The Role of Relational and Instructional Classroom Supports in the Language Development of At-Risk Preschoolers

Carolyn S. Gosse [a], Anita S. McGinty [a], Andrew J. Mashburn [a], LaVae M. Hoffman [a] & Robert C. Pianta [a]

[a] Curry School, University of Virginia
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Curry School, University of Virginia

The present study examined the extent to which preschool classroom supports—relational support (RS) and instructional support (IS)—are associated with children's language development and whether these associations vary as a function of children's language ability. The language skills of 360 children within 95 classrooms were assessed using an expressive narrative task in the fall and spring of the preschool year, teachers rated RS in the fall, and observations of IS were collected across the year. *Research Findings:* Hierarchical linear models revealed main effects of IS, but not RS, on preschoolers' development of expressive language skills. In addition, the associations between RS and IS on children's expressive language development were moderated by children's fall language ability. Specifically, the association between IS and language development was stronger for children with stronger expressive language skills, and the association between RS and language development was stronger for children with weaker expressive language skills. *Practice or Policy:* These findings suggest that professional development for preschool teachers might focus on aligning classroom supports with the needs of children with weaker language skills who are at risk for difficulty acquiring literacy.

Young children leave preschool with a variety of skills that make them differentially prepared for later school success (Bowman, Donovan, & Burns, 2001; Zill et al., 2003). Preschool oral language is one skill area consistently recognized as part of young children's school readiness and later school success, particularly their reading success (e.g., Bishop & Adams, 1990; Dickinson, Golinkoff, & Hirsh-Pasek, 2010; Kendeou, Van den Broek, White, & Lynch, 2009; National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 2005b; Storch & Whitehurst, 2002). Indeed, early oral language skills predict half of the variance in later reading comprehension and a third of the variance in word recognition skills (Catts, Fey, Zhang, & Tomblin, 1999). Unfortunately, many young children experiencing sociodemographic risk (e.g., poverty, low maternal education) demonstrate lags in early language skills compared to their more advantaged peers (e.g., Dollaghan et al., 1999; Hart & Risley, 1995), and these early language weaknesses continue to present themselves

as achievement gaps in literacy and academic development throughout elementary school (Chatterji, 2006; Duncan, Ludwig, & Magnuson, 2007; Farkas & Beron, 2004; Lee & Burkam, 2002; Walker, Greenwood, Hart, & Carta, 1994). Considered another way, prior findings suggest that reducing reading difficulties in children involves supporting children's early language development in preschool. The perspective that supporting children's early language will support later reading is consistent with an emergent view of literacy development that conceptualizes language development during the preschool period as part of a continuum of literacy development (Whitehurst & Lonigan, 1998).

Research demonstrates that supporting young children's language skill development may begin with providing children with high-quality language *experiences.* In fact, the language weaknesses of sociodemographically at-risk children are thought to be, in part, a function of having fewer and lower quality language-learning opportunities than their more advantaged peers. For example, mothers of children in poverty use a more constrained vocabulary and simpler syntax when talking to their children compared to mothers of children with less sociodemographic risk, and these differences in parental input are related to differences in children's skill levels (Hart & Risley, 1995; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002). These findings are notable because they show that linguistic input can act as a mechanism of language development. In fact, state and federal policies in the United States recognize the importance of early language experiences to children's language development and look to the preschool classroom as a means of addressing the experiential learning gaps of many children from disadvantaged homes relative to their more advantaged peers. Unfortunately, the evidence that preschool experiences may have a positive effect on children's language development is not entirely clear. Some evidence suggests that high-quality preschool experiences can have a positive impact on children's oral language development (Belsky et al., 2007; Burchinal et al., 2009; Howes et al., 2008; NICHD Early Child Care Research Network, 2005a). Particularly for children at risk because of poverty, attending preschool appears to have a moderate effect ($d = 0.40$) on reading achievement as a young adult, suggesting that early experiences can have long-term positive effects on children's development (Campbell & Ramey, 1994; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). Yet many preschool interventions aimed at improving children's language development have failed to do this or have done so only under highly specific conditions (Coulter & Gallagher, 2001; Dickinson, 2011; Sylva et al., 2011; U.S. Department of Health and Human Services, 2010). For example, a wide-scale experimental evaluation of the impacts of 14 preschool curricula on children's language skills found main effects on preschoolers' language development for only one curriculum (Preschool Curriculum Evaluation Research Consortium, 2008), although moderated effects for at least one other curriculum have been reported (Justice, Mashburn, Pence, & Wiggins, 2008). Such results point to the importance of examining specific characteristics of children and classrooms that affect children's development in order to understand the nuanced ways in which preschool experiences might benefit children.

Results from these previous studies suggest that there is still a lack of understanding as to the specific mechanisms that contribute to a high-quality learning environment that supports young children's language development. Although some research points to highly specific instructional techniques that improve specific skills (e.g., vocabulary, print knowledge) in specific activity contexts (e.g., book reading), less research identifies mechanisms that operate across contexts and contribute to language development across the preschool day (Hargrave & Sénéchal,

2000; Justice & Ezell, 2002; Justice, Kaderavek, Fan, Sofka, & Hunt, 2009; Sénéchal, 1997). In this study, we are particularly interested in the extent to which two theoretically different global classroom supports—instructional support (IS) and relational support (RS)—are associated with young children's language development.

CLASSROOM SUPPORTS AND CHILDREN'S LANGUAGE DEVELOPMENT

Preschool enrollment has continued to increase over the past five decades, with more than 1 million 4-year-olds attending preschool in the United States during the 2009–2010 school year (Barnett et al., 2010; Barnett & Yarosz, 2007). Federal and state funding for preschool has also increased substantially, making the effects of preschool programs on children's development of particular interest to policymakers and researchers alike (Barnett & Yarosz, 2007). One way to protect the sizeable investment in preschool is to ensure that children are receiving high-quality experiences in these programs. Many dimensions of preschool programs contribute to high-quality experiences (Cassidy, Buell, Pugh-Hoese, & Russell, 1995; Cassidy, Hestenes, Hegde, Hestenes, & Mims, 2005; Howes, Phillips, & Whitebook, 1992; Phillipsen, Burchinal, Howes, & Cryer, 1997). However, recent research has emphasized the very different roles that structural supports (i.e., program infrastructure and design) and process supports (i.e., children's direct classroom experiences) may have on children's learning. Specifically, evidence shows that process supports (e.g., teacher–child instructional, social, and emotional interactions) may be more directly related to children's development, including language development (Mashburn et al., 2008; Pianta et al., 2005), whereas structural supports may have more of an indirect effect, supporting children only to the extent that they lead to improved processes between teachers and children (Mashburn & Pianta, 2010; NICHD Early Child Care Research Network, 2002). Indeed, a broad literature has established that the quality of adult–child interactions in a variety of domains is related to children's development (Ainsworth & Bell, 1974; Brophy-Herb, Lee, Nievar, & Stollak, 2007; Girolametto & Weitzman, 2002; Landry, Smith, & Swank, 2003; McCartney, Dearing, Taylor, & Bub, 2007). The current study situates itself within a particular area of research in this broader literature specifically focusing on studies investigating the relationship to children's development of two particular types of process-based classroom supports, namely IS and RS.

