previous research has found that traditional teaching styles, which focus on rote learning, are associated with more student-reported *conflict* with the teacher (Mantzicopolous, 2005); we have found that high-quality teacher-child interactions may affect the extent of perceived support as well. Furthermore, teachers with high scores on OIQ likely have more frequent conversations and interactions with students which could allow teachers to learn more about their students and develop close relationships. These interactions are more apt to have a positive tone, further improving the likelihood that a supportive relationship will develop.

Behavior management may also play a role in the association between teacher-child interaction quality and perceived teacher support. O'Connor (2010) found that teachers with well-managed classrooms reported closer relationships with their students. O'Connor speculated that the goodness-of-fit between teachers and children is improved when children understand the behaviors desired by the teacher, as children can more easily meet clear expectations. Furthermore, teachers who manage classroom behavior well feel more effective, which can improve the quality of their relationship with students (Hamre et al., 2008; Pianta, 1999).

The high intercorrelations among CLASS domains suggest that teachers who provide supportive interactions in one domain are likely to provide high-quality interactions in another domain. Easy though it may be to link each CLASS domain to children's outcomes, it is more likely that high-quality teachers provide a "package" of high-quality interactions that provide children with a sense that their teachers care about them.

Emotionally supportive interactions and children's perceptions of teacher support. We followed up our tests of overall interaction quality with the single domain of observed emotional support, given our hypothesis of the overarching importance of a warm, caring classroom for the development of teacher-child relationships. As expected, classrooms with high levels of emotional support were more likely to have students who reported feeling supported by their teachers. Similarly, O'Connor (2010) found that one dimension of emotional support, positive climate, was associated with closer teacher-child relationships, as reported by the teacher, and a slower decline in the quality of the relationship quality across the elementary school years. Essentially, we confirmed that the teacher-child interactions that are *thought* to be indicators of the attachment-like relationship between the teacher and students are, indeed, associated with children's feelings of a supportive and secure relationship with the teacher. Importantly, our findings suggest that the Emotional Support domain of the CLASS is a meaningful indicator of the actual relationships that develop in a classroom.

Teachers who provide a high level of emotional support may learn more about their students as a result of their personal involvement with their students, which may lead students to feel closer to their teacher. Students likely feel more supported when teachers see them as individual students with distinct needs, rather than a class of homogeneous students. Finally, the positive climate, coupled with few to no instances of negative interactions, likely provides a setting conducive to the formation of close relationships.

Perceived peer support. Classrooms also varied in the extent to which students felt support from their peers, consistent with previous research (Danielson et al., 2010). That is, beyond the expected child-to-child differences in perceptions of relatedness among one's classmates, children within the same classroom had similar perceptions. These findings suggest

that the teachers' interactions may influence children's interactions with one another.

Teacher-child interaction quality and children's perceptions of peer support. As expected, children in classrooms with higher overall interaction quality perceived more support from their peers. Again, the high frequency of conversation, interaction, and child involvement may play a role. Students who are encouraged to discuss concepts with one another may develop positive relationships and see one another as part of a community of learning (Solomon, Battistich, Kim, & Watson, 1997). Similarly, teachers who focus on students' performance rather than the importance of a deep conceptual understanding may encourage splits among cliques based on academic ability (Hallinan, 1989), which could reduce cohesiveness among all classmates. Furthermore, children in better-managed classrooms are more socially competent, resulting in better-quality relationships among students (Donohue, Perry, & Weinstein, 2003). Productive classrooms are also characterized by brief, smooth transitions from one activity to the next (Pianta, La Paro, & Hamre, 2008), leaving less time for children to be disruptive and have negative interactions with one another (Arlin, 1979).

