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Classroom and Teacher Support in Kindergarten: Associations with the Behavioral and Academic Adjustment of Low-Income Students

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Abstract

For socio-economically disadvantaged children, a positive experience in kindergarten may play a particularly important role in fostering the behavioral adjustment and learning engagement necessary for school success. Prior research has identified supportive student-teacher relationships and classroom emotional support as two features of the classroom context that can promote student adjustment; however, very few studies have examined these two aspects of the classroom context simultaneously. Given their modest inter-correlations, these dimensions of classroom context may have both unique and shared associations with child progress. This study followed 164 children as they transitioned from Head Start into elementary school, and regressions revealed significant unique associations between each type of kindergarten support and children's aggressive behaviors, social withdrawal, learning engagement, and emergent literacy skills in first grade, controlling for their pre-kindergarten adjustment. In addition, learning engagement significantly mediated the association between a supportive relationship with the kindergarten teacher and first grade literacy skills.

Children who grow up in poverty are at elevated risk for school adjustment difficulties at the transition into kindergarten; as many as 40% demonstrate delays in learning behaviors and emergent literacy skills, and over 20% exhibit high rates of social difficulties and disruptive behavior problems that undermine school adjustment (Macmillan, McMorris, & Kruttschnitt, 2004; Rimm-Kaufman, Pianta & Cox, 2000). These early delays often set the stage for later difficulties, contributing to a socio-economic gap in school attainment. Whereas learning engagement and emergent literacy skills in early elementary school predict later school success, aggression and social withdrawal at school entry predict later behavior problems and learning difficulties, as well as reduced high school graduation rates and less advantageous long-term employment (McClelland, Acock, Morrison, 2006; Ryan, Fauth, & Brooks-Gunn, 2006).

The contexts that children experience in early childhood are influential in shaping their development (Bronfenbrenner, 1986; Kellam, Ling, Merisca, Brown, & Ialongo, 1998). The quality of parent-child interactions and the home environment play key roles in supporting the development of school readiness skills (Lengua, Honorado, & Bush, 2007), and

heightened rates of family adversity associated with poverty, such as low levels of parental education and elevated family stress often reduce support for early childhood cognitive and social-emotional development (Ritsher, Warner, Johnson, & Dohrenwend, 2001; Ryan et al., 2006). Research suggests that features of the classroom context also influence child development in important ways. Indeed, a key goal of early childhood programs for low-income families, such as Head Start, is to provide high-quality emotional supports and academic enrichment to compensate for the early adversity associated with poverty (Administration for Children and Families, 2010).

Given the importance of the child's functioning at the transition into elementary school, research has also explored features of the kindergarten context that affect student adjustment and academic progress (Bierman et al., 2014; Kellam et al., 1998). For example, classroom instructional practices are associated with children's academic achievement (Mashburn et al., 2008) and high-quality instruction can reduce socio-economic gaps in reading readiness (Lonigan, 2006). In addition, an extensive body of research has investigated aspects of classroom climate that are associated with child adjustment and attainment in elementary school (Cohen, McCabe, Michelli, & Pickeral, 2009). Broadly defined, classroom climate reflects the nature of children's experiences in the classroom, including the degree to which children feel safe, supported, bonded to, and motivated by the interactions they have with teachers and peers (Cohen et al., 2009). Several studies suggest that, at school entry, two features of the classroom climate are major determinants of children's classroom experiences and linked with their subsequent school adjustment: 1) the quality of the relationship they establish with the kindergarten teacher, and 2) the kindergarten teacher's capacity to create an emotionally supportive and behaviorally well-managed classroom community (Downer, Sabol, & Hamre, 2008). These two features of classroom climate (student-teacher relationship quality and classroom emotional support) appear particularly important for socio-economically disadvantaged children who often enter school with low levels of behavioral and academic readiness (Hughes, Luo, Kwok, & Loyd, 2008; Pianta, La Paro, Payne, Cox, & Bradley, 2002; Silver, Measelle, Armstrong, & Essex, 2005).

Existing research suggests that experiencing a warm and supportive relationship with the kindergarten teacher may foster children's early learning and behavioral development in multiple ways. Emotionally, it may promote feelings of safety and security in the school context; behaviorally, it may increase child exposure to positive teacher modeling and reinforcement of appropriate child coping skills in the school setting; and academically, it may increase teacher attention, enhancing academic support and opportunities to participate in classroom learning activities (Pianta et al., 2002; O'Connor, Dearing, & Collins, 2011). Positive student-teacher relationships have been linked with elevated levels of social competence (Silver et al., 2005) and academic achievement (Hughes et al., 2008) as well as decreased behavioral difficulties (Meehan, Hughes, & Cavell, 2003; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009).

In addition, levels of classroom emotional support in kindergarten may significantly affect child school experiences and school adjustment. Classroom emotional support reflects the overall level of warmth, respect, and sensitivity that characterizes teacher-student interactions in the classroom, as well as the emotional tone and effectiveness of the teacher's

behavior management strategies (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008). High levels of classroom emotional support in early elementary school are associated with social participation and learning engagement and reduced rates of disruptive-aggressive behavior (Hamre & Pianta, 2005).

Although student-teacher relationships and classroom-level emotional support have each been studied separately, these dimensions of support are rarely studied together, and likely represent distinct levels of influence (Suldo, McMahan, Chappel, & Loker, 2012). This study examined both aspects of school support in kindergarten, evaluating their unique and combined associations with changes in aggression, social withdrawal, learning engagement, and literacy skills as children moved from Head Start through kindergarten and into first grade.