The importance of process supports to children's language development is consistent with a social-interactionist perspective on language development (Chapman, 2000; Dickinson & McCabe, 1991). A social-interactionist perspective posits that children's verbal interactions with adults are a key mechanism of young children's language development because they afford opportunities to hear and practice new linguistic structures with a more skilled conversational partner in a meaningful context. Furthermore, this theory suggests that verbal interactions that are attuned to children's individual linguistic needs may be particularly important for supporting language development. Teachers who are adept at scaffolding children's language may help children advance their development by giving the appropriate amount of assistance so that children accomplish more linguistically than they would be able to achieve on their own (i.e., work within their zone of proximal development; Vygotsky, 1930/1978). Consistent with the emphasis of social-interactionist theories of language development, the current study examines classroom supports involving verbal interactions between teachers and children that

may scaffold children's language development. High-quality interactions with an individual child theoretically may afford teachers the opportunity to adjust language input for that child's needs, thus scaffolding development. Researchers have demonstrated empirically that verbal interactions adapted to the abilities of the child support language development and are important for understanding individual differences in children's development (K. E. Smith, Landry, & Swank, 2000).

To date, the majority of work examining the association between process-based classroom supports (i.e., IS and RS) and children's language development has focused on the nature of teacher–child instructional interactions at the classroom level, or IS. IS refers to interactions that provide for the creation and integration of learning opportunities through effective language facilitation in the classroom. Classrooms that provide high-quality IS have teachers who develop children's understanding by using thought-provoking, extended conversations and carefully attuned, responsive verbal feedback (Pianta, LaParo, & Hamre, 2008). Research has generally shown that high-quality IS supports the language development of children experiencing sociodemographic risk (Burchinal et al., 2008; Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Curby et al., 2009; Howes et al., 2008; Mashburn et al., 2008). For example, Mashburn et al. (2008) examined IS in 671 preschool classrooms and found these types of classroom-level interactions to be significantly and positively associated with both receptive and expressive language skills in preschool. Furthermore, evidence shows the effects of preschool IS on children's language development to be long term, in that preschool instructional quality is a positive predictor of language skills at the end of the *kindergarten* year (Burchinal et al., 2008). These associations are not surprising in light of social-interactionist theory, as the interactions that characterize IS (i.e., scaffolded verbal interactions that introduce and integrate concepts) are proximal to children's language development.

Although the role of classroom-level IS in children's language development is well established, the relationship between sociorelational classroom supports and young children's language development is less clear. Researchers who have measured the quality of affective interactions in the classroom have demonstrated links to children's social and behavioral outcomes but have often failed to find these same associations with children's academic development (including language development; Burchinal et al., 2008; Hamre & Pianta, 2005; Howes et al., 2008). Nevertheless, models of high-quality preschool experiences point to the importance of positive affective interactions to young children's academic development, including their language development (Pianta, 1999). Perhaps one reason that prior research has not always demonstrated a link between positive affective interactions and language development is that affective interactions have often been measured at the classroom level, which may not sufficiently characterize the nature of individual teacher–child interactions that provide opportunities to facilitate language development. It may be that measurement at the child level is more sensitive to individual teacher–child interactions that potentially offer the finely tuned, supportive verbal interactions that scaffold language development. When measured at the child level, affectively supportive interactions have often been quantified by assessing the quality of the relationship between the teacher and individual children, or RS. RS is thought to be critical to children's development across many domains of learning because it provides a secure base for children, thus fostering their sense of security and promoting their ability to explore and engage in the classroom environment (Ainsworth & Bell, 1974; Bus & van IJzendoorn, 1988; Pianta, Nimetz, & Bennett, 1997). Research has established the importance of RS for children's sociobehavioral

development (Birch & Ladd, 1998; Meehan, Hughes, & Cavell, 2003; Pianta & Steinberg, 1992; Pianta, Steinberg, & Rollins, 1995). In addition, the intertwining of preschool children's social and language development points toward the importance of examining cross-domain links between sociorelational classroom supports and children's language development (Downer, Sabol, & Hamre, 2010; Fujiki, Brinton, Morgan, & Hart, 1999; Zins, Bloodworth, Weissberg, & Walberg, 2004). The theoretical importance of RS to children's language becomes more apparent when one considers that children acquire language primarily through interactions with skilled conversational partners (i.e., social-interactionist theory), and the nature of these interactions is necessarily embedded in the broader context of the teacher–child relationship. High-quality teacher–child relationships, then, can be viewed as child-level affective supports in which adult responsiveness and warmth provide a context for children to engage in the verbal interactions that develop language skills.

It is important to note that research seems to suggest that RS is not simply a background context for instructional influences on children's language learning. In fact, a number of studies have found direct, independent associations between RS and language development in preschool and beyond (Howes et al., 2008; Oades-Sese & Li, 2011; Peisner-Feinberg et al., 2001; Pianta, Nimetz, et al., 1997). For example, Howes and colleagues (2008) examined a group of 2,800 at-risk preschoolers and found RS to be significantly predictive of children's gains in teacher-rated language and literacy skills (measured together; $d = 0.13$) and directly assessed expressive language skills when fall language skills were controlled ($d = 0.06$). In another study, Peisner-Feinberg et al. (2001) followed 733 children longitudinally and found that those with closer relationships with their preschool teachers tended to have better receptive language skills through kindergarten ($d = 0.10$ in preschool, $d = 0.08$ in kindergarten). These studies show that high-quality RS in preschool contributes directly to children's language development and thus is an important support within the preschool classroom. Although significant, these few studies showed fairly weak associations between RS and language development, perhaps owing to the somewhat constrained measures of language used (e.g., vocabulary knowledge, sentence completion), or potentially because the relationship was not consistent across all children in the sample. Thus, in our study we seek to more fully understand this relationship between RS and language development found in previous studies by looking at a more elaborated language measure (i.e., oral language use as assessed through a narrative storytelling task) as well as to consider how this relationship may vary for children of varying language ability.