Emotionally supportive interactions and children's perceptions of peer support. Our hypothesis that emotionally supportive interactions would be important for children's relatedness with peers was confirmed. Classrooms with positive climates may serve as a supportive backdrop for students to have friendly, helpful interactions with one another (Gest & Rodkin, under review). Indeed, Donohue and colleagues (2003) found that classrooms with more student-centered teaching and positive social atmospheres had less peer rejection later in the school year than did more traditional teacher-directed classrooms. Their analyses suggest that a supportive teaching style led to fewer problems between students later in the school year, which accounted for the lower levels of peer rejection. Indeed, classrooms with greater emotional support have

more reciprocated friendship ties (Gest & Rodkin).

Loneliness. Only 4% of the variance in children's loneliness was at the classroom level, much less than the between-classroom variance in perceived support from teachers and peers. We are not aware of other studies of classroom effects on loneliness, but our results suggest that, at least for elementary students, loneliness may be nearly equally distributed across classrooms.

Teacher-child interactions and children's reports of loneliness. Overall interaction quality was not associated with children's reports of loneliness. Given that such a small proportion of the variance in loneliness was located at the classroom level, it was unlikely that our classroom-level measure OIQ would account for significant variance. It is interesting that OIQ was associated with children's perceptions of peer support, as expected, but was not associated with children's feelings of loneliness. Perceptions of peer support may be a reflection of children's sense of the overall classroom social climate, which may be under the teacher's control. In contrast, loneliness may be a reflection of personal experiences with social relationships. The implication is that children's perceptions of poor peer support are not always associated with feelings of loneliness; rather, children may need to experience first-hand poor social experiences such as rejection to report substantial levels of loneliness.

Characteristics of the Child: Aggression, Rejection, and Children's Perceptions of Relatedness

Based on systems theories (Bronfenbrenner & Morris, 2006; Ford & Lerner, 1992), we hypothesized that classroom-level processes would affect individual children differently. We explored whether aggressive and rejected children benefited any more, or less, than their peers when provided with high-quality teacher-child interactions.

Perceived teacher support. There were no interactions between children's aggressive

behavior and the quality of teacher-child interactions in the prediction of perceived teacher support. Previous work has found that the effect of emotionally supportive interactions on academic outcomes was only significant for children who were at risk of school problems (Hamre & Pianta, 2001). In our sample, the lack of an interaction indicates that high-quality teacher-child interactions were equally important for aggressive and non-aggressive children. Supportive teachers could be a source of resilience for aggressive children, such that aggressive children might obtain relationships with their teachers that approach the same quality as non-aggressive children in less-supportive classrooms.

In the absence of moderation effects, we found a significant main effect of children's aggressive behaviors on their perceptions of support from the teacher. These results were consistent with many previous studies of the negative effects of children's aggression of the teacher-child relationship (Birch & Ladd, 1998; Gest et al., 2005). It is not easy to develop a warm relationship with a child who constantly disrupts class and force the teacher to stop instruction to provide discipline. Furthermore, teachers are likely to avoid interacting with disruptive children when possible (Brophy & Evertson, 1981), which could make it difficult to establish a close relationship. Finally, although they may frequently discipline such children, teachers rarely praise their positive behavior (Brophy & Evertson, 1981). In contrast to children's aggression, lower peer social preference was not associated with less perceived support from teachers. Children seem to understand that the source of their rejection comes from peers. It may even be that teachers attempt to provide additional support for children they know are rejected. Future research will consider this potentially moderating role of the teacher.

Perceived peer support. Similarly, we had expected that teacher-child interactions would be more important for aggressive and rejected children's perceptions of peer support. Again,

however, there were no moderation effects. Furthermore, aggressive children did not perceive less support from their classmates, nor did rejected children. This was surprising, given that rejected and aggressive children struggle with their interactions with peers (Asher et al., 1990; Ladd & Burgess, 1999). One possible explanation is that the items in our measure of peer support did not focus on children's actual interactions with peers; rather, they addressed the overall quality of interactions in the classroom, such as the extent to which *students in the class* work together to solve problems. It may be that aggressive and rejected children perceive their classrooms to be generally positive places, in spite of their own interpersonal problems. Again, the lack of moderation suggests that supportive teacher-child interactions are important for aggressive and rejected children's perceptions of peer support, to the same extent that they are for typical children.