Student-Teacher Closeness and Behavioral Outcomes

Students form relationships with their teachers, which theoretically both reflect and affect the quality of student-teacher interactions and the degree of support that children receive as they adjust to school. The closeness of the student-teacher relationship reflects the degree of warmth, sensitivity, and openness between the individual student and teacher. Pianta (1999) highlighted the transition to kindergarten as a period of increased challenges for young children and, drawing from attachment theory (Bowlby, 1969), proposed that close relationships with teachers provide an important source of emotional security that helps children adapt to the social-emotional and academic demands of school. In addition to providing a source of emotional security, a close student-teacher relationship may also provide young children with elevated levels of positive teacher attention and extra instrumental support for learning (O'Connor et al., 2011).

Prior research documents links between student-teacher relationship closeness in kindergarten and school adjustment, including enhanced learning engagement (Hamre & Pianta, 2001) and emotion regulation skills (O'Connor et al., 2011). Learning engagement encompasses the set of behaviors that directly foster classroom learning, including attending, following directions, complying with classroom rules, self-direction, and persistence (Hughes et al., 2008). Conceptually, warm and supportive relationships with teachers increase children's motivation to adhere to classroom rules and live up to teacher expectations, galvanizing their learning efforts (Wentzel, 2002). In addition, teachers may exert more effort to spend time with and assist children they feel close to, further supporting and reinforcing child learning engagement (Hamre & Pianta, 2001). Supporting this hypothesis, social cognitive theories, such as the self-system motivation theory, suggest that children who feel supported by their teachers are more likely to perceive themselves as competent and motivated to adhere to the values of the classroom, thus increasing their learning efforts and performance (Osterman, 2000; Wentzel, 2002).

Longitudinal studies suggest sustained benefits for children who experience close relationships with their kindergarten teachers, including lower rates of aggression and internalizing behaviors in first grade (Pianta and Stuhlman, 2004), and improved learning engagement that extends through fourth grade (Hamre & Pianta, 2001). For children

entering kindergarten with high levels of externalizing behaviors, kindergarten student-teacher closeness also predicts significant decreases in externalizing behavior through third grade, whereas low levels of closeness predict increased externalizing behaviors (Silver et al., 2005).

Although most studies focus on the way that teacher support may promote students' adjustment, it is also the case that influences operate in the other direction, as child characteristics predict the quality of student-teacher relationships. Children who exhibit more aggression and less learning engagement often have more conflictual and less close relationships with their teachers, as rated by both teachers and children in early elementary school (Henricsson & Rydell, 2004). For this reason, it is critical to account for baseline child characteristics when assessing links between student-teacher relationship quality and child outcomes.

Classroom Emotional Support and Behavioral Outcomes

Classroom emotional support refers to the level of warmth and responsiveness that generally characterizes student-teacher interactions in a classroom, the proactive quality and effectiveness of the teacher's classroom management strategies, the degree to which the teacher is responsive to student social and emotional needs, and the teacher's avoidance of critical or harsh comments (Hamre & Pianta, 2005; National Institute of Child Health and Human Development Early Child Care Research Network [NICHD ECCRN], 2002).

Although some studies have found that general levels of classroom emotional support are correlated with the quality of individual student-teacher relationships within the classroom (Pianta et al., 2002), other studies find no significant association (NICHD ECCRN, 2003). To some extent, this lack of correspondence may reflect differences in measurement strategy, as measures of the individual student-teacher relationship are typically based on teacher reports, whereas measures of classroom emotional support are typically based on observer ratings. At the same time, the two constructs are distinct conceptually. Teacher ratings of their relationship with an individual child reflects how the teacher feels about and behaves towards that child, which may vary depending on the characteristics of each child (Howes & Ritchie, 1999), whereas classroom emotional support may be more generally reflective of the teacher's style of classroom management.

Emotionally supportive classrooms may enhance children's school adjustment in kindergarten by modeling and reinforcing positive behavior, providing clear expectations and consistent, non-punitive consequences to limit aggressive-disruptive behaviors, thereby optimizing children's opportunities for active engagement in learning (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Indeed, in classrooms characterized by high levels of emotional support, children show increased prosocial engagement and decreased levels of student aggression in pre-kindergarten (Mashburn et al., 2008) and in kindergarten (Pianta et al., 2002). Children in classrooms high in emotional support are also more likely to show attentive, on task, and engaged learning behavior, relative to children in less emotionally supportive classrooms, and this association holds in pre-kindergarten (McWilliam, Scarborough, & Kim, 2003), kindergarten (Pianta et al., 2002), and first grade classrooms (NICHD ECCRN, 2002; 2003). Prospectively, experiencing a well-managed and supportive

classroom was associated with significant decreases in aggressive-disruptive behavior over the course of first grade, controlling for kindergarten aggression and inattention (Thomas, Bierman, Thompson, Powers, & CPPRG, 2008).

Student-Teacher Closeness, Classroom Emotional Support, and Academic Outcomes

There is also research evidence linking close student-teacher relationships and classroom emotional support with academic outcomes, particularly literacy skills. For example, Hughes et al. (2008) found that supportive first grade student-teacher relationships predicted third grade reading achievement. However, there are also some mixed findings; Pianta and Stuhlman (2004) found associations between first grade student-teacher closeness and first grade teacher ratings of academic achievement but not assessment of vocabulary development. Burchinal, Peisner-Feinberg, Pianta, and Howes (2002) found that supportive relationships with teachers predicted enhanced reading skills only for the subgroup of students with authoritarian parents. Similarly, studies reveal mixed findings regarding links between classroom emotional support and elevated literacy skills. Burchinal and colleagues (2008) found significant associations between exposure to high classroom emotional support in pre-kindergarten and elevated literacy skills in kindergarten one year later, but in another study that examined concurrent effects in the spring of first grade, the academic benefits of a positive classroom support applied primarily to at-risk children who exhibited elevated rates of externalizing problems and underachievement (Hamre & Pianta, 2005). It is possible that close student-teacher relationships and emotionally supportive classrooms have immediate effects on student behavioral adjustment, reducing aggression and facilitating learning engagement. Proximal effects on learning engagement may then allow children to benefit more effectively from classroom instruction and learning opportunities, leading to improved academic achievement over time. Hence, effects on achievement may emerge over time, mediated by more immediate effects on learning engagement.