CLASSROOM SUPPORTS AND CHILDREN WITH LOW LANGUAGE

Research increasingly suggests that the benefit of classroom supports for children's development may vary as a function of children's own characteristics, a phenomenon that has been revealed by examining Child × Instruction interactions (Connor, Morrison, & Katch, 2004; Connor, Morrison, & Petrella, 2004; Juel & Minden-Cupp, 2000; Rutter & Maughan, 2002). Said another way, Child × Instruction interactions suggest that the effects of classroom experiences vary depending on children's initial skill level, such that children's own abilities determine in part what they are able to glean from these experiences. Understanding whether children may benefit differently from classroom supports has both practical and theoretical implications for

the investigation and allocation of preschool resources, because supports that benefit one child may not benefit another. Many previous studies have focused on a fairly narrow aspect of the preschool environment—primarily instructional interventions—and their interactions with child characteristics and have found support for complex relationships between instruction and children's development (Al Otaiba & Fuchs, 2002; Connor, Morrison, & Katch, 2004; Connor, Morrison, & Petrella, 2004; Connor et al., 2009; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Juel & Minden-Cupp, 2000; McGinty & Justice, 2009; McGinty, Justice, Piasta, Kaderavek, & Fan, 2011). For example, Connor, Morrison, and Slominski (2006) investigated literacy development in preschoolers and found complex relationships between children's language skills and their response to literacy instruction, suggesting that classroom supports do not function the same for all children. Investigators have also examined global classroom supports, such as RS and IS, and found indications that these supports may differentially benefit children's academic and social development depending on children's own characteristics (e.g., Hamre & Pianta, 2001, 2005). For example, Baker (2006) examined the association between RS and social and academic development in elementary-age children and reported that a positive teacher–child relationship acted as a protective factor for children with behavioral difficulties in terms of both types of outcomes. However, researchers to date have not examined specifically whether preschool children benefit differently from classroom supports depending on their *language skills,* although it makes theoretical sense that strengths and weaknesses in this domain may interact with IS and RS in the preschool classroom. It is important to note that both IS and RS are dependent upon interactions between the teacher and the child, and these interactions in the preschool classroom are likely verbally mediated. It is through these verbal interactions with children that teachers may model and reinforce more advanced linguistic structures and thus influence the language development of children. Verbal interactions by their very nature are bidirectional; thus, children's own language skills may be a particularly important influence on the quality of the verbal interactions that make up IS and RS in the classroom and thus potentially the extent to which children benefit from these classroom supports. Therefore, we are particularly interested in whether the strength of the association between classroom supports and children's language development depends upon children's own initial language skills.

The current study contributes to the limited research base concerning the complex relationships between global classroom supports and language development by addressing two research aims. The first research aim is to determine the unique association between two types of classroom supports that occur on different levels, namely child-level RS and classroom-level IS, and preschoolers' language development. We expected that classroom supports would relate positively to children's language development, with stronger associations for IS than RS. The second research aim is to determine whether the association between classroom supports and language skill is moderated by children's initial language ability. This second aim expands previous research in an important way by examining whether classroom supports may be particularly protective for children who begin preschool with low language skills and are at risk for difficulty acquiring literacy. Given the lack of previous research bearing directly on this aim, we do not offer specific hypotheses but expect that the relationship between classroom supports and language development will vary depending on children's initial language skills, based on a broader literature and our social-interactionist perspective on language development.

METHOD

Participants

Participants in the current study were preschool children ($n = 360$) and their teachers ($n = 95$) drawn from 95 classrooms aimed at serving at-risk children in 21 districts in a single state during the 2005–2006 school year. This sample was taken from the second cohort of a 2-year study examining the effects of online teacher professional development aimed at improving teacher–child interactions in preschool classrooms (Pianta, Mashburn, Downer, Hamre, & Justice, 2008). In the larger study, teachers were randomly assigned to one of three conditions: (a) access to language and literacy curricula; (b) access to language and literacy curricula plus online videos of high-quality teaching; and (c) access to language and literacy curricula, online video access, and Web-mediated consultation with a teaching mentor. The current study was not designed to evaluate differences in children's outcomes in relation to condition in the parent study but rather to investigate the effect of supports present across all classrooms on children's development. Therefore, in the current study, children and teachers in the second and third conditions of the parent study were combined in order to allow us to increase the number of teachers and children available for study (data reflecting IS in classrooms in the first condition were not collected, so these classrooms were excluded). Study condition was controlled in all analyses to ensure that associations were not confounded with condition in the parent study, as the intervention in the parent study has been demonstrated to impact teacher–child interactions (Pianta, Mashburn, et al., 2008).

Children eligible for participation in the larger study came from classrooms that received state funding and prioritized enrollment for children who exhibited some combination and degree of the following risk factors, as specified by state guidelines: (a) poverty; (b) homelessness; (c) parents or guardians are school dropouts, have limited education, or are chronically ill; (d) family stress as evidenced by poverty, episodes of violence, crime, underemployment, unemployment, homelessness, incarceration, or family instability; (e) developmental problems; or (f) limited English proficiency. Within each classroom, approximately four children (range = 1–5) were chosen from a pool of consented and eligible children. Children were considered eligible if they met classroom eligibility criteria based on sociodemographic risk, if a consent form was received within the designated recruitment period, if they were eligible for kindergarten enrollment the following year, and if their teacher indicated on a survey that the child could follow simple directions in English.

Teachers included in this study were those who had submitted at least three videos of classroom instructional activities ($M = 7$, range = 3–11) from which the IS measure was derived. Participating teachers were all lead teachers in state-funded preschool classrooms in which the state program targeted enrollment for children based on sociodemographic risk. Teachers had on average 15 years of experience teaching (range = 0–37) and were mostly female (96%). In accordance with program requirements, all teachers had at least a bachelor's degree, 33% had an advanced degree, and 36% had a degree in early childhood education. The majority of classrooms (63%) implemented the HighScope preschool curriculum, 13% were using Creative Curriculum, 5% relied on locally-developed curricula, 2% reported using no curriculum, and the remainder used a variety of other curricula. Classrooms mainly provided full-day preschool programming ($n = 85$); only two programs were half-day programs (data were missing for eight classrooms).