Loneliness*.* Teacher-child interactions were not any more important for aggressive or rejected children's perceptions of loneliness. There was, however, a main effect of peer social preference on children's reports of loneliness, consistent with previous research (Asher et al., 1990; Davidson et al., 2010; Gest et al., 2005). Children with lower peer social preference scores reported feeling significantly lonelier than their peers. Our measure of loneliness was apparently more sensitive to children's personal experiences in social interactions than the measure of peer support, appropriately capturing the lack of dissatisfaction with social experiences that is typical of rejected children (Asher, Hymel, & Renshaw, 1984). Davidson and colleagues (2010) speculated that children who are left out of social experiences do not acquire the social skills that would facilitate positive social experiences. The absence of successful peer interactions could then lead to a cycle of low-quality social interactions and more rejection. Finally, although aggression did not stand out as a unique predictor of loneliness, it may have been a result of the

high correlation between aggression and peer social preference. Our results suggest that even though many aggressive children are rejected, it is the experience of being rejected that contributes most to feeling lonely.

Implications and Limitations of the Present Study

The findings from the present study suggest that the quality of teacher-child interactions may be among the numerous factors that affect the nature of relationships between teachers and children, as well as among children within a classroom. Given the importance of relationships for the positive development of children (Baumeister & Leary, 1995), teachers may benefit from training in the interactional styles measured in this study (i.e., emotional support, instructional support, and classroom organization). Such professional development programs have already been developed, and evaluations suggest that they may be effective at improving teachers' ability to provide supportive interactions (Pianta, Mashburn, et al., 2008).

Furthermore, our results validate the recommendations of others (Brophy & Evertson, 1981) to increase teachers' awareness of their tendency toward negative interactions with aggressive children. Perhaps if teachers are conscious of their behavioral bias, they can be more intentional in their interactions with aggressive children. Similarly, it may be useful for teachers to be well-attuned to children's social status, such as peer rejection. Teachers who have the knowledge and tools to change the social dynamics may be able to minimize negative interactions (Gronlund, 1959), possibly decreasing the severity of children's loneliness.

Our study does have several limitations, first of which is our small sample. With the classroom as the unit of analysis, we were limited to only 40 classrooms. A larger sample is needed to provide the power for an analysis that could potentially reveal unique effects of single domains. Second, our analyses are not longitudinal, and do not allow us to test the direction of

effects. All of our measures were collected during the second half of the school year, after children's interpersonal relationships had likely been established. Future research should explore this association in a longitudinal framework. In the present study, we assumed that teachers provided the same quality of emotional support, instructional support, and classroom organization across the school year, which would influence the development of classroom relationships. It could be, however, that teachers with poor-quality interactions at the time of observation were attempting to work with an exceptionally difficult group of students. In fact, there is likely a reciprocal association between teacher-child interaction quality and children's outcomes, as suggested by Gest and Rodkin (under review).

Though it is not a necessarily a weakness, it is important to note that we measured teacher-child interaction quality at the classroom level. We do not know whether teachers had more supportive interactions with some students than with others. Classroom-level teacher-child interactions are thought to be indicators of global classroom quality, as all children experience this same classroom climate (Pianta, La Paro, & Hamre, 2008). Therefore, our results may be considered conservative estimates of the importance of teacher-child interactions. Measures of interaction quality for each child may provide more information about whether teacher-child interaction quality matters, and for whom it matters most.

An additional limitation is the high intercorrelations among CLASS domains. We followed the approach of others (Brown et al., 2010) and combined the ten dimensions into a single indicator of teacher-child interaction quality. Studies with larger samples should continue to test the unique importance of each domain, or even each dimension, because a large sample would provide more power to detect unique effects. For now, we can conclude that that good teaching behaviors seem to hang together.