Indeed, some existing empirical evidence suggests that the impact of teacher and classroom support on achievement is mediated by enhanced student learning behaviors. In their study of third through sixth grade students, Furrer and Skinner (2003) found that the effect of the student-teacher relationship on academic achievement was fully mediated by the impact of that relationship on student learning engagement. That is, students who reported a supportive relationship with their teacher also showed higher levels of behavioral and emotional engagement in the classroom, which in turn, predicted improved academic performance. In general, aggression control, prosocial involvement, and positive learning engagement foster academic achievement (NICHD ECCRN, 2003), because students who can control their aggression and engage socially with peers spend more time on task (Hinshaw, 1992), and are more likely to be included in classroom activities that promote their academic growth (Ladd, Birch, & Buhs, 1999; Wentzel, Baker, & Russell, 2009). Hence, if close student-teacher relationships and classroom emotional support enhance aggression control and learning engagement as well as reduce social withdrawal, they may thereby increase learning opportunities associated with achievement (Valiente et al., 2011). Few studies have examined mediation models, and additional research is needed to understand the processes

by which teacher and classroom support may influence growth in children's literacy skills in the early elementary school years.

The Current Study

Past studies have typically focused on a single level of analysis when examining associations between the kindergarten classroom context and student school adjustment, assessing the impact of close student-teacher relationships or classroom emotional support on positive child outcomes. However, it is important to study both levels of support at the same time to better understand their shared and unique associations with student progress. In addition, a longitudinal framework is important in order to disentangle pre-existing child differences that may affect their classroom experiences as well as their school outcomes. This study simultaneously examined student-teacher closeness and classroom emotional support in kindergarten, evaluating associations with changes in child aggression, social withdrawal, learning engagement, and literacy skill acquisition as socio-economically-disadvantaged children transitioned from Head Start classrooms into a wide array of kindergartens, and on into first grade. It was hypothesized that both levels of kindergarten support (e.g., student-teacher closeness; classroom emotional support) would make unique contributions to behavioral and academic outcomes in first grade, after accounting for child baseline adjustment in pre-kindergarten. This study also explored the impact of various combinations of teacher and classroom support in kindergarten classroom, to determine whether a close student-teacher relationship might moderate the impact of a classroom low in emotional support, or vice versa. Finally, this study tested for mediation, based on the hypothesis that the impact of school support (close student-teacher relationship and classroom emotional support) on child literacy skill acquisition would be mediated by changes in student aggression, social withdrawal, and learning engagement.

Method

Participants

Participants included two cohorts of 4-year-old children (Total N = 164, 14% Hispanic-American, 30% African-American, 56% Caucasian; 56% girls) recruited from 22 Head Start classrooms in three counties in Pennsylvania, who served as the "usual practice" comparison group for a preventive intervention study. None of these children received the preventive intervention. At the time of baseline assessment, children were, on average 4.49 years old (SD = .31, range = 3.72 – 5.65). Reflecting their participation in Head Start, families were low-income, with an average income-to-needs ratio of .88. Parent education levels were generally high school (65%) or less than high school (33%). Parents reported their occupations at the time of baseline assessment, and 78% of the employed parents were working in unskilled or semi-skilled labor categories based on the Hollingshead (1975) classification system.

The two cohorts represent children who were recruited across two years. At the beginning of the pre-kindergarten year for each cohort, brochures describing the research project were distributed to parents of all 4-year-old children in the participating classrooms, and 86% elected to participate in the study and completed initial assessments. All but 7 children

participated in the follow-up assessment at the end of kindergarten (96% retention), and all but 8 children participated in the follow-up assessment at the end of first grade (95% retention). Mann-Whitney U tests comparing the children who were missing in kindergarten or first grade with the children who remained in the study revealed no significant differences on any of the pre-kindergarten study measures, with the single exception of emergent literacy skills which were higher for the missing children. Participants transitioned from the original 22 Head Start classrooms into 113 kindergarten classrooms and then into 121 first grade classrooms.

Data Collection Procedures

In the fall of two successive years, recruitment letters describing the study were sent home from Head Start to parents of all 4-year-old children who would qualify for kindergarten the following year. Parents who indicated interest in the study were visited in their homes, where the study was described in detail and informed consent was obtained for their child's participation.

Data collection for this study occurred in the spring of pre-kindergarten, kindergarten, and first grade. In the spring of each of these three school years, a research assistant met with teachers to deliver and explain the rating scales and to obtain their informed consent to participate as raters in the study. Teachers then completed the ratings on their own time, and returned them to the project within two weeks. In pre-kindergarten and first grade, teachers rated child behaviors. In kindergarten, teachers rated their relationships with participating children. Teachers were compensated financially for their ratings. Direct child assessments were conducted in the spring of the pre-kindergarten and first grade years. These assessments were conducted at school by trained interviewers, in a location outside of the classroom to avoid distractions. Children received school supplies and stickers for their participation. Classroom observations of emotional support were conducted in the spring (March-April) of the kindergarten year. All study procedures complied with the American Psychological Association standards for ethical conduct of research and were approved by the university Institutional Review Board.