The 360 children enrolled in the present study completed the spring language assessment and had teachers who submitted at least three videotapes of instructional activities across the school year. Children had a mean age of 4 years, 5 months; half were boys (51%). A total of 45% of the children were Black (28% White, 12% Hispanic, 7% multiracial, 6% Asian, and 3% other) and the majority came from poor households (70% had an income-to-needs ratio of 1.5 or below). Of the mothers, 16% did not graduate from high school, 24% had a high school diploma, 46% had some post-high school experience or an associate's degree, and 14% had a bachelor's or advanced degree. In regard to language usage, the majority of children (79%) spoke only English at home, whereas 21% of children spoke a language instead of or in addition to English.

Procedures

Recruitment into the current study occurred in one mid-Atlantic state. Letters were sent to district-level coordinators in districts housing more than one state-funded preschool program. Interested coordinators agreed to contact preschool teachers within their districts regarding study participation. Letters containing study details were mailed to interested teachers, a subset of whom then volunteered and consented to participate in the study. Parental consent letters were mailed to the households of all children in participating classrooms. In each classroom, four to five children were randomly selected to participate from among all children who returned consent letters within 1 week and who met eligibility criteria (detailed in ''Participants'') for study participation.

Study personnel conducted onsite trainings prior to the start of the school year in which they instructed teachers in how to videotape instructional activities and assess children's oral language skills. Throughout the school year, teachers videotaped classroom instructional activities (i.e., the implementation of activities designed to promote language and literacy or socioemotional development) and submitted these videotapes to study personnel, who coded them for IS. Teachers were trained in how to set up and operate a video camera and were given standardized protocols for taping that asked them to begin recording a few minutes before a whole- or small-group instructional activity and to continue recording for at least 30 min. Teachers also followed standardized study protocol to assess children's oral language skills in the fall and spring of the preschool year. Language assessments were conducted in quiet areas of the classroom where teachers videotaped children telling a story related to a wordless storybook. Teachers mailed assessment videotapes to the research lab for coding by study personnel. The majority of the language assessment video data were judged to be of good quality, in that teachers adhered to the assessment protocol and children were audible (as rated on a Likert-type scale by study personnel). In addition, in the fall of the preschool year teachers completed a questionnaire on their relationship with each of the children selected from their classrooms as part of a larger set of questionnaires.

Measures

Language skills.   Children's language skills were examined using the Narrative Assessment Protocol-Short Form (NAP-SF), a tool designed to assess children's oral language skills in the context of a narrative storytelling (Justice, Bowles, Pence, & Gosse, 2010). The NAP-SF

measures skills in the domain of narrative microstructure, or the grammatical structures used to accomplish a storytelling task (Justice, Bowles, Kaderavek et al., 2006). The NAP-SF is composed of 12 items that fall within five domains of narrative microstructure (i.e., sentence structure, phrase structure, modifiers, nouns, and verbs). Children earn up to 3 points for each indicator; total points earned are added to yield a NAP-SF sum score (range = 0–36). Assessors adhere to a protocol designed to elicit children's oral narratives by asking them to tell a fictional narrative describing the events of the wordless picture book *Frog, Where Are You?* (Mayer, 1969). Specifically, assessors provide children with a copy of the book and instruct them to preview its pictures. Then children are asked to tell a story that corresponds to the pictures in the book. Assessors are restricted from prompting children or expanding children's utterances during the narrative storytelling. Finally, assessors give children an opportunity to add any additional details to their stories before ending the assessment (Justice et al., 2010).

Narrative storytelling relies in part on children's abilities to integrate morphological, semantic, and syntactic structures to accomplish an ecologically valid goal (Liles, 1993). Thus, spoken narratives reflect children's broad understanding of the linguistic system and reveal strengths and weaknesses in multiple domains of language. It is important to note that narrative skill distinguishes preschool children with strong oral language skills from those with low language (Boudreau & Hedberg, 1999; Kaderavek & Sulzby, 2000; Paul, Hernandez, Taylor, & Johnson, 1996; Paul & Smith, 1993) and has been identified as a key component of emergent literacy (Whitehurst & Lonigan, 1998). According to previous work, children's scores on the NAP-SF exhibit concurrent and predictive relations to scores on a standardized measure of general language ability (Justice et al., 2010). In addition, children with low language abilities and those who qualify for special education services have been found to score significantly lower on the NAP-SF than their typical peers.

Interrater reliability of the NAP-SF was evaluated in the current study by randomly selecting and double-coding 20% of all narratives. Intraclass correlation coefficients (ICCs) were calculated for the overall NAP-SF sum score. ICCs are used to assess the consistency between ratings when neither rating is considered correct (Müller & Büttner, 1994). The ICC for the NAP-SF sum score was 0.77, which indicates strong reliability. ICCs can be interpreted similarly to Pearson's r in that they approach 1 when ratings strongly resemble each other. In accordance with guidelines set out by Shrout and Fleiss (1979), we considered ICCs greater than .75 to be excellent, .40 to .75 to be fair to good, and less than .40 to be poor.

IS.   IS was measured using the Classroom Assessment Scoring System Pre-K (CLASS Pre-K; Pianta, LaParo, et al., 2008), an observational tool designed to characterize the quality of teacher–child interactions in preschool classrooms. The CLASS Pre-K assesses classroom-based interactions in three domains: Emotional Support, Classroom Organization, and IS. Prior work has shown this measure to be a valid tool for rating preschool classroom quality, as higher CLASS Pre-K scores have been shown to predict greater growth in children's academic skills (Howes et al., 2008; Mashburn et al., 2008). The current study focused only on the IS subscale of the CLASS Pre-K in all analyses. The IS subscale of the CLASS Pre-K comprises three dimensions that reflect the way in which teachers implement curricula in their classroom: (a) Concept Development, which refers to how teachers develop students' higher order thinking and comprehension during instructional activities; (b) Quality of Feedback, or the degree to which teachers engage children in feedback loops that build understanding and prompt further

participation; and (c) Language Modeling, which captures the quality and quantity of language-enriching exchanges facilitated by the teacher.