Conclusion

Using children's self-reports of relatedness to their teacher and classmates, as well as feelings of loneliness, we have found that the social experience of attending school differs from one child to the next, and that some differences may be due to the quality of interactions between teachers and students. This study makes clear the importance of considering the various sources of influence on children's development. Studies that fail to consider the social context of children's development overlook influences that are actually quite important for children; unfortunately, these studies may fail to identify potential targets for intervention.

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Tables

Table 1

Descriptive Statistics for Measures of Classroom Quality and Relational Support

	N	M	SD	Min	Max
Youth Reports of Relatedness					
Teacher Support	628	4.27	.78	.96	5.09
Peer Support	628	3.66	0.86	1.00	5
Loneliness	628	2.08	1.07	.84	5
Peer-Nominated Child Characteristics					
Aggressive Behavior	628	0.18	0.19	0	0.93
Peer Social Preference	628	0.03	0.29	-1	0.77
Observed Classroom Quality					
Overall Interaction Quality	40	4.81	.53	3.94	6.06
Emotional Support	40	5.34	.51	4.38	6.50
Instructional Support	40	3.81	.81	1.71	5.71
Classroom Organization	40	5.12	.55	3.71	6.04
Class Size	40	18.95	3.94	12	27

Table 2

Zero-order Correlations among Measures of Relatedness and Child Characteristics

	Teacher Support	Peer Support	Loneliness	Aggression	Social Preference
Perceived teacher support	--	.46***	-.12**	-0.35***	0.13**
Perceived peer support		--	-.12**	-0.09*	0.09*
Loneliness			--	0.03	-0.23***
Aggression				--	-0.44***

Note. N = 628 children.

* *p* < .05, ** *p* < .01, *** *p* < .001

Table 3

Predicting Perceived Relatedness from Overall Teacher-Child Interaction Quality (OIQ)

	Teacher Support (exponentiated)	Peer Support	Loneliness
Model Parameter	Est (SE)	Est (SE)	Est (SE)
Intercept	84.26*** (6.17)	3.73*** (0.10)	1.90*** (0.13)
Class Size	-0.93 (0.93)	-0.02 (0.02)	0.03 (0.02)
Grade	-5.12** (1.58)	-0.21*** (0.03)	-0.03 (0.03)
Gender[a]	12.93** (4.22)	-0.02 (0.07)	0.10 (0.09)
Peer Social Preference	-3.95 (6.58)	0.14 (0.13)	-0.97*** (0.17)
Aggression	-47.79*** (8.78)	0.11 (0.18)	-0.32 (0.23)
Overall Interaction Quality	15.79** (5.14)	0.35** (0.11)	-0.18 (0.11)
Gender*OIQ	--	-0.24* (0.12)	--

[a]A random slope for gender was included in the models of Teacher Support and Loneliness.

Note. N = 628 students, 40 classrooms. Models control for nesting within classrooms and fixed effects of school (n = 7). Class size, social preference, aggression, and overall interaction quality scores were grand-mean centered. Grade is centered at3rd grade. For gender, 0 = male.

[†] < .10, * p < .05, **p < .01, ***p < .001

Table 4

Predicting Perceived Relatedness from Observed Emotionally Supportive Interactions

Model Parameter	Teacher Support (exponentiated)	Peer Support
	Est (SE)	Est (SE)
Intercept	84.31*** (6.29)	3.74*** (0.11)
Class Size	-0.78 (0.95)	-0.02 (0.02)
Grade	-5.31** (1.60)	-0.21*** (0.03)
Gender[a]	12.90** (4.22)	-0.02 (0.07)
Peer Social Preference	-4.15 (6.59)	0.14 (0.13)
Aggression	-47.73*** (8.79)	0.12 (0.18)
Observed Emotional Support	15.42* (5.65)	0.38** (0.11)
Gender*OIQ	--	-0.27* (0.13)

[a]A random slope for gender was included in the models of Teacher Support.