Measures

To assess support in the kindergarten context, teachers rated the closeness of the student-teacher relationship, and observers coded the level of emotional support in the classroom. Pre-kindergarten and first grade teacher ratings assessed student aggression and learning engagement, and direct assessments indexed student literacy skills. Given the wide dispersion of students across elementary classrooms, there was little dependency in the data associated with classroom assignment. In kindergarten, most teachers (71%) provided ratings for only one student in the classroom, while 21% of teachers rated two students and 8% of teachers rated three or four students in the classroom. Similarly, in first grade, most teachers (80%) rated only one student, while 13% of teachers rated two students and 7% of teachers rated three to five students in the classroom.

Kindergarten Context—Teacher ratings collected in kindergarten assessed the quality of closeness in the student-teacher relationship, using an abbreviated form of the *Student-*

Teacher Relationship Scale (Pianta, 2001). Eight items assessed student-teacher closeness (e.g., “I share an affectionate, warm relationship with this child”, “This child openly shares his/her feelings and experiences with me.”). Each item was rated on a 5-point Likert scale ranging from “Definitely does not apply” to “Definitely does apply”. The average item score was used in analyses.

Observers used the *Classroom Assessment Scoring System* (CLASS; La Paro & Pianta, 2003) to rate each kindergarten classroom on 10 dimensions of student-teacher interaction quality. Research assistants, trained by certified CLASS trainers, visited each kindergarten classroom and conducted four 20-minute observation sessions (usually over a period of 2–3 hours on the same day), resulting in a total observation time of 80 minutes for each classroom. At the end of each 20-minute observation session, each rater used a 7-point Likert scale to assess the overall quality of student-teacher interactions observed during that session using 10 items, with ratings of 1–2 indicating low quality, 3–5 indicating moderate quality, and 6–7 indicating high quality ($\alpha = .82 - .90$ across 4 observations). The ratings for each item were averaged across the four sessions (Pianta, Belsky, Vandegrift, Houts, & Morrison, 2008). Given the focus of the present study on the warmth and responsiveness of the teacher in the classroom, the Emotional Support subscale of the CLASS was used in the analyses. This scale included five items assessing positive climate, negative climate (reverse coded), teacher sensitivity, overcontrol (reverse coded) and behavior management ($\alpha = .86$), which were averaged to form an Emotional Support score for each classroom. Research assistants were required to attain 80% reliability with a training videotape prior to collecting data. They were also required to maintain that 80% (within one scale point) reliability with a master-coder during spot checks held throughout the data collection period. The master-coder independently rated 20% of all sessions (intraclass correlation coefficient = .76) and was within one point of the other coders 88% of the time, which is comparable to the reliability test results of other studies using the CLASS in kindergarten (e.g. La Paro et al., 2009).

Aggressive behavior—In both pre-kindergarten and first grade, teachers completed 7 items from the *Teacher Observation of Child Adaptation – Revised* (TOCA – R; Werthamer-Larsson, Kellam, & Wheeler, 1991) describing overt aggression and disruptive behavior (e.g., stubborn, yells, fights). All items were rated on a 6-point Likert scale, with response options ranging from “almost never” to “almost always”, and averaged to form an aggression score ($\alpha = .94$). In the baseline pre-kindergarten year, both lead and assistant teachers provided ratings and these were averaged ($r = .69, p < .001$).

Social withdrawal—In both pre-kindergarten and first grade, teachers completed 6 items describing internalizing symptoms and withdrawn behaviors (e.g. low energy, lethargic, or inactive; keeps to him or herself, tends to withdraw; avoids playing with other children), which were compiled for the Head Start REDI—Research-based, Developmentally Informed project (Bierman et al., 2008). All items were rated on a 6-point Likert scale, with response options ranging from “almost never” to “almost always”, and averaged to form a social withdrawal score ($\alpha = .67$). In the baseline pre-kindergarten year, both lead and assistant teachers provided ratings and these ratings were averaged ($r = .50, p < .001$).

Learning engagement—In both pre-kindergarten and first grade, teachers completed a measure of attentive and on task behaviors, the Inattention subscale of the *ADHD Rating Scale* (Dupaul, 1991). This subscale consists of 9 items (e.g. “Has trouble staying focused on something,” “Goes from one uncompleted activity to another”), which are rated on a 4-point Likert scale, with response options ranging from “not at all” to “very much”, and the average item score was reverse coded to indicate attentive learning engagement ($\alpha = .96$). In addition, teachers completed a measure of learning behaviors, the *School Readiness Questionnaire* (developed for the Head Start REDI project; Bierman et al., 2008). The learning behaviors subscale consisted of 8 items that assessed self-regulation and learning motivation (e.g., “Can follow rules and routines,” “Seems enthusiastic about learning new things”) rated on a 6-point scale, with response options ranging from “strongly disagree” to “strongly agree” ($\alpha = .95$). The average item score was used. In the baseline pre-kindergarten year, both lead and assistant teachers provided ratings ($r = .76$ for attention ratings; $r = .70$ for learning behaviors). Teacher ratings on these two subscales were standardized within the sample and averaged to represent learning engagement.

Literacy skills—Given the rapid development of emergent literacy skills, a different set of measures was used to assess baseline emergent literacy skills in pre-kindergarten and literacy skills in first grade. In the spring of the Head Start pre-kindergarten year, three subscales assessing emergent literacy skills were administered, drawn from the Test of Preschool Early Literacy (TOPEL; previously labeled the Pre-CTOPP; Lonigan, Wagner, Torgesen, & Rashotte, 2007). Blending and Elision assessed phonological processing. Children were asked to combine different parts of a word, such as “hot” and “dog” or “b” and “air” and point to the correct picture or say the full word ($\alpha = .86$); and children were asked to deconstruct compound words, pointing to the correct picture or saying the correct word (e.g., Point to “snowshoe” without “snow”; Say “airport” without “air”; $\alpha = .83$). On the Print Knowledge subtest, children identified pictures of letters or words and named letters ($\alpha = .97$). Prior research has reported correlations in the range of .43 to .88 between these three subscales and the acquisition of initial reading skills (Lonigan, 2006). Children’s scores on these three subscales were standardized within the sample and averaged to form an emergent literacy skill composite.