CLASS Pre-K-reliable coders viewed each 30-min instructional activity videotape that teachers submitted (range = 3–11) and rated the dimensions making up CLASS Pre-K IS along a 7-point scale where lower ratings corresponded to lower quality IS. Scores for each dimension of IS were averaged together to obtain IS domain scores (range = 1–7), which were averaged across the school year to reflect the typical quality of each classroom. Each coder considered reliable achieved 80% agreement (within 1 scale point) with five master-coded videotapes on each dimension of the CLASS Pre-K and was reliable within 1 scale point per dimension on at least two out of five master-coded tapes.

RS. RS was assessed using the short form of the Student–Teacher Relationship Scale (Pianta, 1992), a 15-item rating scale that captures teachers' perceptions of their relationships with their students along two dimensions. The dimension of Closeness (7 items) describes the extent to which the student–teacher relationship is characterized by feelings of warmth and support (e.g., ''When I praise this child, he/she beams with pride,'' ''I share an affectionate, warm relationship with this child''). The dimension of Conflict (8 items) reflects the degree to which the student–teacher relationship is characterized by discordant and antagonistic interactions (e.g., ''This child is sneaky or manipulative with me,'' ''This child easily becomes angry with me''). Teachers rated how well each statement described their relationship with a particular child on a Likert-type scale that ranged from 1 (*definitely does not apply*) to 5 (*definitely applies*). Ratings were averaged within each dimension to obtain a Closeness and Conflict subscore. Both scales demonstrated good internal consistency (Closeness, $\alpha = 0.86$; Conflict, $\alpha = 0.86$). The predictive and concurrent validity of the Student–Teacher Relationship Scale has been demonstrated by studies linking children's early relationships with their teachers (as measured by this instrument) to their later academic and behavioral outcomes (Birch & Ladd, 1998; Hamre & Pianta, 2001; Pianta et al., 1995).

Control variables. Upon enrolling their children in the study, parents completed a demographics survey that requested information regarding the mother's level of education; the child's age, race, and sex; and the primary language spoken in the home. Children's literacy skills, which have been demonstrated to have a reciprocal effect on their language development (i.e., the Matthew effect; Stanovich, 1986), and their socioeconomic backgrounds were included as control variables to account for the known relationships between these factors and language development. Control variables included (a) age; (b) maternal education; (c) race; (d) sex; (e) whether English was spoken in the child's home; (f) a fall literacy skills composite score, composed of subtests measuring children's sound and print knowledge (Alphabet Knowledge—Uppercase, Beginning Sound Awareness, Rhyme Awareness, Print and Word Awareness) from the Phonological Awareness Literacy Screening PreK (Invernizzi, Sullivan, Meier, & Swank, 2004) and the Preschool Comprehensive Test of Phonological and Print Processing (Blending Words and Elision; Glass, Peckham, & Sanders, 1972; Lonigan, Wagner, Torgesen, & Rashotte, 2002), that were standardized and averaged together; (g) fall NAP-SF scores; and (h) condition in the parent study.

Analytic Approach

Variables were first examined for accuracy of input, reasonable means and standard deviations, lack of normality, and univariate outliers. All variables appeared to have plausible values, and

assumptions generally appeared to be met; no univariate outliers were detected. The distribution for RS–Conflict was positively kurtotic (kurtosis = 2.45), indicating that teachers largely rated their relationships with students as low in conflict. However, linear regression is robust to assumptions of normality (Glass et al., 1972; Ito, 1980). Missing data were examined and found to represent a small percentage of variables (i.e., 6% of data points were missing across all variables and participants). We used multiple imputation to estimate missing values in final models (Acock, 2005; Schafer & Graham, 2002). Multiple imputation is used when data are assumed to be missing at random, meaning that the pattern of missingness is explained by variables in the model or other measured variables termed *auxiliary variables*. The identification of model and auxiliary variables that are significantly related to missingness provided support for this assumption. Thus, we used the missing value analysis procedure (SPSS Version 19) to identify variables from the parent data set that were significantly related to the missingness of model variables (i.e., auxiliary variables). Auxiliary variables and model variables were entered into the PROC MI statement of SAS Version 9.2 to generate 10 complete data sets that were used in all models and combined in reported estimates (PROC MIANALYZE; SAS Version 9.2).

To account for the fact that child-level data in this study were not independent observations (i.e., children were nested in classrooms), we used multilevel modeling techniques. Multilevel modeling permits partitioning of the variance attributable to children and classrooms, thus allowing for a more precise estimation of standard errors and controlling the possibility of inflated Type I error rates (Raudenbush & Bryk, 2002). Initially, three-level models were built to evaluate between-district variance where children were nested within teachers and teachers were nested within districts. Estimates of between-district variance in children's language development across the preschool year were not different from zero. Thus, all relations were estimated using two-level hierarchical linear models (PROC MIXED; SAS Version 9.2), where Level 1 estimated the variability between children's scores (within classrooms) and Level 2 estimated the variability between classrooms (Singer, 1998). Child-level covariates (including language skills pretest) and RS (Closeness and Conflict) were modeled at Level 1; IS and condition in the parent study were modeled in Level 2.

RESULTS

Descriptive statistics based on unimputed data for child- and classroom-level study variables are presented in Table 1, and correlations for child-level variables are reported in Table 2. Children's spring NAP scores were moderately correlated with their fall NAP scores ($r = .43$, $p < .001$), which were regressed on children's spring NAP scores in all models. Children's fall language skills were positively associated with teachers' ratings of RS–Closeness ($r = .18$, $p < .001$) and negatively associated with teachers' ratings of RS–Conflict ($r = -.04$, $p < .05$).

Before we built models to evaluate the two main research questions, an unconditional baseline model without predictor variables was analyzed to determine the proportion of variance in oral language skills accounted for by the classroom unit. Unconditional models indicated that 6% of the variance in children's oral language skills was attributable to the classroom level.

The first research aim was to determine the unique contribution of classroom supports (RS, IS) to children's language development (i.e., spring NAP scores when fall scores were controlled for). A two-level main effects regression model was built that controlled for demographic

TABLE 1
Descriptive Information for Study Variables

Variable	M	SD
Age (years)	4.4	0.3
Maternal education (years)	12.8	2.1
Alphabet Knowledge[a,b]	9.8	9.3
Beginning Sound Awareness[a,b]	4.7	3.4
Print and Word Awareness[a,b]	5.3	2.3
Rhyme Awareness[a,b]	4.8	2.4
Blending Words[a,c]	14.8	3.0
Elision[a,c]	10.2	3.3
Fall NAP scores	15.6	7.3
Spring NAP scores	19.5	6.7
Closeness	4.3	0.6
Conflict	1.6	0.8
Instructional support	3.1	0.5

	n	%
English spoken in home		
Yes	303	84
No	57	16
Race/ethnicity		
White	96	27
African American	157	43
Other	107	30
Sex		
Male	176	49
Female	184	51

Note. Alphabet Knowledge and Beginning Sound Awareness, range = 0–26; Print and Word Awareness and Rhyme Awareness, range = 0–10; Blending Words, range = 1–21; Elision, range = 1–18. NAP = Narrative Assessment Protocol.