Note. N = 628 students, 40 classrooms. Models control for nesting within classrooms and fixed effects of school (n = 7). Class size, social preference, aggression, and overall interaction quality scores were grand-mean centered. Grade is centered at 3rd grade. For gender, 0 = male.
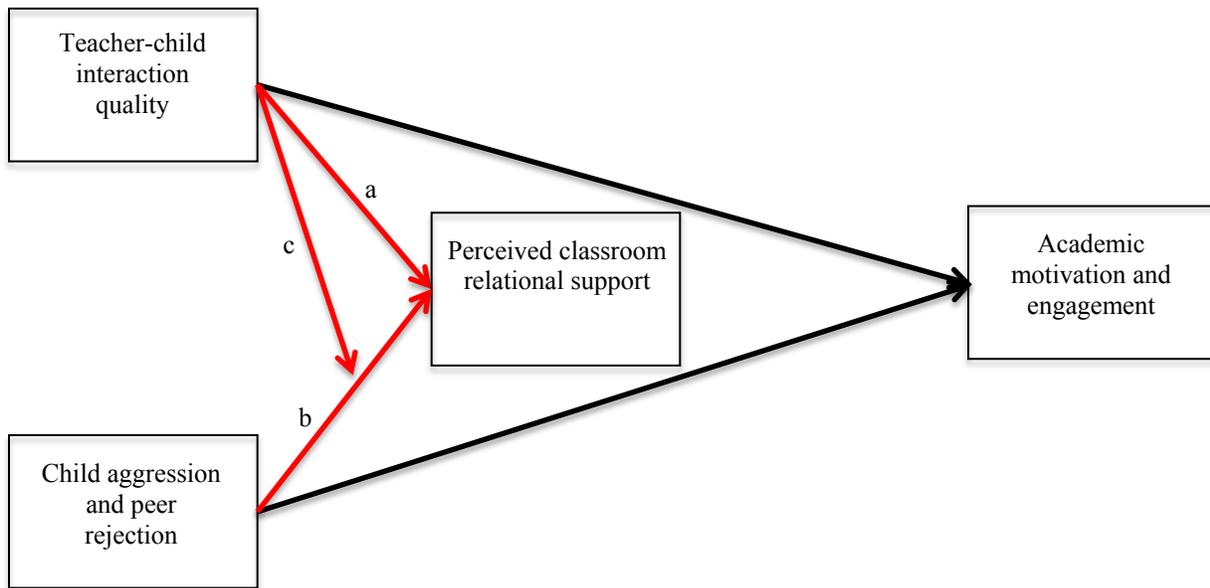
* p < .05, ***p* < .01, ****p* < .001