In first grade, the Letter-Word Identification subscale of the *Woodcock-Johnson Tests of Achievement III – Revised* (Woodcock, McGrew, & Mather, 2001) provided a nationally normed, standardized test of letter recognition and basic sight word knowledge; total raw scores were used in the analyses ($\alpha = .90$). In addition, the *Test of Word Reading Efficiency* (TOWRE; Torgesen, Wagner, & Rashotte, 1999), included a Sight Word Efficiency subscale measuring the number of words read accurately within 45 seconds, and a Phonemic Decoding Efficiency subscale measuring the number of non-words sounded out accurately within 45 seconds (test-retest reliability reported by the developers of .85 - .90). Children’s scores on these three measures were standardized within the sample and averaged to form a literacy skill composite.

Results

Means and standard deviations for the measures included in this study are presented in Table 1 and correlations among these variables are presented in Table 2. Partial correlations controlled for child sex, age, race, and family SES. The two indices of kindergarten support were unrelated ($r = .13, p > .10$), indicating the independence of the closeness of the individual student-teacher relationship in kindergarten and the overall degree of emotional support observed in the kindergarten classroom. These two forms of support also showed different patterns of association with child characteristics. The closeness of the kindergarten student-teacher relationship was significantly associated (in the expected direction) with pre-kindergarten and first grade student aggression and social withdrawal, and with first grade student learning engagement and literacy skills. Thus, pre-kindergarten child behavioral characteristics predicted kindergarten student-teacher closeness, and in turn, kindergarten student-teacher closeness predicted first grade child behavioral and academic adjustment. Overall, pre-kindergarten child characteristics were not associated with kindergarten classroom emotional support, except for one correlation (pre-kindergarten child emergent literacy skills). Given that children matriculated at schools based on the location of their residence, there was no reason to anticipate that child pre-kindergarten characteristics would significantly predict their kindergarten classroom assignment, and for the most part, they did not. The exception was a significant association between child emergent literacy skills in prekindergarten and kindergarten classroom levels of emotional support. Experiencing a kindergarten classroom characterized by high support was significantly correlated with reduced child aggression and enhanced learning engagement in first grade.

Main Effects of Student-Teacher Closeness and Classroom Emotional Support

Four regression analyses were conducted to examine the unique and combined variance in each of the child first grade outcomes (aggression, social withdrawal, learning engagement, and literacy skills) associated with the two forms of kindergarten support, controlling for child baseline variables. The 156 children were dispersed across 113 kindergartens so that most teachers (92%) rated only 1 or 2 study children. Given the small amount of missing data (data was missing for a range of 3 to 12 children for each study variable), listwise deletion was used in regression analyses. In the first step of these regressions, the control variables (child age, race, gender, and family SES) and pre-kindergarten baseline variables were entered. In the second step, the two types of kindergarten support (student-teacher closeness, classroom emotional support) were entered simultaneously. Then, the interaction of the two types of kindergarten support was entered in the third step.

Results for child aggression are shown in the top section of Table 3. At step 1 (left hand column), the control variables and pre-kindergarten (baseline) aggression accounted for 11% of the variance in first grade aggression, $p < .01$. At step 2 (middle column), adding the two indices of the kindergarten classroom context accounted for an additional 15% of the variance in first grade aggression, $p < .01$. Kindergarten student-teacher relationship closeness and classroom-level emotional support each accounted for unique variance in first grade aggression.

Results for child social withdrawal are shown beneath the aggression results in Table 3. At step 1 (left hand column), the control variables and pre-kindergarten (baseline) social withdrawal accounted for 19% of the variance in first grade social withdrawal, $p < .01$. At step 2 (middle column), adding the two indices of the kindergarten classroom context accounted for an additional 9% of the variance in first grade social withdrawal, $p < .01$. In this case, only student-teacher relationship closeness added unique variance to the prediction of first grade social withdrawal.

Next, results for learning engagement are shown. At step 1, the control variables and pre-kindergarten (baseline) learning engagement accounted for 23% of the variance in first grade learning engagement, $p < .01$. At step 2, adding the two indices of kindergarten classroom context accounted for an additional 12% of the variance in first grade learning engagement, $p < .01$. Similar to the prediction of aggression, each form of support, student-teacher relationship closeness and classroom-level emotional support accounted for unique variance in first grade learning engagement.

Finally, results for literacy skills are shown at the bottom of the page. At step 1, the control variables and pre-kindergarten (baseline) literacy skills accounted for 13% of the variance in first grade literacy skills, $p < .01$. At step 2, adding the two indices of kindergarten classroom context accounted for an additional 6% of the variance in first grade literacy skills, $p < .01$. Similar to the prediction of social withdrawal, only student-teacher relationship closeness added unique variance to the prediction of first grade literacy skills.

Interaction Effects of Classroom and Teacher Support

To test for moderation of the two types of kindergarten classroom support, an interaction term was included in step 3 (right column) of the regression analyses for each of the child first grade outcomes (Table 3). Adding the interaction term did not significantly account for additional variance in the prediction of any of the first grade outcomes, suggesting that the effects associated with student-teacher closeness and classroom emotional support operate independently of each other.