[a]Subtest of literacy skills standard score.
[b]Phonological Awareness Literacy Screening PreK.
[c]Preschool Comprehensive Test of Phonological and Print Processing.

TABLE 2
Correlations of Child-Level Study Variables

Measure	1	2	3	4	5	6
1. Age	—	–0.11**	0.10**	0.03	0.04*	0.03
2. Maternal education		—	0.11**	0.25**	0.11**	–0.08**
3. Fall NAP scores			—	0.43**	0.18**	–0.04*
4. Spring NAP scores				—	0.20**	–0.06*
5. Relational support–Closeness					—	–0.28**
6. Relational support–Conflict						—

Note. n = 360 children in 95 classrooms. NAP = Narrative Assessment Protocol.
*p < .05. **p < .001.

characteristics (i.e., age, maternal education, race, sex, and whether English was spoken at home), literacy skills, study condition, and fall language scores (see Table 3). This model demonstrated that IS was a significant predictor of language skills when RS was already considered in the classroom ($B = 1.33$, $SE = .62$, $p = .03$). In contrast, neither RS–Closeness ($B = 0.88$, $SE = .52$, $p = .09$) nor RS–Conflict ($B = 0.34$, $SE = .42$, $p = .42$) was uniquely associated with language development when IS was taken into account. The main effects model explained 23% of the within-classroom variability and all of the between-classroom variability in children's language development, a small fraction of the total variance in children's language development. To gauge the magnitude of the relationship between IS and language development (i.e., the effect size), we calculated standardized coefficients by dividing the product of the coefficient for classroom support and its standard deviation by the outcome's standard deviation (Mashburn, Justice, Downer, & Pianta, 2009; NICHD Early Child Care Research Network & Duncan, 2003). Standardized coefficients can be interpreted as effect sizes because they permit comparison of the relative magnitude of predictors' associations with outcomes in that they are based on the same unit of measure (1 SD) regardless of the predictor's original unit of measure. The effect of IS on language development (effect size = 0.10) was two thirds the size of the effect of maternal education on language development (effect size = 0.15) and approximately one third the magnitude of fall language skills on spring language skills (effect size = 0.35).

The second research aim was to determine whether the relationship between IS and RS and children's language development was moderated by children's initial language skills (i.e., fall NAP scores). For the purposes of evaluating this question, three additional models were built

TABLE 3
Multilevel Model Results for Classroom Supports Predicting Children's Language Skill Development

Variable	Coefficient	SE	p
Language skills intercept (β_{0j})	18.00	1.42	<.001
Child-level variables			
Age (β_{1j})	−0.58	1.05	.58
Maternal education (β_{2j})	0.48	0.16	.004
Race (β_{3j})	−0.59	0.45	.19
Sex (β_{4j})	−1.32	0.62	.03
English (β_{5j})	1.76	1.08	.10
Literacy skills (β_{6j})	1.55	0.49	.002
Fall NAP scores (β_{7j})	0.32	0.05	<.001
RS–Closeness (β_{8j})	0.88	0.52	.09
RS–Conflict (β_{9j})	0.34	0.42	.42
Teacher-level variables			
Instructional support (λ_{02})	1.33	0.62	.03
Condition (λ_{03})	1.47	0.65	.02
Interactions			
Language × Instructional Support	0.06	0.03	.04
Language × RS–Closeness	−0.15	0.08	.04
Language × RS–Conflict	0.03	0.05	.52

Note. $n = 360$ children in 95 classrooms. NAP = Narrative Assessment Protocol; RS = relational support.

in which interaction terms (Language × IS, Language × RS–Closeness, and Language × RS–Conflict) were added separately to the main effects model (also shown in Table 3). Results from the first model, which evaluated the Language × IS interaction, revealed that the interaction term made a unique contribution to children's language skill development, even after RS was accounted for ($B = 0.06$, $SE = .03$, $p = .04$). This model explained 24% of the between-child variance in spring language scores, a 1% increase over the main effects model. The second model, testing the Language × RS–Closeness interaction, revealed a unique contribution of the interaction above and beyond IS ($B = -0.15$, $SE = .08$, $p = .04$) and explained 24% of the between-child variance in spring language scores, or 1% more variance than the main effects model. The final model, evaluating the Language × RS–Conflict interaction term, failed to achieve statistical significance ($B = 0.03$, $SE = .05$, $p = .52$).

The two significant interactions (Language × IS, Language × RS–Closeness) were further explored by plotting children's spring language scores for children with low, average, and high language skills when the quality of classroom supports was relatively low, average, or high. Using the sample means and standard deviations for IS, RS–Closeness, and the spring NAP-SF, we divided children and classrooms with relatively low (≤ -1 SD from the mean), average (> -1 SD and < 1 SD from the mean), and high (≥ 1 SD from the mean) scores into groups. As can be seen in Figure 1, children with low language (i.e., those who scored ≤ -1 SD from the sample mean on the spring NAP-SF) did not appear to benefit differentially from relatively low versus high levels of IS. However, children with high initial language ability who were in classrooms with relatively high IS had stronger spring language skills than their peers who were experiencing lower quality IS. A different pattern of results vis-à-vis children with low language was revealed from the test of the Language × RS–Closeness interaction term (see Figure 2). Children with low initial language ability who had relatively close relationships with their teachers had higher spring language scores compared to children with similar language abilities but less close relationships. Closer relationships with teachers did not appear to benefit the language skill development of children with high initial language abilities.
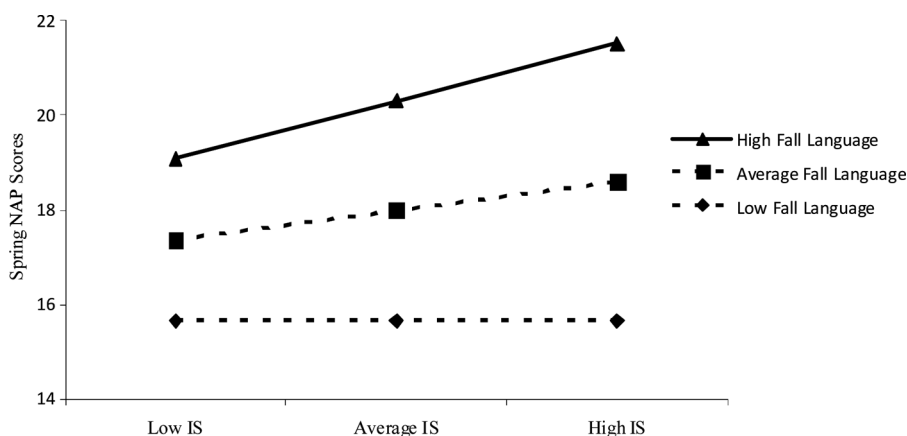