Figure 1. Conceptual framework of mediation and moderation effects. The current study tested
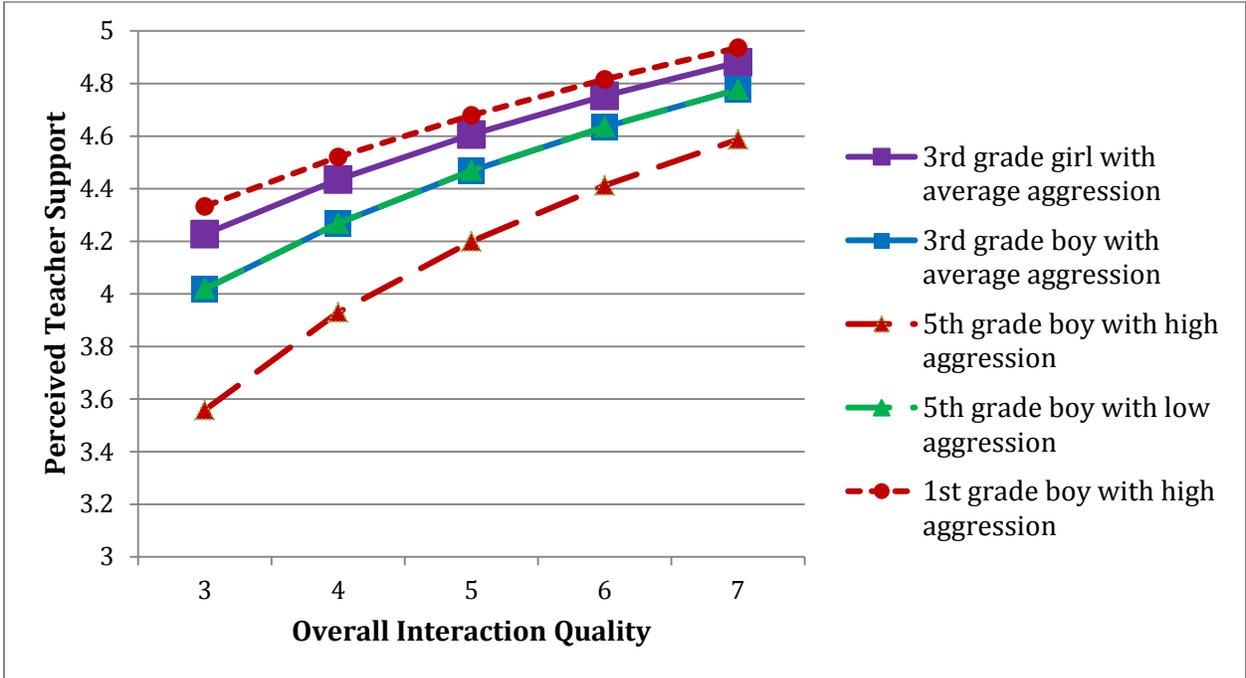
the paths in red (a,b,c)

Figure 2. Variation in perceived teacher support across children. Older children perceive less

support, with high-aggression boys perceiving even less support than low-aggressive boys. The

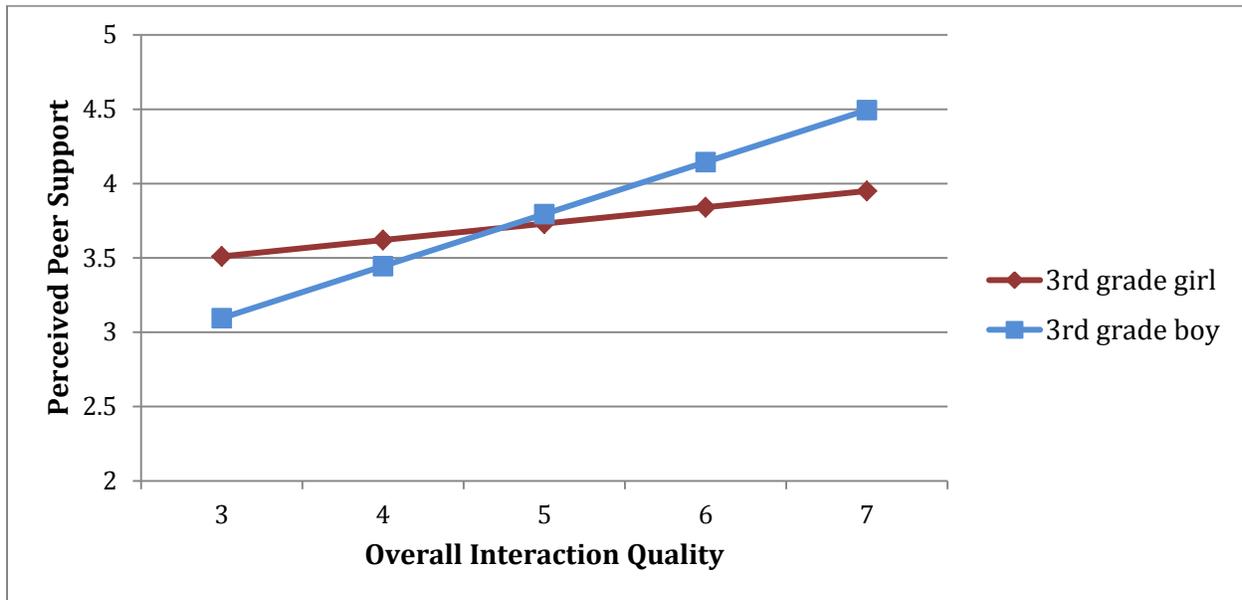youngest boys, even when aggressive, perceived high levels of teacher support.