Mediation of Student-Teacher Relationship and Literacy

Finally, three mediation analyses tested whether aggression, social withdrawal, or learning engagement accounted for the association between kindergarten student-teacher closeness and first grade literacy skills (Barron & Kenny, 1986), controlling for child age, race, gender, family SES, and pre-kindergarten literacy skills. Mediation analyses were not examined for classroom emotional support because it was not significantly associated with first grade literacy skills. Neither first grade aggression nor social withdrawal significantly mediated the association between the student-teacher relationship closeness and first grade literacy skills. However, first grade learning engagement significantly mediated the effects of student-teacher closeness and first grade literacy skills ($z = 2.41$, $p < .05$; Sobel, 1982), accounting for 44% of the relationship. The direct effect of the kindergarten student-teacher relationship closeness on first grade literacy skills ($\beta = .24$, $p < .01$) was no longer significant when first grade learning engagement was included as a predictor in the regression analyses ($\beta = .14$, $p > .10$).

Discussion

Prior research has demonstrated the value of a warm, supportive relationship with a teacher in promoting school success (e.g. Hamre & Pianta, 2001, Silver et al., 2005). Other studies have shown that high levels of classroom emotional support are associated with positive child adjustment at school (e.g. Mashburn et al., 2008, Rimm-Kaufman et al., 2009). We found only two prior studies that tried to disentangle the effects of individual (student-teacher relationship) and classroom-level support, in order to understand unique links with student social-emotional adjustment and achievement. In one of these studies, Howes (2000) created a composite score to represent classroom-level quality in preschool, including the classroom average of the individual student-teacher relationship ratings, occurrence of child behavior problems, and amount of interactive peer play observed in each classroom. She found that this classroom-level variable and the quality of the individual student-teacher relationships each predicted unique variance in child outcomes in second grade. However, because multiple indicators were used to assess classroom functioning in that study, the role of teacher emotional support remained unclear. In a slightly older sample, O'Connor et al. (2011) found that the quality of student-teacher relationships experienced from first through fifth grades predicted trajectories of student externalizing and internalizing behaviors over the same time period as rated by parents, but observations of positive classroom environment (conducted in first, third, and fifth grade) did not add any unique variance to that prediction. Given that relationship quality and classroom quality were estimated over the course of elementary school in that study, it remains unclear whether unique contributions might exist within years and at the point of initial school entry. In addition, the parent-rated behavior outcomes used in that study might not fully reflect child behavior at school. Hence, this is the first study that we are aware of that simultaneously examined student-teacher closeness (measured with the STRS) and classroom emotional support (measured with the CLASS) at elementary school entry. A conservative design was used in which the contributions of kindergarten support were estimated on first grade outcomes collected in the year following the kindergarten exposure, controlling for children's pre-kindergarten baseline characteristics.

In this study, student-teacher relationship closeness and classroom emotional support were not correlated with each other, but represented independent dimensions of school support. Each source of support was uniquely associated with children's behavioral outcomes in first grade, and together they accounted for substantial variance in first grade aggression (15%) and learning engagement (12%), after controlling for demographics and baseline child characteristics. In addition, kindergarten support explained 9% of the variance in children's first grade social withdrawal and 6% of the variance in children's first grade literacy skills, but only student-teacher relationship quality emerged as uniquely associated with each of these outcomes. These findings are correlational, and so causality cannot be inferred, but the associations documented here replicate those found by other investigators studying different samples, thus attesting to the robust nature of the associations.

The findings are consistent with theoretical models in which a close student-teacher relationship is thought to enhance feelings of emotional security (Bowlby, 1969), increasing the young child's comfort and confidence in the school setting and thereby supporting

social-emotional adjustment and positive classroom engagement. They are also consistent with the hypothesis that supportive interactions with teachers model appropriate behavioral control as well as social and academic engagement. In addition, findings support theories that children are motivated to work harder to please a teacher with whom they have a positive relationship, and that teachers may provide elevated levels of positive attention and supported opportunities for learning to students with whom they have a close relationship (Hamre & Pianta, 2001; O'Connor et al., 2011). Specific mechanisms of action were not studied here, but the closeness of the relationship with the kindergarten teacher was associated with reduced aggression and social withdrawal as well as increased learning engagement for children in first grade (controlling for pre-kindergarten levels), suggesting that kindergarten teacher support may have fostered behavioral control and motivated effortful learning.

The overall supportiveness of the classroom environment also emerged as uniquely associated with aggression control and enhanced learning engagement, and its association with child outcomes appeared independent and distinct from the support children received in the context of their personal relationships with the teacher. Emotional support measured by observations of student-teacher interactions at the level of the classroom reflects characteristics of the peer group and the teacher's organization and management skills, which are distinct from the teacher's feelings about individual students within the classroom. The findings are consistent with social setting theory (Tseng & Seidman, 2007), which emphasizes the importance of children's exposure to the interactions that the teacher has with other students as well as interactions amongst peers in the classroom as contextual influences on their social behavior and engagement in learning.

Importantly, this study suggests a lasting influence of close teacher-student relationships and kindergarten classroom emotional support on aggression and learning engagement, sustained after children transitioned into new first grade classrooms. Classrooms that are characterized by well-mannered peers and by organized class rules and routines may provide clear expectations and models for adaptive classroom behaviors that support the development of positive social and self-regulation skills, building competencies that children carry with them into subsequent years (Pianta et al., 2008; Thomas et al., 2008). Similarly, emotionally supportive classrooms and teachers may reduce stress and enhance security, facilitating the development of emotion and attention regulation skills (Rimm-Kaufman et al., 2009). Researchers have postulated that initial classroom experiences in elementary school may be particularly influential because they set the stage for the child's understanding of behavioral and academic expectations at school, which may influence their attitudes and motivation as they progress through school (Kellam et al., 1998). Whereas early gains in aggression control and learning engagement associated with emotionally supportive classrooms may start children on a positive trajectory of school success, experiencing an unsupportive kindergarten may contribute to negative expectations, less progress in self-regulatory skill development, and increasing risk for subsequent adjustment difficulties in later grades. Some research suggests a cumulative model, in which child outcomes are affected by the number of years in elementary school that they experience positive classroom influences (Thomas, Bierman, & CPPRG, 2006).