FIGURE 1 Children's initial language skill moderates the effect of instructional support (IS) on language development. NAP = Narrative Assessment Protocol.
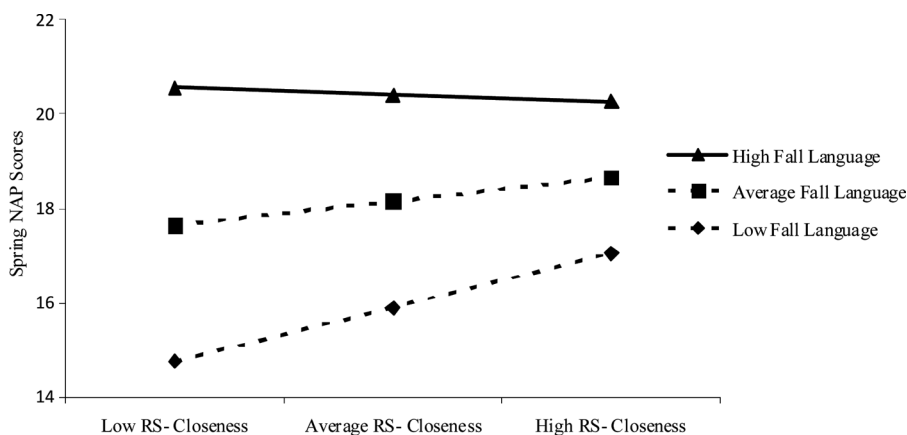
FIGURE 2 Children's initial language skill moderates the effect of RS–Closeness on language development. NAP = Narrative Assessment Protocol; RS = relational support.

DISCUSSION

The purpose of this investigation was to examine the extent to which IS and RS are associated with preschool children's language development and whether this association varies with children's initial language abilities. Results indicated that IS but not RS accounted for a significant portion of the variance in children's language skills. However, both IS and RS interacted with children's language skills to predict language development across time. Our study adds to a growing body of research investigating whether children might differentially benefit from classroom environments depending on particular child characteristics (Ladd, 2003). Results from this study have the potential to inform researchers and educators aiming to promote language growth for children with poor language skills who are at risk for difficulty acquiring literacy.

Our first finding, that IS accounted for a significant portion of the variance in children's language development, is consistent with our hypothesis and previous research linking high-quality instructional interactions to children's language skills (Burchinal et al., 2008, 2010; Curby et al., 2009; Howes et al., 2008; Mashburn et al., 2008). Classrooms that provide high-quality IS have teachers who introduce concepts appropriate for children's skill levels and provide individualized, supportive feedback that promotes learning and the integration of new ideas (Pianta, LaParo, et al., 2008). Theoretically speaking, children who experience such instruction are assisted in moving beyond their current level of development to acquire new skills, including language skills (Vygotsky, 1930/1978). The findings from our study add to existing research linking IS to more constrained measures of language development (e.g., Burchinal et al., 2008; Mashburn et al., 2008) by suggesting that the rich, targeted dialogue characteristic of high-quality IS also promotes the development of expressive language at the discourse level, which is not often examined in the literature. Expressive language skills are an important area of development because children's higher order thinking (e.g., reasoning, analysis, inference) is thought to be promoted (or inhibited) by their sentence- and text-level language skills (van Kleeck, 2008). In fact, prior research supports the idea that exposure to more cognitively

demanding language (an aspect of IS) is related to children's abilities to use such language themselves (Peterson & McCabe, 1994; van Kleeck, Gillam, Hamilton, & McGrath, 1997).

In addition to the main effect of IS, we expected and found evidence that a child characteristic (i.e., initial language skills) affected the extent to which children benefited from classroom supports. These results are consistent with a body of work in intervention research that attempts to identify which types of interventions work for which children and under what conditions (Ladd, 2003; Morrison & Connor, 2009). In our study, children who demonstrated stronger language skills at the beginning of the preschool year benefited more from high-quality IS than children with lower language skills. However, high-quality RS appeared to promote the language development of children with weaker initial language skills. In the remainder of the Discussion, we consider each of these interactions in turn.

Our first finding considering the role children's initial language skills was that higher quality IS was differentially beneficial for children with stronger language skills compared to children with relatively weak language skills. This finding can be interpreted to mean that IS in the study classrooms was most accessible to children with relatively high language skills. These results are consistent with a body of literature supporting the Matthew effect (i.e., the rich get richer and the poor get poorer; Stanovich, 1986), a pattern of development posited to account for differences in reading skill but also found in studies of language development (e.g., Cabell et al., 2011; Mashburn et al., 2009; Penno, 2002). Figure 1 illustrates how initial differences in language skill may lead to widening gaps over time and suggests the importance of classroom supports that operate across contexts and benefit the language development of children with relatively weak language skills. Social-interactionist theory offers a potential explanation for our finding that children with strong language skills benefited most from relatively high-quality IS. This theory would predict that children who experienced frequent, responsive verbal interactions would have developed language more quickly than those who did not (Chapman, 2000; Dickinson & McCabe, 1991). Perhaps teachers were more skilled at scaffolding conversations (an aspect of IS) with children with relatively high language skills, and consequently these children benefitted more from teacher–child interactions than children with weaker language skills. Indeed, during book-reading sessions, Head Start teachers have been shown to rely on language facilitation strategies more attuned to the language needs of children with stronger language skills. Pentimonti and Justice (2010) found that teachers were less adept at using verbal scaffolding strategies intended to increase access to instructional opportunities for children with weaker language skills. Teachers rarely offered the types of highly structured support (e.g., modeling the correct answer, having a peer assist) that have been shown to support struggling children. These findings may help explain why higher quality IS was not protective for children with lower language skills in our study. Perhaps teachers were not as skilled at tailoring their verbal interactions to meet the needs of children with weaker language skills, and thus this classroom support was not particularly beneficial for the language development of these children. In addition, the bidirectional nature of instructional interactions points to the importance of considering how the characteristics of the children may have influenced the degree to which they benefitted from IS. Although our data cannot fully test this interpretation, theory and previous empirical work suggest that children with low language skills provide their teachers with fewer opportunities for verbal engagement than children with stronger language skills (Hadley & Rice, 1991). The result of children with lower language skills participating in fewer verbal exchanges with their teachers could be reduced opportunities to develop expressive language skills.