Figure 3. Overall interaction quality * gender interaction. Compared to girls, boys perceive less

teacher support in classrooms with poorer interaction quality. In classrooms with high-quality

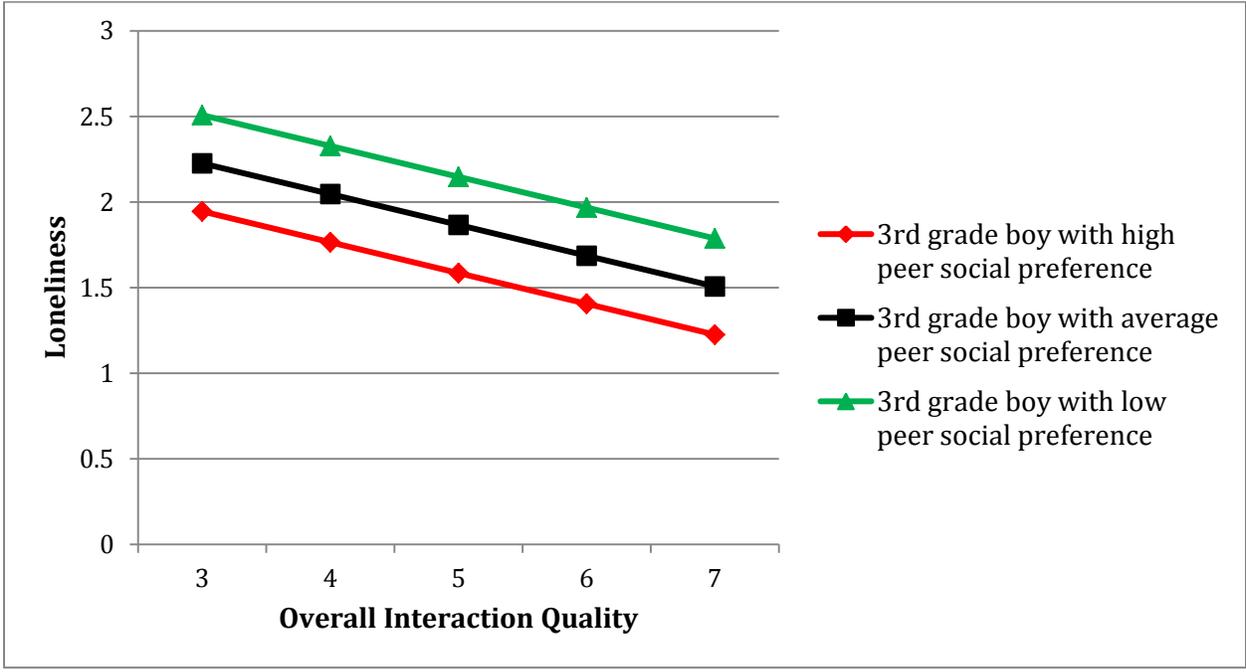interactions, boys perceive more support than do girls.

Figure 4. Association between peer social preference and children's reported loneliness. Across all levels of interaction quality, children who are less socially preferred by their peers report more loneliness. Loneliness decreases as the quality of teacher-child interactions improves, but the effect of overall interaction quality is not statistically significant.