Researchers have described teachers as the “invisible hand” (Kindermann, 2011) in setting the behavioral expectations and emotional tone of the classroom, thus inconspicuously shaping the nature of the interactions that students have with each other and the ways in which students’ behaviors may influence one another. However, it is important to note that the characteristics of the students within a classroom also contribute to the amount of emotional support the teacher is able to provide. Classrooms comprised of greater proportions of aggressive or off task children are more difficult to manage effectively (Thomas et al., 2008), and hence can reduce observed levels of classroom emotional support. One hypothesis tested in this study was that student-teacher relationship closeness might compensate for low levels of emotional support at the classroom level, such that a non-disruptive child might be protected from the negative effects of a disruptive classroom low in emotional support as a function of the provision of teacher support. However, no evidence of such moderation effects emerged. Instead, the findings suggest that these two forms of kindergarten support have an additive influence and the effect of one form of support does not differ depending on the quality of the other.

Interestingly, the closeness of the student-teacher relationship predicted social withdrawal but the classroom level emotional support did not. In contrast to externalizing behaviors, internalizing behaviors are often overlooked by teachers who are focused on managing and supporting students with overt behavior problems that disrupt classroom learning (Pearcy, Clopton, & Pope, 1993). Thus, social withdrawal may be less amenable to classroom-wide efforts to support social-emotional development, and may require more one-on-one attention in the context of close relationships with teachers who can address internalizing symptoms individually. Though prior research found associations between classroom emotional support and decreased internalizing behaviors (NICHD ECCRN 2003), the current findings indicate that classroom-level emotional support is not uniquely associated with social withdrawal after accounting for the closeness of student-teacher relationships. The importance of student-teacher relationship closeness for socially withdrawn children is consistent with previous findings (e.g. Ladd & Burgess, 1999, O’Connor et al., 2011).

Similarly, the closeness of the student-teacher relationship predicted literacy skills but classroom level emotional support did not. In elementary school, it appears as though the classroom emotional support may only be associated with the reading achievement of at-risk students (Hamre & Pianta, 2005). Prior research that has linked classroom emotional support with literacy skills has primarily focused on pre-kindergarten classrooms, however, Burchinal and colleagues (2008) observed that in classrooms characterized by high quality interactions that are associated with literacy skills, these positive interactions typically occurred in small group or individual interactions with the teacher. When the quality of kindergarten student-teacher interactions were examined at both the individual and classroom levels in the present study, the classroom emotional support did not contribute uniquely to reading achievement beyond the closeness of the child’s relationship and individual interactions with his or her teacher. These findings are consistent with Pianta’s (2006) argument that the development of literacy skills is primarily based in the child’s individual relationships with adults, particularly teachers in the early elementary school years. In addition to the importance of warmth and support from the teacher described earlier, individual relationships with teachers may promote literacy through engaging

children in conversations that provide opportunities for language use as well as nurturing interest and motivation in reading (Pianta, 2006).

This explanation is reinforced by findings that lasting effects on literacy skill acquisition evident a year later were associated with student-teacher closeness in this study, mediated by the association between student-teacher closeness and the child's learning engagement. Although mechanisms of action were not tested directly in this study, it is possible that teachers provide more attention and support to students with whom they have close relationships, which may increase child motivation to learn and their on-task behavior. Increased effort and time spent engaged in learning, in turn, might enhance literacy skill acquisition (Hinshaw, 1992) in a way that is sustained even after children transition into a new classroom. These mediation findings are consistent with prior research with older elementary school students (Furrer & Skinner, 2003; Hughes et al., 2008), and support the proposed influence of student-teacher relationships on proximal processes of increased on-task behaviors, which is important for reading achievement. Although student-teacher relationship closeness also predicted decreased aggression and social withdrawal, neither reduced aggression nor reduced social withdrawal mediated the effects of student-teacher relationship closeness on the development of literacy skills. Aggression and social withdrawal are associated with lower academic achievement (Hinshaw, 1992; Rubin, Coplan, & Bowker, 2009), but the results of this study suggest that increases in on-task learning behaviors, rather than more general improvements in social behavior, are more closely linked with academic skill acquisition (Hughes & Coplan, 2010).

Strengths and Limitations

Strengths of this study included the use of well-validated measures of classroom emotional support (CLASS) and student-teacher relationships (STRS), and the longitudinal design from pre-kindergarten through first grade, which allowed for the control of individual child characteristics at baseline, and also ensured the independence of teacher-rated relationship quality in kindergarten and teacher-rated behavioral outcomes in first grade. Despite these strengths, the study also had limitations. This study used teacher ratings to assess the student-teacher relationship, which may reflect teacher biases about the student, although observer ratings of the student-teacher relationship often agree with teacher ratings (Pianta et al., 2002). Student perspectives were not included in the assessment of the student-teacher relationship or classroom emotional support. Student ratings are not typically used in early elementary school; however, there is emerging evidence that young children may be reliable reporters of perceived support from their teacher (Mantzicopoulos & Neuhauser-Pritchett, 2003). The findings from the study are conservative because the effects of the kindergarten context were evaluated one year later, and the design did not account for the first grade classroom emotional support or student-teacher relationship, which may have also contributed to the child outcomes measured in first grade. Other possible intervening variables for the literacy outcomes include instructional approaches and the quality of the curriculum and learning materials. In addition, each of the outcomes may have been affected by unmeasured variables, such as parent-teacher involvement or school or neighborhood characteristics that may also be associated with positive student-teacher relationships or classroom emotional support. Even though we controlled for child characteristics at

baseline, it is possible that teacher ratings of behavior in first grade reflect some stable characteristics of the child along with the influence of kindergarten supports. The study focused on children growing up in poverty and used a sample of children who attended Head Start preschool programs, so the findings may not generalize to all children. Pianta et al. (2002) previously documented that children from poor families more often experience classrooms characterized by lower quality emotional support relative to their financially-advantaged peers, yet the school context may be particularly important for children whose early childhood is characterized by economic adversity (Burchinal, Howes, et al., 2008; Burchinal, Peisner-Feinberg, et al., 2002). Finally, it is important to note that longitudinal associations were studied, and so any causal interpretation of the current findings remains fully speculative.