Our second finding considering the role of children's initial language skills was that RS had a direct relation to children's language development, but only for those children whose initial language abilities were relatively weak. We interpret our unexpected lack of a main effect to be attributable in part to our finding that the effect of RS on children's language development was not consistent across all children in the sample. The role of RS as a classroom support became apparent only when we considered a specific child characteristic, namely language skill. It is important to note that the findings from this study are consistent with a view of the preschool classroom environment that is broader than the classroom-level instructional resources available and includes child-level RS as well. Previous work has also found differences in the way in which RS supports young children's development. Burchinal, Peisner-Feinberg, Pianta, and Howes (2002) measured teacher–child relationships and found RS to be particularly supportive for the language development of preschoolers considered at risk because of their ethnographic background. That is, a close relationship with their teacher appeared to facilitate the vocabulary development of preschool children at sociodemographic risk, suggesting that socio-relational processes in the classroom are particularly important for these children. These findings make sense, as closer teacher–child relationships provide an emotionally sensitive context in which children can engage in meaningful and extended verbal interactions, which may be particularly important for the development of children with low language. Returning to the idea of scaffolding, we can say that a strong relationship with a child may provide a facilitative context for a teacher to adjust language input to the individual child's particular needs. Children who engage in verbal interactions in which a skilled partner targets language at or just above the child's level of development receive attuned linguistic input theoretically and empirically linked to language growth (Landry, Miller-Loncar, Smith, & Swank, 2002; K. E. Smith et al., 2000; Vygotsky, 1930/1978). Our results speak to the general importance of differentiating instruction for children who arrive at school with varying degrees of language skills, considering our finding that children benefit differently from classroom supports. On the one hand, these results suggest that attention should be paid to fostering close relationships between teachers and children in teacher–child dyads in which children demonstrate weak oral language skills. On the other hand, the implication is that children with strong initial language skills may benefit most when exposed to classrooms offering high-quality IS. Our findings suggest that more attention be paid to understanding what makes up high-quality language support and to including teachers' abilities to meet children's various needs in that definition. In addition, findings related to RS suggest a broader consideration of classroom supports for language to go beyond a focus on instructional resources and include relational processes at the child level. Teacher training, education, and support designed to foster a close teacher–child relationship may promote the language development of children who begin preschool with language weaknesses, albeit indirectly. Indeed, prior research has established a positive relationship between language skill and the quality of the teacher–child relationship (Justice, Cottone, Mashburn, & Rimm-Kaufman, 2008), suggesting that higher quality RS may lead to increases in language skill.

LIMITATIONS AND FUTURE DIRECTIONS

Several limitations of this study are worth examining. First, the correlational design of our study allowed for tests of association, not causation. Causal interpretations regarding the influence of

classroom supports on language development could be made from future studies using experimental designs. Second, a standardized measure of children's language skills was not collected in this study, so it was not possible to report the average standardized language scores of participating children. Nevertheless, all children in the current study attended preschool classrooms targeting enrollment for children with sociodemographic risk, which was reflected in the demographics and maternal education of the sample. Children from such backgrounds have repeatedly been shown to be at risk for language difficulty and to score below their peers without sociodemographic risk factors on standardized language assessments (Duncan, Brooks-Gunn, & Klebanov, 1994; Fish & Pinkerman, 2003; Justice, Bowles, & Skibbe, 2006; J. R. Smith, Brooks-Gunn, & Klebanov, 1999). Third, our approach to measuring RS in the classroom was limited to obtaining the teacher's perspective of the teacher–child relationship. Teacher ratings do not exclusively reflect attributes of relationships with children; rather, the ratings reflect the teacher's perception of that relationship in combination with children's characteristics (Mashburn, Hamre, Downer, & Pianta, 2006). Nevertheless, teacher ratings are a widely used and efficient means of collecting information regarding children and do capture information related to children's characteristics, in addition to information pertaining to raters. Future research could include more comprehensive assessments of RS by including ratings from other adults and even the children themselves, as the bidirectional nature of relationships points toward the importance of including the child's perspective. Future investigations of RS that draw on both teachers' and children's knowledge of this relationship might yield a better characterization of RS in the classroom. Undertaking such an investigation would require careful consideration of methods of data collection, because oral language expression, which would likely be required for preschoolers to rate their relationship with their teacher, is a characteristic weakness of children with low language skills. Fourth, IS in the classrooms in our study may not have reached a level of quality sufficient for influencing the language development of children with relatively low language skills. Previous research indicates that although IS predicts language skills in general, it is a much stronger predictor when the instruction provided is of good quality (i.e., a score of >5 on CLASS Pre-K IS; Burchinal et al., 2010). Future investigations might attempt to recruit a sample of classrooms that provide certain levels of quality of IS, including good-quality IS. However, our findings reflect the quality of IS found in most preschool classrooms, which unfortunately can be described as low to low-moderate quality (LaParo, Pianta, & Stuhlman, 2004). Finally, this study provides just an initial examination of the relationships between classroom supports and children's language development; the reasons for these observed relationships were not able to be explored. One possibility is that RS and IS work together to support children with low language; perhaps classroom supports are most protective when children with low language experience both high-quality RS *and* high-quality IS. Another possibility is that high-quality classroom supports may help children develop the self-regulatory skills necessary for learning, including language learning. Considering that children with low language skills often have difficulties with these self-regulatory behaviors (McClelland, Morrison, & Holmes, 2000; Tomblin, Zhang, & Buckwalter, 2000), high-quality RS and IS may function as an important protective factor for these children by providing the regulatory support needed to access the verbal interactions that drive language development. We see this last point, in particular, as an important avenue for future research.

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