Summary and Future Directions

The findings of this study contribute to the growing literature documenting important associations between kindergarten exposure to positive classroom support and close student-teacher relationships and later outcomes, particularly for children affected by socio-economic disadvantage (e.g. McClelland et al., 2006; Rimm-Kaufman et al. 2000). The findings also document unique effects for these two different levels of kindergarten support. Given the longitudinal implications of early elementary support (Hamre & Pianta, 2001), there is a need to better understand the mechanisms by which both the individual student-teacher relationship and classroom level of emotional support are associated with child outcomes. Both the STRS and CLASS are frequently used to assess the quality of supports children received in the classroom but these measures are global and do not capture the specific behaviors that teachers engage in, or the specific dynamics of emotionally supportive classrooms that may be of greatest benefits for individual students. Future research using experimental interventions is particularly needed to assess the degree to which student-teacher relationship closeness and classroom emotional support are malleable and to clarify causal associations with student outcomes. Such research has the potential to inform practice and improve early school adjustment and long-term school outcomes, particularly for students at-risk due to socio-economic disadvantage.

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Table 1

Means, Standard Deviations, and Ranges for all Variables

Variable	Preschool			Kindergarten			First grade		
	N	Mean(SD)	Range	N	Mean(SD)	Range	N	Mean(SD)	Range
Aggression	161	2.07 (.89)	1.00; 5.14	---	---	---	154	1.96 (.85)	1.00; 5.00
Social Withdrawal	161	2.15 (.71)	1.00; 4.42	---	---	---	154	2.28 (.80)	1.00; 5.33
Learning Engagement ^a	161	0.00 (.95)	-3.38; 1.13	---	---	---	154	0.00 (.93)	-2.58; 1.39
Literacy Skills ^b	156	0.01 (.77)	-1.86; 1.71	---	---	---	155	0.01 (.93)	-2.36; 2.84
STRS Closeness	---	---	---	153	4.13 (.64)	1.88; 5.00	---	---	---
Emotional Support	---	---	---	152	5.22 (.70)	3.25; 6.40	---	---	---

^aLearning Engagement represents a composite of scores standardized within the sample.^bLiteracy skills represents a composite of scores standardized within the sample.

Table 2

Partial Correlations among Variables Within and Across Time

	1	2	3	4	5	6	7	8	9
1. Pre-K Aggression	--								
2. Pre-K Social Withdrawal	.30**	--							
3. Pre-K Learning Engagement	-.69**	-.47**	--						
4. Pre-K Literacy Skills	-.07	-.07	.13	--					
5. 1 st gr. Aggression	.26**	.15	-.29**	-.08	--				
6. 1 st gr. Social Withdrawal	.13	.33**	-.37**	-.15	.48**	--			
7. 1 st gr. Learning Engagement	-.17*	-.22*	.41**	.21*	-.59**	-.59**	--		
8. 1 st gr. Literacy Skills	-.20*	-.12	.34**	.23**	-.14	-.22*	.35**	--	
9. K STRS Closeness	-.19*	-.17*	.16	.14	-.40**	-.31**	.37**	.27**	--
10. K CLASS Emotional Support	.01	.07	.07	.18*	-.23**	-.13	.24**	.04	.13

Note: Child sex, age, race and family SES are controlled in these partial correlations

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

Table 3
Predicting Behavioral and Academic Adjustment in First Grade with Kindergarten Supports

Outcomes	Predictive Models					
	Model 1: Child Baseline		Model 2: With Kindergarten Context		Model 3: Interaction	
	F	R ²	β	F	R ²	β
<u>Aggression</u>	2.99*	.11**		6.23**	.15**	
Control Variables					5.50**	.00
Pre-K Aggression			.27**			.21**
STRS Closeness						-.34**
CLASS Emotional Support						-.20**
STRS χ CLASS						-.01
<u>Social Withdrawal</u>	5.45**	.19**		6.54**	.09**	
Control Variables					5.87**	.00
Pre-K Social Withdrawal			.33**			.29**
STRS Closeness						-.28**
CLASS Emotional Support						-.12
STRS χ CLASS						.06
<u>Learning Engagement</u>	6.86**	.23**		8.96**	.12**	
Control Variables					8.46**	.02
Pre-K Learning Engagement			.41**			.35**
STRS Closeness						.30**
CLASS Emotional Support						.18*
STRS χ CLASS						-.13
<u>Literacy Skills</u>	3.49**	.13**		4.06**	.06**	
Control Variables					3.58**	.00
Pre-K Learning Engagement			.22**			.19*

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Outcomes	Predictive Models							
	Model 1: Child Baseline			Model 2: With Kindergarten Context			Model 3: Interaction	
	F	R ²	β	F	R ²	β	F	R ² β
STRS Closeness					.27**			.27**
CLASS Emotional Support					-.04			-.04
STRS γ CLASS								.00

Note: Analyses control for baseline score on the adjustment outcome, child sex, age, race, and family SES.

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